

## SAFETY DATA SHEET

SDS: 6403

### 6403 MONOLEC® R&O COMPRESSOR/TURBINE OIL

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

#### 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

**Product Identifier**

**Product Name** 6403 MONOLEC® R&O COMPRESSOR/TURBINE OIL

**Other means of identification**

**Synonyms** No information available

**Recommended use of the chemical and restrictions on use**

**Identified uses** Lubricant

**Uses advised against** Consumer use

**Details of the supplier of the safety data sheet**

**Manufacturer**

Lubrication Engineers Inc.  
300 Bailey Avenue  
Fort Worth, TX 76107  
USA  
(817) 916-3200

**Emergency Telephone Number**

CHEMTREC: +1-703-527-3887 (INTERNATIONAL)  
1-800-424-9300 (NORTH AMERICA)



SDS: 6403

## 6403 MONOLEC® R&O COMPRESSOR/TURBINE OIL

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

### 2. HAZARDS IDENTIFICATION

#### Classification

#### OSHA Regulatory Status

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

#### Label Elements

#### Emergency Overview

##### Signal Word

None

The product contains no substances which at their given concentration, are considered to be hazardous to health

**appearance** red

**Physical state** liquid

**Odor** Hydrocarbon-like

#### Precautionary Statements - Prevention

None.

#### Response

None.

#### Eyes

None.

#### Skin

None.

#### Inhalation

None.

#### Ingestion

None.

#### Fire

None.

#### Spill

None.

#### Storage

None.

#### Disposal

None.

#### Hazards not otherwise classified (HNOC)

None

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

The producer of "6403" declares that it contains less than 3% DMSO extractable material by IP-346

SDS: 6403

## 6403 MONOLEC® R&O COMPRESSOR/TURBINE OIL

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

### 4. FIRST AID MEASURES

#### First Aid Measures

<b>General Advice</b>	If symptoms develop move victim to fresh air. Show this safety data sheet to the doctor in attendance. Do not breathe dust/fume/gas/mist/vapors/spray.
<b>Eye Contact</b>	Rinse thoroughly with plenty of water, also under the eyelids. Keep eye wide open while rinsing.
<b>Skin Contact</b>	Consult a physician if necessary. Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes.
<b>Inhalation</b>	Move to fresh air. Consult a physician. If not breathing, give artificial respiration.
<b>Ingestion</b>	May cause adverse kidney effects. Drink plenty of water. Do NOT induce vomiting.
<b>Protection of First-aiders</b>	Use personal protective equipment.

#### Most important symptoms and effects, both acute and delayed

**Symptoms** None known.

#### Indication of any immediate medical attention and special treatment needed

**Notes to Physician** Treat symptomatically.

### 5. FIRE-FIGHTING MEASURES

<b>Flash Point</b>	223 °C / 435 °F
<b>Suitable Extinguishing Media</b>	Water spray, Carbon dioxide (CO2), Foam, Dry chemical
<b>Unsuitable Extinguishing Media</b>	Do not use a solid water stream as it may scatter and spread fire.
<b>Specific Hazards Arising from the Chemical</b>	Thermal decomposition can lead to release of irritating gases and vapors.
<b>Explosion Data</b>	
<b>Sensitivity to Mechanical Impact</b>	Not impact sensitive.
<b>Sensitivity to Static Discharge</b>	May be ignited by friction, heat, sparks or flames.
<b>Protective Equipment and Precautions for Firefighters</b>	Wear self-contained breathing apparatus and protective suit.

NFPA

Health hazard 1

Flammability 1

Instability 1

### 6. ACCIDENTAL RELEASE MEASURES

#### Personal precautions, protective equipment and emergency procedures

SDS: 6403

## 6403 MONOLEC® R&O COMPRESSOR/TURBINE OIL

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

**Personal Precautions** Do not touch or walk through spilled material. Remove all sources of ignition.

### Environmental Precautions

**Environmental Precautions** Prevent entry into waterways, sewers, basements or confined areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.

### Methods and material for containment and cleaning up

**Methods for Containment** Prevent further leakage or spillage if safe to do so. Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container.

**Methods for Cleaning up** Use personal protective equipment. Dam up. Take up mechanically and collect in suitable container for disposal. Clean contaminated surface thoroughly.

## 7. HANDLING AND STORAGE

### Precautions for safe handling

**Advice on safe handling** Avoid contact with skin, eyes and clothing. Wear personal protective equipment. Prevent vapor buildup by providing adequate ventilation during and after use. Do not eat, drink or smoke when using this product.

### Conditions for safe storage, including any incompatibilities

**Technical measures/Storage conditions** Keep container tightly closed in a dry and well-ventilated place. Keep out of the reach of children.

**Incompatible products.** Strong oxidizing agents. Strong acids. Strong bases.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Control parameters

#### Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
White Mineral Oil 8042-47-5	TWA: 5 mg/m <sup>3</sup>	TWA: 5 mg/m <sup>3</sup> (vacated) TWA: 5 mg/m <sup>3</sup>	IDLH: 2500 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup> STEL: 10 mg/m <sup>3</sup>
Calcium Sulfate 7778-18-9	TWA: 10 mg/m <sup>3</sup>	TWA: 15 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup> (vacated) TWA: 15 mg/m <sup>3</sup> (vacated) TWA: 5 mg/m <sup>3</sup>	TWA: 10 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup>
Ethyl acrylate 140-88-5	STEL: 15 ppm TWA: 5 ppm	TWA: 25 ppm TWA: 100 mg/m <sup>3</sup> (vacated) TWA: 5 ppm (vacated) TWA: 20 mg/m <sup>3</sup> (vacated) STEL: 25 ppm (vacated) STEL: 100 mg/m <sup>3</sup> (vacated) S* S*	IDLH: 300 ppm
Diphenylamine 122-39-4	TWA: 10 mg/m <sup>3</sup>	(vacated) TWA: 10 mg/m <sup>3</sup>	TWA: 10 mg/m <sup>3</sup>

SDS: 6403

## 6403 MONOLEC® R&O COMPRESSOR/TURBINE OIL

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

### Appropriate engineering controls

**Engineering Measures**                      Showers  
    Eyewash stations  
    Ventilation systems.

### Individual protection measures, such as personal protective equipment

<b>Eye/Face Protection</b>	Tightly fitting safety goggles.
<b>Skin and Body Protection</b>	Long sleeved clothing. Protective gloves.
<b>Respiratory Protection</b>	No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.
<b>Hygiene Measures</b>	Handle in accordance with good industrial hygiene and safety practice.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### 9.1. Information on basic physical and chemical properties

<b>Physical state</b>	liquid
<b>appearance</b>	red
<b>Odor</b>	Hydrocarbon-like
<b>Odor threshold</b>	No information available

#### Property

#### Property

<b>pH</b>	6 - 8
<b>Melting point/freezing point</b>	No data available
<b>Boiling Point/Range</b>	no data available
<b>Flash Point</b>	223 °C / 435 °F
<b>Vapor pressure</b>	No data available
<b>Vapor Density</b>	< 1 ( Air = 1 )
<b>Specific Gravity</b>	0.87
<b>Water solubility</b>	negligible
<b>Partition Coefficient: n-octanol/water</b>	no data available
<b>Autoignition Temperature</b>	No data available
<b>Decomposition Temperature</b>	No data available
<b>Viscosity, kinematic</b>	67.60 cSt @ 40°C

## 10. STABILITY AND REACTIVITY

**reactivity**                                      No information available

**Chemical stability**                              Stable under recommended storage conditions.

**Possibility of Hazardous Reactions**      None under normal processing.

**Conditions to Avoid**                              Heat, flames and sparks. Contact with other chemicals

**Incompatible Materials**                              Strong oxidizing agents. Strong acids. Strong bases.

SDS: 6403

## 6403 MONOLEC® R&O COMPRESSOR/TURBINE OIL

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

Hazardous Decomposition Products Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke)

### 11. TOXICOLOGICAL INFORMATION

#### Information on likely routes of exposure

<b>Product Information</b>	Product does not present an acute toxicity hazard based on known or supplied information
<b>Inhalation</b>	May cause irritation of respiratory tract.
<b>Eye Contact</b>	Contact with eyes may cause irritation.
<b>Skin Contact</b>	May cause irritation.
<b>Ingestion</b>	There is no data available for this product.

Component Information No information available

#### Information on toxicological effects

**Symptoms** No information available.

#### Delayed and immediate effects as well as chronic effects from short and long-term exposure

The producer of "6403" declares that it contains less than 3% DMSO extractable material by IP-346

**Sensitization** No information available.

**Mutagenic Effects** No information available.

**Carcinogenicity** No information available.

**Reproductive toxicity** No information available.

**Target Organ Effects** Respiratory system, Eyes, Skin.

#### Numerical measures of toxicity - Product Information

The following values are calculated based on chapter 3.1 of the GHS document .

ATEmix (oral)	4529 mg/kg
ATEmix (dermal)	5436 mg/kg

### 12. ECOLOGICAL INFORMATION

Ecotoxicity No information available



SDS: 6403

# 6403 MONOLEC® R&O COMPRESSOR/TURBINE OIL

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

**Persistence and Degradability** No information available.

**Bioaccumulation**

**Mobility** The product is insoluble and floats on water.

Chemical Name	Log Pow
White Mineral Oil 8042-47-5	>6
2-Ethylhexyl acrylate 103-11-7	4.64
Ethyl acrylate 140-88-5	1.18
Diphenylamine 122-39-4	3.5

**Other Adverse Effects** No information available

## 13. DISPOSAL CONSIDERATIONS

### Waste treatment methods

**Waste Disposal Methods** Dispose of in accordance with local regulations.

**Contaminated Packaging** Do not re-use empty containers. Empty containers should be taken to an approved waste handling site for recycling or disposal.

Chemical Name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Ethyl acrylate 140-88-5				Ignitable waste
Diphenylamine 122-39-4		Included in waste streams: F039, K083, K104		

This product contains one or more substances that are listed with the State of California as a hazardous waste

Chemical Name	California Hazardous Waste Status
Diphenylamine 122-39-4	Toxic

SDS: 6403

## 6403 MONOLEC® R&O COMPRESSOR/TURBINE OIL

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

### 14. TRANSPORT INFORMATION

DOT

Not regulated

### 15. REGULATORY INFORMATION

#### International Inventories

TSCA	Complies
DSL/NDSL	Not determined
NDSL	Not determined
EINECS	Not determined
ELINCS	Not determined
ENCS	Not determined
IECSC	Complies
KECL	Not determined
PICCS	Not determined
AICS	Not determined

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances

ENCS - Japan Existing and New Chemical Substances

IECSC - China Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

AICS - Australian Inventory of Chemical Substances

#### U.S. Federal Regulations

##### SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical Name	CAS-No	Weight %	SARA 313 - Threshold Values %
Petroleum distillates, solvent-refined heavy paraffinic - 64741-88-4	64741-88-4	90 - 100	
Residual oils (petroleum), solvent refined - 64742-01-4	64742-01-4	5 - 10	
Petroleum distillates, solvent-refined light paraffinic - 64741-89-5	64741-89-5	1 - 5	
Benzeneamine,-N-phenyl-, reaction product with 2,4,4-trimethylpentene and 2-methylpropene - 184378-08-3	184378-08-3	0.1 - 1	
Benzenepropanoic acid, 3,5-bis(1,1-dimethylethyl)-4-hydroxy-, C7-9- - 125643-61-0	125643-61-0	0.1 - 1	

SDS: 6403

## 6403 MONOLEC® R&O COMPRESSOR/TURBINE OIL

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

21151 Proprietary Organsulfur-phosphorus Compounds - 9999-99-9	9999-99-9	0.1 - 1	
20095 Alkyl phenol - 9999-99-9	9999-99-9	0.1 - 1	
20095 Petroleum Distillates - 9999-99-9	9999-99-9	0.1 - 1	
White Mineral Oil - 8042-47-5	8042-47-5	< 0.1	
20095 Aryl Amine - 9999-99-9	9999-99-9	< 0.1	
Petroleum distillates, hydrotreated middle - 64742-46-7	64742-46-7	< 0.1	
Calcium long-chain Alkaryl Sulfonate - 115733-10-3	115733-10-3	< 0.1	
Lubricating oils, petroleum, C15-30, hydrotreated neutral oil-based - 72623-86-0	72623-86-0	< 0.1	
Dilauryl Hydrogen Phosphite - 21302-09-0	21302-09-0	< 0.1	
Naphtha (petroleum), hydrotreated heavy - 64742-48-9	64742-48-9	< 0.1	
21069 Ethanox 4782J - 9999-99-9	9999-99-9	< 0.1	
2-Propenoic acid, ethyl ester, polymer with 2-ethylhexyl 2-propenoate - 26376-86-3	26376-86-3	< 0.1	
Petroleum distillates, hydrotreated light - 64742-47-8	64742-47-8	< 0.1	
20095 Alkaryl Triazole - 9999-99-9	9999-99-9	< 0.1	
Petroleum distillates, hydrotreated light paraffinic - 64742-55-8	64742-55-8	< 0.1	
Petroleum distillates, solvent dewaxed heavy paraffinic - 64742-65-0	64742-65-0	< 0.1	
Petroleum distillates, hydrotreated light naphthenic - 64742-53-6	64742-53-6	< 0.1	
Petroleum distillates, hydrotreated heavy naphthenic - 64742-52-5	64742-52-5	< 0.1	
2-Ethylhexyl acrylate - 103-11-7	103-11-7	< 0.1	
Calcium Sulfate - 7778-18-9	7778-18-9	< 0.1	
Ethyl acrylate - 140-88-5	140-88-5	< 0.1	0.1
Diphenylamine - 122-39-4	122-39-4	< 0.1	1.0

**SARA 311/312 Hazard Categories**

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

**Clean Water Act**

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

**CERCLA**

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302):

Chemical Name	Hazardous Substances RQs	CERCLA/SARA RQ	Reportable Quantity (RQ)
Ethyl acrylate 140-88-5	1000 lb	-	RQ 1000 lb final RQ RQ 454 kg final RQ

**U.S. State Regulations**

SDS: 6403

# 6403 MONOLEC® R&O COMPRESSOR/TURBINE OIL

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

**California Proposition 65**

This product contains the following Proposition 65 chemicals:

Chemical Name	California Prop. 65
Ethyl acrylate - 140-88-5	Carcinogen

**U.S. State Right-to-Know Regulations**

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Petroleum distillates, solvent-refined light paraffinic 64741-89-5		X	
White Mineral Oil 8042-47-5		X	X
Petroleum distillates, hydrotreated light paraffinic 64742-55-8		X	
Petroleum distillates, hydrotreated light naphthenic 64742-53-6		X	
2-Ethylhexyl acrylate 103-11-7	X	X	X
Calcium Sulfate 7778-18-9	X	X	X
Ethyl acrylate 140-88-5	X	X	X
Diphenylamine 122-39-4	X	X	X

**16. OTHER INFORMATION**

**Issuing Date** 04-24-2012  
**Revision Date** 04-29-2014  
**Reason for revision** Change to composition.  
**Disclaimer**

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

## SAFETY DATA SHEET

SDS: 6404

### 6404 MONOLEC® R&O COMPRESSOR/TURBINE OIL

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

#### 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

**Product Identifier**

**Product Name** 6404 MONOLEC® R&O COMPRESSOR/TURBINE OIL

**Other means of identification**

**Synonyms** No information available

**Recommended use of the chemical and restrictions on use**

**Identified uses** Lubricant

**Uses advised against** Consumer use

**Details of the supplier of the safety data sheet**

**Manufacturer**

Lubrication Engineers Inc.  
300 Bailey Avenue  
Fort Worth, TX 76107  
USA  
(817) 916-3200

**Emergency Telephone Number**

CHEMTREC: +1-703-527-3887 (INTERNATIONAL)  
1-800-424-9300 (NORTH AMERICA)



SDS: 6404

**6404 MONOLEC® R&O  
COMPRESSOR/TURBINE OIL**

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

**2. HAZARDS IDENTIFICATION****Classification****OSHA Regulatory Status**

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

**Label Elements****Emergency Overview****Signal Word**

None

The product contains no substances which at their given concentration, are considered to be hazardous to health

**appearance** red**Physical state** liquid**Odor** Hydrocarbon-like**Precautionary Statements - Prevention**

None.

**Response**

None.

**Eyes**

None.

**Skin**

None.

**Inhalation**

None.

**Ingestion**

None.

**Fire**

None.

**Spill**

None.

**Storage**

None.

**Disposal**

None.

**Hazards not otherwise classified (HNOC)**

None

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

The producer of "6404" declares that it contains less than 3% DMSO extractable material by IP-346

SDS: 6404

## 6404 MONOLEC® R&O COMPRESSOR/TURBINE OIL

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

### 4. FIRST AID MEASURES

#### First Aid Measures

<b>General Advice</b>	If symptoms develop move victim to fresh air. Show this safety data sheet to the doctor in attendance. Do not breathe dust/fume/gas/mist/vapors/spray.
<b>Eye Contact</b>	Rinse thoroughly with plenty of water, also under the eyelids. Keep eye wide open while rinsing.
<b>Skin Contact</b>	Consult a physician if necessary. Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes.
<b>Inhalation</b>	Move to fresh air. Consult a physician. If not breathing, give artificial respiration.
<b>Ingestion</b>	May cause adverse kidney effects. Drink plenty of water. Do NOT induce vomiting.
<b>Protection of First-aiders</b>	Use personal protective equipment.

#### Most important symptoms and effects, both acute and delayed

**Symptoms** None known.

#### Indication of any immediate medical attention and special treatment needed

**Notes to Physician** Treat symptomatically.

### 5. FIRE-FIGHTING MEASURES

<b>Flash Point</b>	237 °C / 460 °F
<b>Suitable Extinguishing Media</b>	Water spray, Carbon dioxide (CO2), Foam, Dry chemical
<b>Unsuitable Extinguishing Media</b>	Do not use a solid water stream as it may scatter and spread fire.
<b>Specific Hazards Arising from the Chemical</b>	Thermal decomposition can lead to release of irritating gases and vapors.
<b>Explosion Data</b>	
<b>Sensitivity to Mechanical Impact</b>	Not impact sensitive.
<b>Sensitivity to Static Discharge</b>	May be ignited by friction, heat, sparks or flames.
<b>Protective Equipment and Precautions for Firefighters</b>	Wear self-contained breathing apparatus and protective suit.

NFPA

Health hazard 1

Flammability 1

Instability 1

### 6. ACCIDENTAL RELEASE MEASURES

#### Personal precautions, protective equipment and emergency procedures

SDS: 6404

## 6404 MONOLEC® R&O COMPRESSOR/TURBINE OIL

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

**Personal Precautions**

Do not touch or walk through spilled material. Remove all sources of ignition.

**Environmental Precautions****Environmental Precautions**

Prevent entry into waterways, sewers, basements or confined areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.

**Methods and material for containment and cleaning up****Methods for Containment**

Prevent further leakage or spillage if safe to do so. Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container.

**Methods for Cleaning up**

Use personal protective equipment. Dam up. Take up mechanically and collect in suitable container for disposal. Clean contaminated surface thoroughly.

### 7. HANDLING AND STORAGE

**Precautions for safe handling****Advice on safe handling**

Avoid contact with skin, eyes and clothing. Wear personal protective equipment. Prevent vapor buildup by providing adequate ventilation during and after use. Do not eat, drink or smoke when using this product.

**Conditions for safe storage, including any incompatibilities****Technical measures/Storage conditions**

Keep container tightly closed in a dry and well-ventilated place. Keep out of the reach of children.

**Incompatible products.**

Strong oxidizing agents. Strong acids. Strong bases.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Control parameters****Exposure Guidelines**

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
White Mineral Oil 8042-47-5	TWA: 5 mg/m <sup>3</sup>	TWA: 5 mg/m <sup>3</sup> (vacated) TWA: 5 mg/m <sup>3</sup>	IDLH: 2500 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup> STEL: 10 mg/m <sup>3</sup>
Calcium Sulfate 7778-18-9	TWA: 10 mg/m <sup>3</sup>	TWA: 15 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup> (vacated) TWA: 15 mg/m <sup>3</sup> (vacated) TWA: 5 mg/m <sup>3</sup>	TWA: 10 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup>
Ethyl acrylate 140-88-5	STEL: 15 ppm TWA: 5 ppm	TWA: 25 ppm TWA: 100 mg/m <sup>3</sup> (vacated) TWA: 5 ppm (vacated) TWA: 20 mg/m <sup>3</sup> (vacated) STEL: 25 ppm (vacated) STEL: 100 mg/m <sup>3</sup> (vacated) S* S*	IDLH: 300 ppm
Diphenylamine 122-39-4	TWA: 10 mg/m <sup>3</sup>	(vacated) TWA: 10 mg/m <sup>3</sup>	TWA: 10 mg/m <sup>3</sup>

SDS: 6404

# 6404 MONOLEC® R&O COMPRESSOR/TURBINE OIL

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

## Appropriate engineering controls

**Engineering Measures**

Showers  
Eyewash stations  
Ventilation systems.

## Individual protection measures, such as personal protective equipment

**Eye/Face Protection**      Tightly fitting safety goggles.

**Skin and Body Protection**      Long sleeved clothing. Protective gloves.

**Respiratory Protection**      No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

**Hygiene Measures**      Handle in accordance with good industrial hygiene and safety practice.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### 9.1. Information on basic physical and chemical properties

Physical state	liquid
appearance	red
Odor	Hydrocarbon-like
Odor threshold	No information available

#### Property

pH	6 - 8
Melting point/freezing point	No data available
Boiling Point/Range	no data available
Flash Point	237 °C / 460 °F
Vapor pressure	No data available
Vapor Density	< 1 ( Air = 1 )
Specific Gravity	0.88
Water solubility	negligible
Partition Coefficient: n-octanol/water	no data available
Autoignition Temperature	No data available
Decomposition Temperature	No data available
Viscosity, kinematic	98.27 cSt @ 40°C

#### Property

## 10. STABILITY AND REACTIVITY

**reactivity**      No information available

**Chemical stability**      Stable under recommended storage conditions.

**Possibility of Hazardous Reactions**      None under normal processing.

**Conditions to Avoid**      Heat, flames and sparks. Contact with other chemicals

**Incompatible Materials**      Strong oxidizing agents. Strong acids. Strong bases.

SDS: 6404

## 6404 MONOLEC® R&O COMPRESSOR/TURBINE OIL

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

Hazardous Decomposition Products Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke)

### 11. TOXICOLOGICAL INFORMATION

#### Information on likely routes of exposure

<b>Product Information</b>	Product does not present an acute toxicity hazard based on known or supplied information
<b>Inhalation</b>	May cause irritation of respiratory tract.
<b>Eye Contact</b>	Contact with eyes may cause irritation.
<b>Skin Contact</b>	May cause irritation.
<b>Ingestion</b>	There is no data available for this product.

Component Information No information available

#### Information on toxicological effects

**Symptoms** No information available.

#### Delayed and immediate effects as well as chronic effects from short and long-term exposure

The producer of "6404" declares that it contains less than 3% DMSO extractable material by IP-346

**Sensitization** No information available.**Mutagenic Effects** No information available.**Carcinogenicity** No information available.**Reproductive toxicity** No information available.**Target Organ Effects** Respiratory system, Eyes, Skin.

#### Numerical measures of toxicity - Product Information

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)	4614 mg/kg
ATEmix (dermal)	5538 mg/kg

### 12. ECOLOGICAL INFORMATION

Ecotoxicity No information available



SDS: 6404

# 6404 MONOLEC® R&O COMPRESSOR/TURBINE OIL

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

**Persistence and Degradability** No information available.

**Bioaccumulation**

**Mobility** The product is insoluble and floats on water.

Chemical Name	Log Pow
White Mineral Oil 8042-47-5	>6
2-Ethylhexyl acrylate 103-11-7	4.64
Ethyl acrylate 140-88-5	1.18
Diphenylamine 122-39-4	3.5

**Other Adverse Effects** No information available

## 13. DISPOSAL CONSIDERATIONS

### Waste treatment methods

**Waste Disposal Methods** Dispose of in accordance with local regulations.

**Contaminated Packaging** Do not re-use empty containers. Empty containers should be taken to an approved waste handling site for recycling or disposal.

Chemical Name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Ethyl acrylate 140-88-5				Ignitable waste
Diphenylamine 122-39-4		Included in waste streams: F039, K083, K104		

This product contains one or more substances that are listed with the State of California as a hazardous waste

Chemical Name	California Hazardous Waste Status
Diphenylamine 122-39-4	Toxic

SDS: 6404

# 6404 MONOLEC® R&O COMPRESSOR/TURBINE OIL

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

## 14. TRANSPORT INFORMATION

DOT

Not regulated

## 15. REGULATORY INFORMATION

### International Inventories

TSCA	Complies
DSL/NDL	Not determined
NDSL	Not determined
EINECS	Not determined
ELINCS	Not determined
ENCS	Not determined
IECSC	Complies
KECL	Not determined
PICCS	Not determined
AICS	Not determined

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDL - Canadian Domestic Substances List/Non-Domestic Substances List

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances

ENCS - Japan Existing and New Chemical Substances

IECSC - China Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

AICS - Australian Inventory of Chemical Substances

### U.S. Federal Regulations

#### **SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical Name	CAS-No	Weight %	SARA 313 - Threshold Values %
Ethyl acrylate - 140-88-5	140-88-5	0.0009	0.1
Diphenylamine - 122-39-4	122-39-4	0.0008	1.0

#### **SARA 311/312 Hazard Categories**

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

SDS: 6404

**6404 MONOLEC® R&O  
COMPRESSOR/TURBINE OIL**

Issuing Date 04-24-2012

Revision Date 04-29-2014

Revision Number 5

**Clean Water Act**

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

**CERCLA**

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302):

Chemical Name	Hazardous Substances RQs	CERCLA/SARA RQ	Reportable Quantity (RQ)
Ethyl acrylate 140-88-5	1000 lb	-	RQ 1000 lb final RQ RQ 454 kg final RQ

**U.S. State Regulations****California Proposition 65**

This product contains the following Proposition 65 chemicals:

Chemical Name	California Prop. 65
Ethyl acrylate - 140-88-5	Carcinogen

**U.S. State Right-to-Know Regulations**

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Petroleum distillates, solvent-refined light paraffinic 64741-89-5		X	

**16. OTHER INFORMATION**

Issuing Date 04-24-2012  
Revision Date 04-29-2014  
Reason for revision Change to composition.  
**Disclaimer**

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**End of Safety Data Sheet**

Last Reviewed: Dec 2009  
Next Review Due: Dec 2011

MSDS-P-001

## Material Safety Data Sheet Pulsalube #1, Hydraulic Oil

### 1. Product and Company Identification

Product Name:	Multipurpose R&O
MSDS Number:	775465
Synonyms:	Conoco Multipurpose R&O 32 Conoco Multipurpose R&O 46 Conoco Multipurpose R&O 68 Conoco Multipurpose R&O 100 Conoco Multipurpose R&O 150 Conoco Multipurpose R&O 220 Conoco Multipurpose R&O 320 Conoco Multipurpose R&O 460
Intended Use:	Circulating Oil
Manufacturer/Supplier:	ConocoPhillips Lubricants 600 N. Dairy Ashford, 2W900 Houston, Texas 77079-1175
Emergency Health and Safety Number:	Chemtrec: 800-424-9300 (24 hours)
Customer Service:	888-766-7676
Technical Information:	800-255-9556
MSDS Information:	Internet: <a href="http://w3.conocophillips.com/NetMSDS/">http://w3.conocophillips.com/NetMSDS/</a>

### 2. Hazards Identification

#### Emergency Overview

This Material is not considered hazardous according to OSHA criteria.

#### NFPA



**Appearance:** Clear and Bright  
**Physical Form:** Liquid  
**Odor:** Petroleum

#### Potential Health Effects

**Eye:** Contact may cause mild eye irritation including stinging, watering, and redness.

**Skin:** Contact may cause mild skin irritation including redness and a burning sensation. Prolonged or repeated contact can defeat the skin, causing drying and cracking of the skin, and possibly dermatitis (inflammation). A component of this material may cause an allergic skin reaction. No harmful effects from the skin absorption are expected.

**Inhalation (Breathing):** No information on acute toxicity.



**Ingestion (Swallowing):** No harmful effects expected from ingestion.

**Signs and Symptoms:** Effects of overexposure may include irritation of the digestive tract, nausea and diarrhea. Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.

**Pre-Existing Medical Conditions:** Conditions aggravated by exposure may include skin disorders.

See Section 11 for additional Toxicity information.

### 3. Composition / Information on Ingredients

Component	CASRN	Concentration*
Lubricant Base Oil (Petroleum)	Various	>99
Additives	Proprietary	<1

\*All concentrations are percent by weight unless ingredient is a gas. Gas Concentrations are in percent by volume.

### 4. First Aid Measures

**Eye Contact:** If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

**Skin Contact:** Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops and persists, seek medical attention.

**Inhalation (Breathing):** If respiratory symptoms develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. If symptoms persist, seek medical attention.

**Ingestion (Swallowing):** First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

**Notes to Physician:** Acute aspirations of large amounts of oil-laden material may produce serious aspiration pneumonia. Patients who aspirate these oils should be followed for the development of long-term sequelae. In halation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities.

### 5. Fire-Fighting Measures

#### NFPA 704 Hazard Class

**Health:** 0      **Flammability:** 1      **Instability:** 0      (0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

**Unusual Fire & Explosion Hazards:** This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire.

**Extinguishing Media:** Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces.

**Fire Fighting Instructions:** For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

**Hazardous Combustion Products:** Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Oxides of sulfur, nitrogen, or phosphorous may also be formed.

See section 9 for Flammable Properties including Flash Point and Flammable Explosive) Limits



## 6. Accidental Release Measures

**Personal Precautions:** This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. The use of explosion-proof electrical equipment is recommended. Stay upwind and away from spill/release. Notify persons downwind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See sections 2 and 7 for additional information on hazards and precautionary measures.

**Environmental Precautions:** Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

**Methods for Containment and Clean-Up:** Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal.

## 7. Handling and Storage

**Precautions for Safe Handling:** Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment.

Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

**Conditions for Safe Storage:** Keep container(s) tightly closed. Use and store this material in cool, dry, well-ventilated area away from heat and all sources of ignition. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

## 8. Exposure Controls / Personal Protection

Component	US-ACGIH	OSHA	Other
Lubricant Base Oil (Petroleum)	TWA: 5 mg/m <sup>3</sup>  STEL: 10 mg/m <sup>3</sup>  as Oil Mist, if generated	TWA: 5 mg/cm <sup>3</sup>  as Oil Mist, if generated	---

**Note:** State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

**Engineering Controls:** If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

**Eye/Face Protection:** The use of eye/face protection that meets or exceeds ANSI Z.87.1 is recommended to protect against potential eye contact, irritation, or injury. Depending on conditions of use, a face shield may be necessary.

**Skin/Hand Protection:** The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Suggested protective materials: Nitrile

**Respiratory Protection:** Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with R or P95 filters may be used.

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (as directed by regulation or the manufacturer's instructions), in oxygen deficient (less than 19.5 percent oxygen) situations, or under conditions that are immediately dangerous to life and health (IDLH).

**Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.**

## 9. Physical and Chemical Properties

**Note:** Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Clear and bright
Physical Form:	Liquid
Odor:	Petroleum
Odor Threshold:	No data
pH:	Not applicable
Vapor Pressure:	<1 mm Hg
Vapor Density (air = 1):	>1
Boiling Point/Range:	No data
Melting/Freezing Point:	<10.4°F/ <-12°C
Pour Point:	<10.4°F/ <-12°C
Solubility in water:	Negligible
Partition Coefficient (n-octanol/water) (Kow):	No data
Specific Gravity:	0.86 – 0.90 @ 60°F (15.6°C)
Bulk Density:	7.1 – 7.5 lbs/gal
Viscosity:	5-32 cSt @ 100°C; 30-500 cSt @ 40°C
Percent Volatile:	Negligible
Evaporation Rate (nBuAc=1):	No data
Flash Point:	> 302°F / >150°C
Test Method:	Pensky-Martens Closed Cup (PMCC), ASTM D93, EPA 1010
LEL (vol % in air):	No data
UEL (vol % in air):	No data
Auto ignition Temperature:	No data

## 10. Stability and Reactivity

**Stability:** Stable under normal ambient and anticipated conditions of use.

**Condition to Avoid:** Extended exposure to high temperatures can cause decomposition.

**Materials to Avoid (Incompatible materials):** Avoid contact with strong oxidizing agents and strong reducing agents.

**Hazardous Decomposition Products:** Not anticipated under normal conditions of use.

**Hazardous Polymerization:** Not known to occur.

## 11. Toxicological Information

### Chronic Data:

#### **Lubricant Base Oil (Petroleum)**

**Carcinogenicity:** The petroleum base oils contained in this product have been highly refined by a variety of processes including severe hydrocracking/hydroprocessing to reduce aromatics and improve performance characteristics. All of the oils meet the IP-346 criteria of less than 3 percent PAH's and are not considered carcinogens by NTP, IARC, or OSHA.

### Acute Data

Component	Oral LD50	Dermal LD50	Inhalation LC50
Lubricant Base Oil (Petroleum)	>5 g/kg	>2 g/kg	No data



## 12. Ecological Information

**Ecotoxicity:** Experimental studies show that acute aquatic toxicity values are greater than 1000 mg/l. These values are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon compositions.

**Mobility:** Volatilization to air is not expected to be a significant fate process due to the low vapor pressure of this material. In water, base oils will float and spread over the surface at a rate dependent on viscosity. There will be significant removal of hydrocarbons from the water by sediment adsorption. In soil and sediment, hydrocarbon components will show low mobility with adsorption to sediments being the predominant physical process. The main fate process is expected to be slow biodegradation of base oil components in soil and sediment.

**Persistence and Degradability:** The hydrocarbons in this material are not readily biodegradable, but since they can be degraded by microorganisms, they are regarded as inherently biodegradable.

**Bioaccumulation Potential:** Log Kow values are measures for the hydrocarbon components of this material range from 4 to over 6, and therefore regarded as having the potential to bioaccumulate. In practice, metabolic processes may reduce bioconcentration.

## 13. Disposal Considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations.

This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste and is not believe to exhibit characteristics of hazardous waste. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produces contains constituents which are not required to be listed in the MSDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.

This material under most intended uses would become "used oil" due to contamination by physical or chemical impurities. Whenever possible, recycle used oil in accordance with applicable federal and state or local regulations. Container contents should be completely used and containers should be empties prior to discard.

## 14. Transportation Information

### U.S. Department of Transportation (DOT)

Shipping Description: *Not Regulated*

Note: *If shipped by land in a packaging having a capacity or 3,500 gallons or more, the provisions of 49 CFR, Part 130 apply. (Contains Oil)*

### International Maritime Dangerous Goods (IMDG)

Shipping Description: *Not Regulated*

Note: *U.S. DOT compliance requirements may apply. See 49 CFR 171.22, 23 & 25.*

### International Civil Aviation Organization/International Air Transport Association (ICAO/IATA)

UN/ID #: *Not Regulated*

	LTD. QTY	Passenger Aircraft	Cargo Aircraft Only
Packaging Instruction #:	---	---	---
Max. Net Qty. Per Package:	---	---	---

## 15. Regulatory Information

### CERCLA/SARA – Section 302 Extremely Hazardous Substances and TPQs (in pounds):

This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372

**CERCLA/SARA – Section 311/312 (Title III Hazard Categories)**

Acute Health:	No
Chronic Health:	No
Fire Hazard:	No
Pressure Hazard:	No
Reactive Hazard:	No

**CERCLA/SARA – Section 313 and 40 CFR 372:**

This material does not contain any chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372

**EPA (CERCLA) Reportable Quantity (in pounds):**

This material does not contain any chemicals with CERCLA Reportable Quantities.

**California Proposition 65:**

This material does not contain any chemicals which are known to the State of California to cause cancer, birth defects, or other reproductive harm at concentrations that trigger the warning requirements of California Proposition 65.

**Canadian Regulations:**

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the regulations.

**WHMIS Hazard Class:**

None

**National Chemical Inventories:**

All components are either listed on the US TSCA Inventory, or are not regulated under TSCA.  
All components are either on the DSL, or are exempt from DSL listing requirements.

**U.S. Export Control Classification Number: EAR99**

**Other Regulatory Information:**

Diphenylamine, CASRN 122-39-4, which is present at trace amounts, is subject to the export notification requirements of TSCA Section 12(b).

## 16. Other Information

Date of Issue:	1-Sep-2008
Status:	Final
Previous Issue Date:	18-Oct-2005
Revised Sections of Basis for Revision:	NFPA ratings (Sections 2 & 5) Physical Properties (Section 9) Environmental Hazards (Section 12) Regulatory Information (Section 15)

**MSDS Number:** 775465

**Guide to Abbreviations:**

ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = [US] Environmental Protection Agency; IARC = International Agency for Research on Cancer; LEL = Lower Explosive Limit; NE= Not Established; NFPA= National Fire protection Association; NTP = [US] National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 Hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)



**Disclaimer of Expressed and Implied Warranties**

The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

[pulsafeeder.com](http://pulsafeeder.com)



2883 Brighton Henrietta TL Rd

Rochester, NY 14623

Phone: ++1(585) 292-8000

Fax: ++1 (585) 424-5619



An ISO 9001 and ISO 14001 Certified Company

# Safety Data Sheet

Revision Date 11-15-2016  
Revision Number 28



## SECTION 1 Identification of the substance/mixture and of the company/undertaking

### Product identification used on label

Product identifier

4150

NOX-RUST® VCI 10

Details of the supplier of the safety data sheet

Daubert Chemical Company

4700 S. Central Avenue

Chicago, IL 60638

708-496-7350

Emergency telephone number

Chemtrec: (800) 424-9300

Relevant identified uses of the substance or mixture and uses advised against

Corrosion Preventive Compound

## SECTION 2 Hazards identification

Classification of the chemical in accordance with paragraph (d) of §1910.1200;

GHS Hazard

Symbols



GHS

Reproductive Toxicity Category 2

Classification

Signal Word

Warning

Hazard

Suspected of damaging fertility or the unborn child.

Statements

Precautionary

Statements

Prevention

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Wear protective gloves/protective clothing/eye protection/face protection.

IF exposed or concerned: Get medical advice/attention.

Response

Storage

Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulation for hazardous wastes.

# Safety Data Sheet

Revision Date 11-15-2016  
Revision Number 28

## SECTION 3 Composition/information on ingredients

Chemical Name	CAS #	%
2-Ethylhexanoic acid	149-57-5	0.1 - 1

Note: Specific chemical identities and/or exact percentages have been withheld as a trade secret.

## SECTION 4 First aid measures

<b>Inhalation</b>	If symptoms are experienced remove source of contamination or move victim to fresh air and obtain medical advice.
<b>Eyes</b>	Use an eye wash to remove a chemical from your eye regardless of the level of hazard. Flush the affected eye for at least twenty minutes. Tilt the head to prevent chemical from transferring to the uncontaminated eye. Seek medical advice after flushing.
<b>Skin Contact</b>	Wash with soap and water. Remove contaminated clothing and launder. Get medical attention if irritation develops or persists.
<b>Ingestion</b>	No hazard in normal industrial use. Do not induce vomiting. Seek medical attention if symptoms develop. Provide medical care provider with this SDS.
<b>Most important symptoms/effects, acute and delayed</b>	See Section 11
<b>Indication of immediate medical attention and special treatment needed</b>	Treat symptomatically.

## SECTION 5 Firefighting measures

<b>Suitable extinguishing media:</b>	Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.
<b>Unsuitable extinguishing media:</b>	No data available
<b>Fire and/or Explosion Hazards</b>	Material may be ignited only if preheated to temperatures above the high flash point, for example in a fire.
<b>Fire Fighting Methods and Protection</b>	Do not enter fire area without proper protection including self-contained breathing apparatus and full protective equipment. Use appropriate methods for the surrounding fire.
<b>Hazardous Combustion Products</b>	Carbon dioxide, Carbon monoxide, Hydrocarbons

## SECTION 6 Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	No adverse health affects expected from the clean-up of spilled material. Follow personal protective equipment recommendations found in Section VIII of this SDS.
<b>Methods and materials for containment and cleaning up</b>	Collect and discard in accordance with local, state and national regulations.

# Safety Data Sheet

Revision Date 11-15-2016  
Revision Number 28

## SECTION 7 Handling and storage

### **Precautions for safe handling**

Avoid contacting and avoid breathing the material. Use only in a well ventilated area. As with all chemicals, good industrial hygiene practices should be followed when handling this material. Wash thoroughly after handling. Do not get in eyes, on skin and clothing.

### **Conditions for safe storage, including any incompatibilities**

Store in a cool dry place. Isolate from incompatible materials. Do not store in direct sunlight

### **Incompatible materials**

Strong oxidizing agents

## SECTION 8 Exposure controls/personal protection

### Control parameters

#### Chemical Name

#### ACGIH TLV

#### ACGIH STEL

#### OSHA PEL

No exposure limits in vapor form

### **Engineering Measures**

Local exhaust ventilation or other engineering controls are normally required when handling or using this product to avoid overexposure.

### **Respiratory Protection**

Proper ventilation (at a minimum) will be required when handling this product. Use respirators (NIOSH approved) only if ventilation cannot be used to eliminate symptoms or reduce the exposure to below acceptable levels.

### **Eye Protection**

Wear chemically resistant safety glasses with side shields when handling this product. Do not wear contact lenses.

### **Skin Protection**

Wear protective gloves. Inspect gloves for chemical break-through and replace at regular intervals. Clean protective equipment regularly. Wash hands and other exposed areas with mild soap and water before eating, drinking, and when leaving work.

### **Gloves**

Chemically resistant gloves

## SECTION 9 Physical and chemical properties (Typical, not specification)

### **Physical State**

Oily liquid

### **Color**

Amber

### **Odor**

Slight Amine Type

### **Odor Threshold**

No data available

### **pH**

No data available

### **Melting Point/freezing point, °C**

No data available

### **Initial boiling point and boiling range, °C**

No data available

### **Flash Point**

> 340 °F( 171 °C)

### **Evaporation Rate**

>1 (n-Butyl Acetate=1)

### **Flammability (Solid, Gas)**

No data available

### **Lower Flammable/Explosive Limit, % in air**

No data available

### **Upper Flammable/Explosive Limit, % in air**

No data available

### **Vapor Pressure**

No data available

### **Vapor Density**

>1 (Air=1)

NOX-RUST® VCI 10



# Safety Data Sheet

Revision Date 11-15-2016  
Revision Number 28

Specific Gravity @ 25°C	0.91
Solubility in Water	Negligible; 0-1%
Octanol/Water Partition Coefficient	No data available
Autoignition Temperature	No data available
Decomposition Temperature	No data available
Viscosity	Typical 38 cSt @ 40°C
Volatiles, % by weight	6
VOC, Material, lb/gal	.45
VOC, Material, grams/liter	54.0
VOC minus exempt solvents & water, lb/gal	0.45

## SECTION 10 Stability and reactivity

Reactivity	No data available
Chemical stability	Stable under normal conditions. Hazardous polymerization will not occur.
Possibility of hazardous reactions	Under normal conditions of storage and use, hazardous reactions will not occur.
Incompatible materials	Strong oxidizing agents
Hazardous decomposition products	Under normal conditions of use & storage, decomposition and hazardous decomposition products are unlikely.

## SECTION 11 Toxicological information

Likely Routes of Entry	Inhalation, Skin contact, Eye contact
Target Organs Potentially Affected by Exposure	No organs known to be damaged from exposure to this product.
Chemical Interactions That Change Toxicity	No chemical interaction known to affect toxicity.
Medical Conditions Aggravated	Skin contact may aggravate existing skin disease
<b>Immediate (Acute) Health Effects by Route of Exposure</b>	
Inhalation Irritation	Can cause minor respiratory irritation.
Skin Contact	Can cause moderate skin irritation, defatting, and dermatitis. Not likely to cause permanent damage.
Skin Absorption	No absorption hazard expected in normal industrial use.
Eye Contact	Can cause moderate irritation, tearing and reddening, but not likely to permanently injure eye tissue.
Ingestion Irritation	Irritating to mouth, throat, and stomach. Can cause abdominal discomfort, nausea, vomiting and diarrhea.
Ingestion Toxicity	Harmful if swallowed.
<b>Long-Term (Chronic) Health Effects</b>	
Carcinogenicity	There are no carcinogenic ingredients present at or over 0.1%.
Inhalation	Upon prolonged and/or repeated exposure, can cause respiratory irritation.
Skin Contact	Upon prolonged or repeated contact, can cause minor skin irritation, defatting, and dermatitis.
Skin Absorption	Upon prolonged or repeated exposure, no hazard in normal industrial use.
Ingestion	Under normal industrial usage conditions, ingestion is highly unlikely.

# Safety Data Sheet

Revision Date 11-15-2016  
Revision Number 28

## Component Toxicology Data

Chemical Name	CAS Number	LD50/LC50
No data available		

## SECTION 12 Ecological information

Overview	No ecological information available
Mobility	No data
Persistence	No data
Bioaccumulation	No data
Degradability	No data

## Ecotoxicity Data

Chemical Name	CAS Number	Aquatic EC50 Crustacea	Aquatic ERC50 Algae	Aquatic LC50 Fish
No data available				

## SECTION 13 Disposal considerations

Waste Description for Spent Product	Spent or discarded material is not expected to be a hazardous waste.
Disposal Methods	Dispose of in accordance with Local and National regulations.
Waste Disposal Code(s)	Not applicable

## SECTION 14 Transport information

Full shipping name for	Rust Inhibitor / Non-Hazardous
Export, Air, Sea (any quantity unless flash pt. >150°F) or vessels of 119 GL or more	
Domestic Ground in vessels < 119 gal.	Non-Hazardous

## SECTION 15 Regulatory information

### Status of formula components on selected national regulatory inventories:

LIST	STATUS
TSCA	All components in this product are on the TSCA Inventory or exempt.
Canadian DSL	One or more chemical substances in this material are on the Canadian NDSL and the remainder are included on the Canadian DSL or are exempt.

Chemical Name	CAS #	Regulation	Percent
2-Ethylhexanoic acid	149-57-5	California Prop 65	0.1 - 1
No CERCLA-listed chemicals in this product.		CERCLA	
No 313-listed chemicals in this product.		SARA 313	
No SARA 302 EHS-listed chemicals in this product.		SARA EHS	

# Safety Data Sheet

Revision Date 11-15-2016  
Revision Number 28

## **SECTION 16 Other information**

---

**Revision** 11-15-2016

**Date**

**Disclaimer** Although the information contained herein is believed to be reliable, it is furnished without warranty of any kind. This information is not intended to be all-inclusive as to the manner and conditions of use, handling, and storage.

**Version** Reviewed

**Comments** Approved: M. Duncan

Product Name: MOBIL POLYREX EM  
Revision Date: 13 Oct 2016  
Page 1 of 10

## SAFETY DATA SHEET

SECTION 1	PRODUCT AND COMPANY IDENTIFICATION
-----------	------------------------------------

### PRODUCT

**Product Name:** MOBIL POLYREX EM  
**Product Description:** Base Oil and Additives  
**Product Code:** 2010A020Q010, 2015A020G010, 641688-00, 97Y278  
**Intended Use:** Grease

### COMPANY IDENTIFICATION

<b>Supplier:</b>	<b>EXXON MOBIL CORPORATION</b> 22777 Springwoods Village Parkway Spring, TX 77253 USA
<b>24 Hour Health Emergency</b>	609-737-4411
<b>Transportation Emergency Phone</b>	800-424-9300 or 703-527-3887 CHEMTREC
<b>Product Technical Information</b>	800-662-4525
<b>MSDS Internet Address</b>	www.exxon.com, www.mobil.com

SECTION 2	HAZARDS IDENTIFICATION
-----------	------------------------

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

**Other hazard information:**

**HAZARD NOT OTHERWISE CLASSIFIED (HNOC):** None as defined under 29 CFR 1910.1200.

### PHYSICAL / CHEMICAL HAZARDS

No significant hazards.

### HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

### ENVIRONMENTAL HAZARDS

No significant hazards.

<b>NFPA Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0
<b>HMIS Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0

**NOTE:** This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

Product Name: MOBIL POLYREX EM  
Revision Date: 13 Oct 2016  
Page 2 of 10

**SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS**

This material is defined as a mixture.

**Hazardous Substance(s) or Complex Substance(s) required for disclosure**

Name	CAS#	Concentration*	GHS Hazard Codes
1H-IMIDAZOLE-1-ETHANOL, 4,5-DIHYDRO-, 2-NORTALL-OIL ALKYL DERIVS	61791-39-7	0.1 - < 1%	H314(1B)
AMINES, C12-14-ALKYL, ISOOCTYL PHOSPHATES	68187-67-7	1 - < 5%	H315

\* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

**SECTION 4 FIRST AID MEASURES****INHALATION**

Under normal conditions of intended use, this material is not expected to be an inhalation hazard.

**SKIN CONTACT**

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

**EYE CONTACT**

Flush thoroughly with water. If irritation occurs, get medical assistance.

**INGESTION**

First aid is normally not required. Seek medical attention if discomfort occurs.

**SECTION 5 FIRE FIGHTING MEASURES****EXTINGUISHING MEDIA**

**Appropriate Extinguishing Media:** Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

**Inappropriate Extinguishing Media:** Straight Streams of Water

**FIRE FIGHTING**

**Fire Fighting Instructions:** Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to



Product Name: MOBIL POLYREX EM

Revision Date: 13 Oct 2016

Page 3 of 10

protect personnel.

**Hazardous Combustion Products:** Aldehydes, Incomplete combustion products, Oxides of carbon, Smoke, Fume, Sulfur oxides

## FLAMMABILITY PROPERTIES

**Flash Point [Method]:** >204°C (399°F) [EST. FOR OIL, ASTM D-92 (COC)]

**Flammable Limits (Approximate volume % in air):** LEL: N/D UEL: N/D

**Autoignition Temperature:** N/D

## SECTION 6

## ACCIDENTAL RELEASE MEASURES

### NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

### PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: respiratory protection will be necessary only in special cases, e.g., formation of mists. Half-face or full-face respirator with filter(s) for dust/organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to hydrocarbons are recommended. Gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

### SPILL MANAGEMENT

**Land Spill:** Scrape up spilled material with shovels into a suitable container for recycle or disposal.

**Water Spill:** Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Skim from surface.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

### ENVIRONMENTAL PRECAUTIONS

Prevent entry into waterways, sewers, basements or confined areas.

## SECTION 7

## HANDLING AND STORAGE

Product Name: MOBIL POLYREX EM  
Revision Date: 13 Oct 2016  
Page 4 of 10

---

**HANDLING**

Prevent small spills and leakage to avoid slip hazard.

**Static Accumulator:** This material is not a static accumulator.

**STORAGE**

Do not store in open or unlabelled containers.

**SECTION 8****EXPOSURE CONTROLS / PERSONAL PROTECTION**

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

**ENGINEERING CONTROLS**

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

**PERSONAL PROTECTION**

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

**Respiratory Protection:** If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No protection is ordinarily required under normal conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

**Hand Protection:** Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

**Eye Protection:** If contact is likely, safety glasses with side shields are recommended.

**Skin and Body Protection:** Any specific clothing information provided is based on published literature or



Product Name: MOBIL POLYREX EM

Revision Date: 13 Oct 2016

Page 5 of 10

manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

**Specific Hygiene Measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

## ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

## SECTION 9

## PHYSICAL AND CHEMICAL PROPERTIES

**Note:** Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

### GENERAL INFORMATION

**Physical State:** Solid

**Form:** Semi-fluid

**Color:** Blue

**Odor:** Characteristic

**Odor Threshold:** N/D

### IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

**Relative Density (at 15 °C):** 0.884

**Flammability (Solid, Gas):** N/A

**Flash Point [Method]:** >204°C (399°F) [EST. FOR OIL, ASTM D-92 (COC)]

**Flammable Limits (Approximate volume % in air):** LEL: N/D UEL: N/D

**Autoignition Temperature:** N/D

**Boiling Point / Range:** > 330°C (626°F)

**Decomposition Temperature:** N/D

**Vapor Density (Air = 1):** N/D

**Vapor Pressure:** < 0.013 kPa (0.1 mm Hg) at 20 °C

**Evaporation Rate (n-butyl acetate = 1):** N/D

**pH:** N/A

**Log Pow (n-Octanol/Water Partition Coefficient):** > 3.5

**Solubility in Water:** Negligible

**Viscosity:** 95 cSt (95 mm<sup>2</sup>/sec) at 40 °C

**Oxidizing Properties:** See Hazards Identification Section.

### OTHER INFORMATION

**Freezing Point:** N/D

**Melting Point:** >250°C (482°F)

**DMSO Extract (mineral oil only), IP-346:** < 3 %wt

**NOTE:** Most physical properties above are for the oil component in the material.



Product Name: MOBIL POLYREX EM  
Revision Date: 13 Oct 2016  
Page 6 of 10

<b>SECTION 10</b>	<b>STABILITY AND REACTIVITY</b>
-------------------	---------------------------------

**REACTIVITY:** See sub-sections below.

**STABILITY:** Material is stable under normal conditions.

**CONDITIONS TO AVOID:** Excessive heat. High energy sources of ignition.

**MATERIALS TO AVOID:** Strong oxidizers

**HAZARDOUS DECOMPOSITION PRODUCTS:** Material does not decompose at ambient temperatures.

**POSSIBILITY OF HAZARDOUS REACTIONS:** Hazardous polymerization will not occur.

<b>SECTION 11</b>	<b>TOXICOLOGICAL INFORMATION</b>
-------------------	----------------------------------

**INFORMATION ON TOXICOLOGICAL EFFECTS**

<b>Hazard Class</b>	<b>Conclusion / Remarks</b>
<b>Inhalation</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
<b>Ingestion</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
<b>Skin</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
<b>Eye</b>	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
<b>Sensitization</b>	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
<b>Aspiration:</b> Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.
<b>Germ Cell Mutagenicity:</b> No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
<b>Carcinogenicity:</b> No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
<b>Reproductive Toxicity:</b> No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
<b>Lactation:</b> No end point data for material.	Not expected to cause harm to breast-fed children.
<b>Specific Target Organ Toxicity (STOT)</b>	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.

Product Name: MOBIL POLYREX EM

Revision Date: 13 Oct 2016

Page 7 of 10

Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.
--	--

## OTHER INFORMATION

### Contains:

Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitizing in test animals.

The following ingredients are cited on the lists below: None.

### --REGULATORY LISTS SEARCHED--

1 = NTP CARC

3 = IARC 1

5 = IARC 2B

2 = NTP SUS

4 = IARC 2A

6 = OSHA CARC

## SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

### ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

### MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

### PERSISTENCE AND DEGRADABILITY

#### Biodegradation:

Base oil component -- Expected to be inherently biodegradable

### BIOACCUMULATION POTENTIAL

Base oil component -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

## SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.



Product Name: MOBIL POLYREX EM

Revision Date: 13 Oct 2016

Page 8 of 10

## DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

## REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

**Empty Container Warning** Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14	TRANSPORT INFORMATION
------------	-----------------------

**LAND (DOT):** Not Regulated for Land Transport

**LAND (TDG):** Not Regulated for Land Transport

**SEA (IMDG):** Not Regulated for Sea Transport according to IMDG-Code

**Marine Pollutant:** No

**AIR (IATA):** Not Regulated for Air Transport

SECTION 15	REGULATORY INFORMATION
------------	------------------------

**OSHA HAZARD COMMUNICATION STANDARD:** This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

**Listed or exempt from listing/notification on the following chemical inventories:** DSL, IECSC, KECI, TCSI, TSCA

**Special Cases:**

Inventory	Status
PICCS	Restrictions Apply

**SARA 302:** No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302

Product Name: MOBIL POLYREX EM

Revision Date: 13 Oct 2016

Page 9 of 10

**SARA (311/312) REPORTABLE HAZARD CATEGORIES:** None.**SARA (313) TOXIC RELEASE INVENTORY:** This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
DIPHENYLAMINE	122-39-4	18

## --REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16	OTHER INFORMATION
------------	-------------------

N/D = Not determined, N/A = Not applicable

**KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):**

H314(1B): Causes severe skin burns and eye damage; Skin Corr/Irritation, Cat 1B

H315: Causes skin irritation; Skin Corr/Irritation, Cat 2

**THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:**

Section 01: Company Contact Methods information was modified.

Section 01: Company Mailing Address information was modified.

Section 15: National Chemical Inventory Listing information was modified.

Section 15: Special Cases Table information was modified.

The information and recommendations contained herein are, to the best of ExxonMobil's knowledge and belief, accurate and reliable as of the date issued. You can contact ExxonMobil to insure that this document is the most current available from ExxonMobil. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. If buyer repackages this product, it is the user's responsibility to insure proper health, safety and other necessary information is included with and/or on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, republication or retransmission of this document, in whole or in part, is not permitted. The term, "ExxonMobil" is used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliates in which they directly or indirectly hold any interest.



Product Name: MOBIL POLYREX EM  
Revision Date: 13 Oct 2016  
Page 10 of 10

---

Internal Use Only

MHC: 0B, 0B, 0, 0, 0, 0

PPEC: A

DGN: 2031547XUS (1008419)

---

Copyright 2002 Exxon Mobil Corporation, All rights reserved



Product Name: MOBILITH SHC 220  
Revision Date: 17 Jan 2017  
Page 1 of 10

## SAFETY DATA SHEET

### SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

#### PRODUCT

**Product Name:** (see Section 16 for Synonyms) **MOBILITH SHC 220**  
**Product Description:** Synthetic Base Stocks and Additives  
**Product Code:** 2015A0204040, 644021-00, 970409  
**Intended Use:** Grease

#### COMPANY IDENTIFICATION

**Supplier:** **EXXON MOBIL CORPORATION**  
22777 Springwoods Village Parkway  
Spring, TX 77253 USA  
**24 Hour Health Emergency** 609-737-4411  
**Transportation Emergency Phone** 800-424-9300 or 703-527-3887 CHEMTREC  
**Product Technical Information** 800-662-4525  
**MSDS Internet Address** [www.exxon.com](http://www.exxon.com), [www.mobil.com](http://www.mobil.com)

### SECTION 2 HAZARDS IDENTIFICATION

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

**Other hazard information:**

**HAZARD NOT OTHERWISE CLASSIFIED (HNOC):** None as defined under 29 CFR 1910.1200.

#### PHYSICAL / CHEMICAL HAZARDS

No significant hazards.

#### HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

#### ENVIRONMENTAL HAZARDS

No significant hazards.

<b>NFPA Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0
<b>HMIS Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0

**NOTE:** This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary

Product Name: MOBILITH SHC 220  
Revision Date: 17 Jan 2017  
Page 2 of 10

from person to person.

## SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

### Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
1H-BENZOTRIAZOLE-1-METHANAMINE, N,N-BIS(2-ETHYLHEXYL)-METHYL-	94270-86-7	0.1 - < 1%	H315, H317, H401, H411
BENZENAMINE, N-PHENYL-, REACTION PRODUCTS WITH 2,4,4-TRIMETHYLPENTENE	68411-46-1	1 - < 5%	H402, H412
LITHIUM HYDROXIDE MONOHYDRATE	1310-66-3	0.1 - < 1%	H302, H314(1B)
LITHIUM SALT OF ALIPHATIC ACID	CONFIDENTIAL	1 - < 5%	H302
METHYLENE BIS(DIBUTYLDITHIOCARBAMATE)	10254-57-6	1 - < 5%	H413
ZINC DIALKYL DITHIOPHOSPHATE	68457-79-4	1 - < 2.5%	H315, H318, H401, H411
ZINC DINONYLNAPHTHALENE SULFONATE	28016-00-4	0.1 - < 1%	H315, H319(2A), H317

\* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

## SECTION 4 FIRST AID MEASURES

### INHALATION

Under normal conditions of intended use, this material is not expected to be an inhalation hazard.

### SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

### EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

### INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

## SECTION 5 FIRE FIGHTING MEASURES



Product Name: MOBILITH SHC 220  
Revision Date: 17 Jan 2017  
Page 3 of 10

## EXTINGUISHING MEDIA

**Appropriate Extinguishing Media:** Use water fog, foam, dry chemical or carbon dioxide (CO<sub>2</sub>) to extinguish flames.

**Inappropriate Extinguishing Media:** Straight Streams of Water

## FIRE FIGHTING

**Fire Fighting Instructions:** Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

**Hazardous Combustion Products:** Aldehydes, Incomplete combustion products, Oxides of carbon, Smoke, Fume, Sulfur oxides

## FLAMMABILITY PROPERTIES

**Flash Point [Method]:** >204°C (399°F) [EST. FOR OIL, ASTM D-92 (COC)]

**Flammable Limits (Approximate volume % in air):** LEL: N/D UEL: N/D

**Autoignition Temperature:** N/D

## SECTION 6

## ACCIDENTAL RELEASE MEASURES

### NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

### PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

### SPILL MANAGEMENT

**Land Spill:** Stop leak if you can do it without risk. Scrape up spilled material with shovels into a suitable container for recycle or disposal.

**Water Spill:** Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Skim from surface.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

### ENVIRONMENTAL PRECAUTIONS

Prevent entry into waterways, sewers, basements or confined areas.



Product Name: MOBILITH SHC 220  
Revision Date: 17 Jan 2017  
Page 4 of 10

## SECTION 7 HANDLING AND STORAGE

### HANDLING

Prevent small spills and leakage to avoid slip hazard.

**Static Accumulator:** This material is not a static accumulator.

### STORAGE

Do not store in open or unlabelled containers. Keep away from incompatible materials.

## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE LIMIT VALUES

**Exposure limits/standards (Note: Exposure limits are not additive)**

Substance Name	Form	Limit / Standard			NOTE	Source
LITHIUM HYDROXIDE MONOHYDRATE		Ceiling	1 mg/m3		N/A	OARS WEEL

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

### ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

### PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

**Respiratory Protection:** If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No protection is ordinarily required under normal conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

**Hand Protection:** Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions.

Product Name: MOBILITH SHC 220  
Revision Date: 17 Jan 2017  
Page 5 of 10

Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

**Eye Protection:** If contact is likely, safety glasses with side shields are recommended.

**Skin and Body Protection:** Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

**Specific Hygiene Measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

## ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

<b>SECTION 9</b>	<b>PHYSICAL AND CHEMICAL PROPERTIES</b>
------------------	---

**Note:** Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

## GENERAL INFORMATION

**Physical State:** Solid  
**Form:** Semi-fluid  
**Color:** Red  
**Odor:** Characteristic  
**Odor Threshold:** N/D

## IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

**Relative Density (at 15 °C):** 0.9  
**Flammability (Solid, Gas):** N/D  
**Flash Point [Method]:** >204 °C (399 °F) [EST. FOR OIL, ASTM D-92 (COC)]  
**Flammable Limits (Approximate volume % in air):** LEL: N/D UEL: N/D  
**Autoignition Temperature:** N/D  
**Boiling Point / Range:** > 316 °C (600 °F) [Estimated]  
**Decomposition Temperature:** N/D  
**Vapor Density (Air = 1):** N/D  
**Vapor Pressure:** < 0.013 kPa (0.1 mm Hg) at 20 °C [Estimated]  
**Evaporation Rate (n-butyl acetate = 1):** N/D  
**pH:** N/A  
**Log Pow (n-Octanol/Water Partition Coefficient):** > 3.5 [Estimated]  
**Solubility in Water:** Negligible  
**Viscosity:** 220 cSt (220 mm<sup>2</sup>/sec) at 40 °C  
**Oxidizing Properties:** See Hazards Identification Section.



Product Name: MOBILITH SHC 220  
Revision Date: 17 Jan 2017  
Page 6 of 10

#### OTHER INFORMATION

**Freezing Point:** N/D

**Melting Point:** N/D

NOTE: Most physical properties above are for the oil component in the material.

#### SECTION 10 STABILITY AND REACTIVITY

**REACTIVITY:** See sub-sections below.

**STABILITY:** Material is stable under normal conditions.

**CONDITIONS TO AVOID:** Excessive heat. High energy sources of ignition.

**MATERIALS TO AVOID:** Strong oxidizers

**HAZARDOUS DECOMPOSITION PRODUCTS:** Material does not decompose at ambient temperatures.

**POSSIBILITY OF HAZARDOUS REACTIONS:** Hazardous polymerization will not occur.

#### SECTION 11 TOXICOLOGICAL INFORMATION

##### INFORMATION ON TOXICOLOGICAL EFFECTS

<u>Hazard Class</u>	<u>Conclusion / Remarks</u>
<b>Inhalation</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
<b>Ingestion</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
<b>Skin</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
<b>Eye</b>	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
<b>Sensitization</b>	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
<b>Aspiration:</b> Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.
<b>Germ Cell Mutagenicity:</b> No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
<b>Carcinogenicity:</b> No end point data for	Not expected to cause cancer. Based on assessment of the

Product Name: MOBILITH SHC 220

Revision Date: 17 Jan 2017

Page 7 of 10

material.	components.
<b>Reproductive Toxicity:</b> No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
<b>Lactation:</b> No end point data for material.	Not expected to cause harm to breast-fed children.
<b>Specific Target Organ Toxicity (STOT)</b>	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

**OTHER INFORMATION****For the product itself:**

Component concentrations in this formulation would not be expected to cause skin sensitization, based on tests of the components or similar formulations. An ingredient or ingredients that are classified as a skin sensitizer.

**Contains:**

Synthetic base oils: Not expected to cause significant health effects under conditions of normal use, based on laboratory studies with the same or similar materials. Not mutagenic or genotoxic. Not sensitizing in test animals and humans.

The following ingredients are cited on the lists below: None.

**--REGULATORY LISTS SEARCHED--**

1 = NTP CARC

3 = IARC 1

5 = IARC 2B

2 = NTP SUS

4 = IARC 2A

6 = OSHA CARC

**SECTION 12****ECOLOGICAL INFORMATION**

The information given is based on data available for the material, the components of the material, and similar materials.

**ECOTOXICITY**

Material -- Not expected to be harmful to aquatic organisms.

**MOBILITY**

Base oil component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.



Product Name: MOBILITH SHC 220  
Revision Date: 17 Jan 2017  
Page 8 of 10

## SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

### DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

### REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

**Empty Container Warning** Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

## SECTION 14 TRANSPORT INFORMATION

**LAND (DOT):** Not Regulated for Land Transport

**LAND (TDG):** Not Regulated for Land Transport

**SEA (IMDG):** Not Regulated for Sea Transport according to IMDG-Code

**Marine Pollutant:** No

**AIR (IATA):** Not Regulated for Air Transport

## SECTION 15 REGULATORY INFORMATION

**OSHA HAZARD COMMUNICATION STANDARD:** This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

**Listed or exempt from listing/notification on the following chemical inventories:** AICS, IECSC, KECI, TCSI, TSCA

**Special Cases:**

Inventory	Status
-----------	--------

Product Name: MOBILITH SHC 220  
Revision Date: 17 Jan 2017  
Page 9 of 10

NDSL	Restrictions Apply
PICCS	Restrictions Apply

**SARA 302:** No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302

**SARA (311/312) REPORTABLE HAZARD CATEGORIES:** None.

**SARA (313) TOXIC RELEASE INVENTORY:**

Chemical Name	CAS Number	Typical Value
ZINC DIALKYL DITHIOPHOSPHATE	68457-79-4	1 - < 2.5%

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
ZINC DIALKYL DITHIOPHOSPHATE	68457-79-4	13, 15, 17, 19
ZINC DINONYLNAPHTHALENE SULFONATE	28016-00-4	15

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

<b>SECTION 16</b>	<b>OTHER INFORMATION</b>
-------------------	--------------------------

N/D = Not determined, N/A = Not applicable

**KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):**

H302: Harmful if swallowed; Acute Tox Oral, Cat 4  
H314(1B): Causes severe skin burns and eye damage; Skin Corr/Irritation, Cat 1B  
H315: Causes skin irritation; Skin Corr/Irritation, Cat 2  
H317: May cause allergic skin reaction; Skin Sensitization, Cat 1  
H318: Causes serious eye damage; Serious Eye Damage/Irr, Cat 1  
H319(2A): Causes serious eye irritation; Serious Eye Damage/Irr, Cat 2A  
H401: Toxic to aquatic life; Acute Env Tox, Cat 2  
H402: Harmful to aquatic life; Acute Env Tox, Cat 3  
H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2  
H412: Harmful to aquatic life with long lasting effects; Chronic Env Tox, Cat 3





Product Name: MOBILITH SHC 220  
Revision Date: 17 Jan 2017  
Page 10 of 10

---

H413: May cause long lasting harmful effects to aquatic life; Chronic Env Tox, Cat 4

**THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:**

Composition: Component Table information was modified.  
Section 01: Company Contact Methods information was modified.  
Section 01: Company Mailing Address information was modified.  
Section 11: Other Health Effects information was modified.  
Section 14: Marine Pollutant information was modified.  
Section 15: List Citations Table information was modified.  
Section 15: National Chemical Inventory Listing information was modified.  
Section 15: SARA (313) TOXIC RELEASE INVENTORY - Table information was modified.  
Section 16: HCode Key information was modified.

**SYNONYMS:** MOBILITH SHC 220 ELECTROLUBER

---

The information and recommendations contained herein are, to the best of ExxonMobil's knowledge and belief, accurate and reliable as of the date issued. You can contact ExxonMobil to insure that this document is the most current available from ExxonMobil. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. If buyer repackages this product, it is the user's responsibility to insure proper health, safety and other necessary information is included with and/or on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, republication or retransmission of this document, in whole or in part, is not permitted. The term, "ExxonMobil" is used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliates in which they directly or indirectly hold any interest.

---

Internal Use Only

MHC: 0B, 0B, 0, 0, 0, 0

PPEC: A

DGN: 2010011XUS (553335)

---

Copyright 2002 Exxon Mobil Corporation, All rights reserved

Product Name: MOBILGEAR SHC 320  
Revision Date: 17 Mar 2015  
Page 1 of 10

## SAFETY DATA SHEET

<b>SECTION 1</b>	<b>PRODUCT AND COMPANY IDENTIFICATION</b>
------------------	---

### PRODUCT

**Product Name:** MOBILGEAR SHC 320  
**Product Description:** Synthetic Base Stocks and Additives  
**Product Code:** 201560402520, 610816-00, 970354  
**Intended Use:** Gear oil

### COMPANY IDENTIFICATION

**Supplier:** EXXON MOBIL CORPORATION  
22777 Springwoods Village Parkway  
Spring, TX. 77389 USA  
**24 Hour Health Emergency** 609-737-4411  
**Transportation Emergency Phone** 800-424-9300 or 703-527-3887 CHEMTREC  
**Product Technical Information** 800-662-4525  
**MSDS Internet Address** <http://www.exxon.com>, <http://www.mobil.com>

<b>SECTION 2</b>	<b>HAZARDS IDENTIFICATION</b>
------------------	-------------------------------

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

### Other hazard information:

**HAZARD NOT OTHERWISE CLASSIFIED (HNOC):** None as defined under 29 CFR 1910.1200.

### PHYSICAL / CHEMICAL HAZARDS

No significant hazards.

### HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

### ENVIRONMENTAL HAZARDS

No significant hazards.

<b>NFPA Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0
<b>HMIS Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0

**NOTE:** This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

Product Name: MOBILGEAR SHC 320  
Revision Date: 17 Mar 2015  
Page 2 of 10

## SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

### Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
DITRIDECYL ADIPATE	16958-92-2	20 - < 30%	None

\* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

## SECTION 4 FIRST AID MEASURES

### INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

### SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

### EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

### INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

## SECTION 5 FIRE FIGHTING MEASURES

### EXTINGUISHING MEDIA

**Appropriate Extinguishing Media:** Use water fog, foam, dry chemical or carbon dioxide (CO<sub>2</sub>) to extinguish flames.

**Inappropriate Extinguishing Media:** Straight Streams of Water

### FIRE FIGHTING

**Fire Fighting Instructions:** Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed



Product Name: MOBILGEAR SHC 320  
Revision Date: 17 Mar 2015  
Page 3 of 10

spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

**Hazardous Combustion Products:** Incomplete combustion products, Sulfur oxides, Smoke, Fume, Aldehydes, Oxides of carbon

#### FLAMMABILITY PROPERTIES

**Flash Point [Method]:** >210°C (410°F) [ASTM D-92]

**Flammable Limits (Approximate volume % in air):** LEL: 0.9 UEL: 7.0

**Autoignition Temperature:** N/D

### SECTION 6

### ACCIDENTAL RELEASE MEASURES

#### NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

#### PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

#### SPILL MANAGEMENT

**Land Spill:** Stop leak if you can do it without risk. Recover by pumping or with suitable absorbent.

**Water Spill:** Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

#### ENVIRONMENTAL PRECAUTIONS

**Large Spills:** Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

### SECTION 7

### HANDLING AND STORAGE

#### HANDLING

Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not



Product Name: MOBILGEAR SHC 320  
Revision Date: 17 Mar 2015  
Page 4 of 10

eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

**Static Accumulator:** This material is a static accumulator.

## STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. Do not store in open or unlabelled containers.

## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE LIMIT VALUES

**Exposure limits/standards (Note: Exposure limits are not additive)**

Substance Name	Form	Limit / Standard	NOTE	Source
DITRIDECYL ADIPATE		TWA 5 mg/m <sup>3</sup>	N/A	ExxonMobil

**Exposure limits/standards for materials that can be formed when handling this product:** When mists/aerosols can occur the following are recommended: 5 mg/m<sup>3</sup> - ACGIH TLV (inhalable fraction), 5 mg/m<sup>3</sup> - OSHA PEL.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

### ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Adequate ventilation should be provided so that exposure limits are not exceeded.

### PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

**Respiratory Protection:** If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

**Hand Protection:** Any specific glove information provided is based on published literature and glove

Product Name: MOBILGEAR SHC 320  
Revision Date: 17 Mar 2015  
Page 5 of 10

manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

**Eye Protection:** If contact is likely, safety glasses with side shields are recommended.

**Skin and Body Protection:** Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

**Specific Hygiene Measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

## ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9	PHYSICAL AND CHEMICAL PROPERTIES
-----------	----------------------------------

**Note:** Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

## GENERAL INFORMATION

**Physical State:** Liquid  
**Color:** Amber  
**Odor:** Characteristic  
**Odor Threshold:** N/D

## IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

**Relative Density (at 15 °C):** 0.876  
**Flammability (Solid, Gas):** N/A  
**Flash Point [Method]:** >210 °C (410 °F) [ASTM D-92]  
**Flammable Limits (Approximate volume % in air):** LEL: 0.9 UEL: 7.0  
**Autoignition Temperature:** N/D  
**Boiling Point / Range:** > 316 °C (600 °F) [Estimated]  
**Decomposition Temperature:** N/D  
**Vapor Density (Air = 1):** > 2 at 101 kPa [Estimated]  
**Vapor Pressure:** < 0.013 kPa (0.1 mm Hg) at 20 °C [Estimated]  
**Evaporation Rate (n-butyl acetate = 1):** N/D  
**pH:** N/A  
**Log Pow (n-Octanol/Water Partition Coefficient):** > 3.5 [Estimated]  
**Solubility in Water:** Negligible  
**Viscosity:** 320 cSt (320 mm<sup>2</sup>/sec) at 40 °C  
**Oxidizing Properties:** See Hazards Identification Section.



Product Name: MOBILGEAR SHC 320  
Revision Date: 17 Mar 2015  
Page 6 of 10

## OTHER INFORMATION

Freezing Point: N/D  
Melting Point: N/A  
Pour Point: -33°C (-27°F)

## SECTION 10 STABILITY AND REACTIVITY

**REACTIVITY:** See sub-sections below.

**STABILITY:** Material is stable under normal conditions.

**CONDITIONS TO AVOID:** Excessive heat. High energy sources of ignition.

**MATERIALS TO AVOID:** Strong oxidizers

**HAZARDOUS DECOMPOSITION PRODUCTS:** Material does not decompose at ambient temperatures.

**POSSIBILITY OF HAZARDOUS REACTIONS:** Hazardous polymerization will not occur.

## SECTION 11 TOXICOLOGICAL INFORMATION

### INFORMATION ON TOXICOLOGICAL EFFECTS

<u>Hazard Class</u>	<u>Conclusion / Remarks</u>
<b>Inhalation</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
<b>Ingestion</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
<b>Skin</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
<b>Eye</b>	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
<b>Sensitization</b>	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
<b>Aspiration:</b> Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.
<b>Germ Cell Mutagenicity:</b> No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
<b>Carcinogenicity:</b> No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
<b>Reproductive Toxicity:</b> No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
<b>Lactation:</b> No end point data for material.	Not expected to cause harm to breast-fed children.

Product Name: MOBILGEAR SHC 320

Revision Date: 17 Mar 2015

Page 7 of 10

Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

**OTHER INFORMATION****For the product itself:**

Repeated and/or prolonged exposure may cause irritation to the skin, eyes, or respiratory tract.

**Contains:**

Synthetic base oils: Not expected to cause significant health effects under conditions of normal use, based on laboratory studies with the same or similar materials. Not mutagenic or genotoxic. Not sensitizing in test animals and humans.

The following ingredients are cited on the lists below: None.

**--REGULATORY LISTS SEARCHED--**

1 = NTP CARC

3 = IARC 1

5 = IARC 2B

2 = NTP SUS

4 = IARC 2A

6 = OSHA CARC

**SECTION 12 ECOLOGICAL INFORMATION**

The information given is based on data available for the material, the components of the material, and similar materials.

**ECOTOXICITY**

Material -- Not expected to be harmful to aquatic organisms.

**MOBILITY**

Base oil component -- Low solubility and floats and is expected to migrate from water to the land.  
Expected to partition to sediment and wastewater solids.

**SECTION 13 DISPOSAL CONSIDERATIONS**

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.



Product Name: MOBILGEAR SHC 320  
Revision Date: 17 Mar 2015  
Page 8 of 10

## DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

## REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

**Empty Container Warning** Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

<b>SECTION 14</b>	<b>TRANSPORT INFORMATION</b>
-------------------	------------------------------

**LAND (DOT):** Not Regulated for Land Transport

**LAND (TDG):** Not Regulated for Land Transport

**SEA (IMDG):** Not Regulated for Sea Transport according to IMDG-Code

**Marine Pollutant:** No

**AIR (IATA):** Not Regulated for Air Transport

<b>SECTION 15</b>	<b>REGULATORY INFORMATION</b>
-------------------	-------------------------------

**OSHA HAZARD COMMUNICATION STANDARD:** This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

**Listed or exempt from listing/notification on the following chemical inventories:** DSL, TSCA  
**Special Cases:**

Inventory	Status
AICS	Restrictions Apply
IECSC	Restrictions Apply
KECI	Restrictions Apply



Product Name: MOBILGEAR SHC 320  
Revision Date: 17 Mar 2015  
Page 9 of 10

PICCS

Restrictions Apply

**EPCRA SECTION 302:** This material contains no extremely hazardous substances.

**SARA (311/312) REPORTABLE HAZARD CATEGORIES:** None.

**SARA (313) TOXIC RELEASE INVENTORY:** This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

**The following ingredients are cited on the lists below:** None.

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

**SECTION 16**

**OTHER INFORMATION**

N/D = Not determined, N/A = Not applicable

**THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:**

Updates made in accordance with implementation of GHS requirements.

The information and recommendations contained herein are, to the best of ExxonMobil's knowledge and belief, accurate and reliable as of the date issued. You can contact ExxonMobil to insure that this document is the most current available from ExxonMobil. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. If buyer repackages this product, it is the user's responsibility to insure proper health, safety and other necessary information is included with and/or on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, re-publication or retransmission of this document, in whole or in part, is not permitted. The term, "ExxonMobil" is used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliates in which they directly or indirectly hold any interest.

Internal Use Only



Product Name: MOBILGEAR SHC 320  
Revision Date: 17 Mar 2015  
Page 10 of 10

---

MHC: 0B, 0B, 0, 0, 0, 0

PPEC: A

DGN: 2009054XUS (1012235)

---

Copyright 2002 Exxon Mobil Corporation, All rights reserved



Product Name: MOBILGEAR SHC 460  
Revision Date: 17 Mar 2015  
Page 1 of 10

## SAFETY DATA SHEET

### SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

#### PRODUCT

**Product Name:** MOBILGEAR SHC 460  
**Product Description:** Synthetic Base Stocks and Additives  
**Product Code:** 201560402525, 610832-00, 970714  
**Intended Use:** Gear oil

#### COMPANY IDENTIFICATION

**Supplier:** EXXON MOBIL CORPORATION  
22777 Springwoods Village Parkway  
Spring, TX. 77389 USA  
**24 Hour Health Emergency** 609-737-4411  
**Transportation Emergency Phone** 800-424-9300 or 703-527-3887 CHEMTREC  
**Product Technical Information** 800-662-4525  
**MSDS Internet Address** <http://www.exxon.com>, <http://www.mobil.com>

### SECTION 2 HAZARDS IDENTIFICATION

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

#### Other hazard information:

**HAZARD NOT OTHERWISE CLASSIFIED (HNOC):** None as defined under 29 CFR 1910.1200.

#### PHYSICAL / CHEMICAL HAZARDS

No significant hazards.

#### HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

#### ENVIRONMENTAL HAZARDS

No significant hazards.

<b>NFPA Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0
<b>HMIS Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0

**NOTE:** This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.



Product Name: MOBILGEAR SHC 460  
Revision Date: 17 Mar 2015  
Page 2 of 10

### SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

#### Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
DITRIDECYL ADIPATE	16958-92-2	20 - < 30%	None

\* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

### SECTION 4 FIRST AID MEASURES

#### INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

#### SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

#### EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

#### INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

### SECTION 5 FIRE FIGHTING MEASURES

#### EXTINGUISHING MEDIA

**Appropriate Extinguishing Media:** Use water fog, foam, dry chemical or carbon dioxide (CO<sub>2</sub>) to extinguish flames.

**Inappropriate Extinguishing Media:** Straight Streams of Water

#### FIRE FIGHTING

**Fire Fighting Instructions:** Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed

Product Name: MOBILGEAR SHC 460  
Revision Date: 17 Mar 2015  
Page 3 of 10

spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

**Hazardous Combustion Products:** Oxides of carbon, Sulfur oxides, Incomplete combustion products, Aldehydes, Smoke, Fume

## FLAMMABILITY PROPERTIES

**Flash Point [Method]:** >210°C (410°F) [ASTM D-92]

**Flammable Limits (Approximate volume % in air):** LEL: 0.9 UEL: 7.0

**Autoignition Temperature:** N/D

## SECTION 6

## ACCIDENTAL RELEASE MEASURES

### NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

### PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

### SPILL MANAGEMENT

**Land Spill:** Stop leak if you can do it without risk. Recover by pumping or with suitable absorbent.

**Water Spill:** Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

### ENVIRONMENTAL PRECAUTIONS

**Large Spills:** Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

## SECTION 7

## HANDLING AND STORAGE

### HANDLING

Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not



Product Name: MOBILGEAR SHC 460  
Revision Date: 17 Mar 2015  
Page 4 of 10

eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

**Static Accumulator:** This material is a static accumulator.

## STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. Do not store in open or unlabelled containers.

## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE LIMIT VALUES

**Exposure limits/standards (Note: Exposure limits are not additive)**

Substance Name	Form	Limit / Standard	NOTE	Source
DITRIDECYL ADIPATE		TWA 5 mg/m <sup>3</sup>	N/A	ExxonMobil

**Exposure limits/standards for materials that can be formed when handling this product:** When mists/aerosols can occur the following are recommended: 5 mg/m<sup>3</sup> - ACGIH TLV (inhalable fraction), 5 mg/m<sup>3</sup> - OSHA PEL.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

### ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

### PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

**Respiratory Protection:** If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

**Hand Protection:** Any specific glove information provided is based on published literature and glove

Product Name: MOBILGEAR SHC 460

Revision Date: 17 Mar 2015

Page 5 of 10

manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

**Eye Protection:** If contact is likely, safety glasses with side shields are recommended.

**Skin and Body Protection:** Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

**Specific Hygiene Measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

## ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

## SECTION 9

## PHYSICAL AND CHEMICAL PROPERTIES

**Note:** Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

### GENERAL INFORMATION

**Physical State:** Liquid

**Color:** Pale Yellow

**Odor:** Characteristic

**Odor Threshold:** N/D

### IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

**Relative Density:** 0.868

**Flammability (Solid, Gas):** N/A

**Flash Point [Method]:** >210°C (410°F) [ASTM D-92]

**Flammable Limits (Approximate volume % in air):** LEL: 0.9 UEL: 7.0

**Autoignition Temperature:** N/D

**Boiling Point / Range:** > 316°C (600°F) [Estimated]

**Decomposition Temperature:** N/D

**Vapor Density (Air = 1):** > 2 at 101 kPa [Estimated]

**Vapor Pressure:** < 0.013 kPa (0.1 mm Hg) at 20 °C [Estimated]

**Evaporation Rate (n-butyl acetate = 1):** N/D

**pH:** N/A

**Log Pow (n-Octanol/Water Partition Coefficient):** > 3.5 [Estimated]

**Solubility in Water:** Negligible

**Viscosity:** 460 cSt (460 mm<sup>2</sup>/sec) at 40 °C | 45.4 cSt (45.4 mm<sup>2</sup>/sec) at 100°C

**Oxidizing Properties:** See Hazards Identification Section.



Product Name: MOBILGEAR SHC 460  
Revision Date: 17 Mar 2015  
Page 6 of 10

#### OTHER INFORMATION

Freezing Point: N/D  
Melting Point: N/A  
Pour Point: -27°C (-17°F)

<b>SECTION 10</b>	<b>STABILITY AND REACTIVITY</b>
-------------------	---------------------------------

**REACTIVITY:** See sub-sections below.

**STABILITY:** Material is stable under normal conditions.

**CONDITIONS TO AVOID:** Excessive heat. High energy sources of ignition.

**MATERIALS TO AVOID:** Strong oxidizers

**HAZARDOUS DECOMPOSITION PRODUCTS:** Material does not decompose at ambient temperatures.

**POSSIBILITY OF HAZARDOUS REACTIONS:** Hazardous polymerization will not occur.

<b>SECTION 11</b>	<b>TOXICOLOGICAL INFORMATION</b>
-------------------	----------------------------------

#### INFORMATION ON TOXICOLOGICAL EFFECTS

<u>Hazard Class</u>	<u>Conclusion / Remarks</u>
<b>Inhalation</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
<b>Ingestion</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
<b>Skin</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
<b>Eye</b>	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
<b>Sensitization</b>	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
<b>Aspiration:</b> Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.
<b>Germ Cell Mutagenicity:</b> No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
<b>Carcinogenicity:</b> No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
<b>Reproductive Toxicity:</b> No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
<b>Lactation:</b> No end point data for material.	Not expected to cause harm to breast-fed children.

Product Name: MOBILGEAR SHC 460

Revision Date: 17 Mar 2015

Page 7 of 10

Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

**OTHER INFORMATION****For the product itself:**

Repeated and/or prolonged exposure may cause irritation to the skin, eyes, or respiratory tract.

**Contains:**

Synthetic base oils: Not expected to cause significant health effects under conditions of normal use, based on laboratory studies with the same or similar materials. Not mutagenic or genotoxic. Not sensitizing in test animals and humans.

The following ingredients are cited on the lists below: None.

**--REGULATORY LISTS SEARCHED--**

1 = NTP CARC

3 = IARC 1

5 = IARC 2B

2 = NTP SUS

4 = IARC 2A

6 = OSHA CARC

**SECTION 12****ECOLOGICAL INFORMATION**

The information given is based on data available for the material, the components of the material, and similar materials.

**ECOTOXICITY**

Material -- Not expected to be harmful to aquatic organisms.

**MOBILITY**

Base oil component -- Low solubility and floats and is expected to migrate from water to the land.  
Expected to partition to sediment and wastewater solids.

**SECTION 13****DISPOSAL CONSIDERATIONS**

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

Product Name: MOBILGEAR SHC 460  
Revision Date: 17 Mar 2015  
Page 8 of 10

## DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

## REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

**Empty Container Warning** Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

## SECTION 14 TRANSPORT INFORMATION

**LAND (DOT):** Not Regulated for Land Transport

**LAND (TDG):** Not Regulated for Land Transport

**SEA (IMDG):** Not Regulated for Sea Transport according to IMDG-Code

**Marine Pollutant:** No

**AIR (IATA):** Not Regulated for Air Transport

## SECTION 15 REGULATORY INFORMATION

**OSHA HAZARD COMMUNICATION STANDARD:** This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

**Listed or exempt from listing/notification on the following chemical inventories:** DSL, ENCS, KECI, TSCA  
**Special Cases:**

Inventory	Status
AICS	Restrictions Apply
IECSC	Restrictions Apply



Product Name: MOBILGEAR SHC 460

Revision Date: 17 Mar 2015

Page 9 of 10

**EPCRA SECTION 302:** This material contains no extremely hazardous substances.

**SARA (311/312) REPORTABLE HAZARD CATEGORIES:** None.

**SARA (313) TOXIC RELEASE INVENTORY:** This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

**The following ingredients are cited on the lists below:** None.

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16	OTHER INFORMATION
------------	-------------------

N/D = Not determined, N/A = Not applicable

**THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:**

Updates made in accordance with implementation of GHS requirements.

The information and recommendations contained herein are, to the best of ExxonMobil's knowledge and belief, accurate and reliable as of the date issued. You can contact ExxonMobil to insure that this document is the most current available from ExxonMobil. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. If buyer repackages this product, it is the user's responsibility to insure proper health, safety and other necessary information is included with and/or on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, re-publication or retransmission of this document, in whole or in part, is not permitted. The term, "ExxonMobil" is used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliates in which they directly or indirectly hold any interest.

Internal Use Only

MHC: 0B, 0B, 0, 0, 0, 0

PPEC: A



Product Name: MOBILGEAR SHC 460

Revision Date: 17 Mar 2015

Page 10 of 10

---

DGN: 2009063XUS (549007)

---

Copyright 2002 Exxon Mobil Corporation, All rights reserved

Product Name: MOBIL SHC 629  
Revision Date: 16 Mar 2015  
Page 1 of 10

## SAFETY DATA SHEET

### SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

#### PRODUCT

**Product Name:** MOBIL SHC 629  
**Product Description:** Synthetic Base Stocks and Additives  
**Product Code:** 201560500540, 602946-00, 970114  
**Intended Use:** Circulating/gear oil

#### COMPANY IDENTIFICATION

**Supplier:** EXXON MOBIL CORPORATION  
22777 Springwoods Village Parkway  
Spring, TX. 77389 USA  
**24 Hour Health Emergency** 609-737-4411  
**Transportation Emergency Phone** 800-424-9300 or 703-527-3887 CHEMTREC  
**Product Technical Information** 800-662-4525  
**MSDS Internet Address** <http://www.exxon.com>, <http://www.mobil.com>

### SECTION 2 HAZARDS IDENTIFICATION

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

#### Other hazard information:

**HAZARD NOT OTHERWISE CLASSIFIED (HNOC):** None as defined under 29 CFR 1910.1200.

#### PHYSICAL / CHEMICAL HAZARDS

No significant hazards.

#### HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

#### ENVIRONMENTAL HAZARDS

No significant hazards.

<b>NFPA Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0
<b>HMIS Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0

**NOTE:** This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.



Product Name: MOBIL SHC 629  
Revision Date: 16 Mar 2015  
Page 2 of 10

**SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS**

This material is defined as a mixture.

**Hazardous Substance(s) or Complex Substance(s) required for disclosure**

Name	CAS#	Concentration*	GHS Hazard Codes
1-DECENE, HOMOPOLYMER HYDROGENATED	68037-01-4	30 - < 40%	H304
TRIPHENYL PHOSPHATE	115-86-6	0.1 - < 1%	H400(M factor 1), H410(M factor 1)

\* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

**SECTION 4 FIRST AID MEASURES****INHALATION**

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

**SKIN CONTACT**

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

**EYE CONTACT**

Flush thoroughly with water. If irritation occurs, get medical assistance.

**INGESTION**

First aid is normally not required. Seek medical attention if discomfort occurs.

**SECTION 5 FIRE FIGHTING MEASURES****EXTINGUISHING MEDIA**

**Appropriate Extinguishing Media:** Use water fog, foam, dry chemical or carbon dioxide (CO<sub>2</sub>) to extinguish flames.

**Inappropriate Extinguishing Media:** Straight Streams of Water

**FIRE FIGHTING**

Product Name: MOBIL SHC 629  
Revision Date: 16 Mar 2015  
Page 3 of 10

**Fire Fighting Instructions:** Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

**Hazardous Combustion Products:** Oxides of carbon, Smoke, Fume, Sulfur oxides, Incomplete combustion products, Aldehydes

## FLAMMABILITY PROPERTIES

**Flash Point [Method]:** >210°C (410°F) [ASTM D-92]

**Flammable Limits (Approximate volume % in air):** LEL: 0.9 UEL: 7.0

**Autoignition Temperature:** N/D

## SECTION 6

## ACCIDENTAL RELEASE MEASURES

### NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

### PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

### SPILL MANAGEMENT

**Land Spill:** Stop leak if you can do it without risk. Recover by pumping or with suitable absorbent.

**Water Spill:** Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

### ENVIRONMENTAL PRECAUTIONS

**Large Spills:** Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

## SECTION 7

## HANDLING AND STORAGE

### HANDLING

Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could



Product Name: MOBIL SHC 629  
Revision Date: 16 Mar 2015  
Page 4 of 10

ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

**Static Accumulator:** This material is a static accumulator.

## STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. Do not store in open or unlabelled containers.

## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Substance Name	Form	Limit / Standard			NOTE	Source
1-DECENE, HOMOPOLYMER HYDROGENATED	Aerosols (thoracic fraction)	TWA	5 mg/m <sup>3</sup>		N/A	ExxonMobil
TRIPHENYL PHOSPHATE		TWA	3 mg/m <sup>3</sup>		N/A	OSHA Z1
TRIPHENYL PHOSPHATE		TWA	3 mg/m <sup>3</sup>		N/A	ACGIH

**Exposure limits/standards for materials that can be formed when handling this product:** When mists/aerosols can occur the following are recommended: 5 mg/m<sup>3</sup> - ACGIH TLV (inhalable fraction), 5 mg/m<sup>3</sup> - OSHA PEL.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

### ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:  
No special requirements under ordinary conditions of use and with adequate ventilation.

### PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

**Respiratory Protection:** If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:  
No special requirements under ordinary conditions of use and with adequate ventilation.



For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

**Hand Protection:** Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

**Eye Protection:** If contact is likely, safety glasses with side shields are recommended.

**Skin and Body Protection:** Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

**Specific Hygiene Measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

## ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

## SECTION 9

## PHYSICAL AND CHEMICAL PROPERTIES

**Note:** Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

### GENERAL INFORMATION

**Physical State:** Liquid  
**Color:** Orange  
**Odor:** Characteristic  
**Odor Threshold:** N/D

### IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

**Relative Density (at 15 °C):** 0.864  
**Flammability (Solid, Gas):** N/A  
**Flash Point [Method]:** >210°C (410°F) [ASTM D-92]  
**Flammable Limits (Approximate volume % in air):** LEL: 0.9 UEL: 7.0  
**Autoignition Temperature:** N/D  
**Boiling Point / Range:** > 316°C (600°F)  
**Decomposition Temperature:** N/D  
**Vapor Density (Air = 1):** > 2 at 101 kPa  
**Vapor Pressure:** < 0.013 kPa (0.1 mm Hg) at 20 °C  
**Evaporation Rate (n-butyl acetate = 1):** N/D

Product Name: MOBIL SHC 629  
Revision Date: 16 Mar 2015  
Page 6 of 10

pH: N/A  
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5  
Solubility in Water: Negligible  
Viscosity: 150 cSt (150 mm<sup>2</sup>/sec) at 40 °C | 20.8 cSt (20.8 mm<sup>2</sup>/sec) at 100°C  
Oxidizing Properties: See Hazards Identification Section.

#### OTHER INFORMATION

Freezing Point: N/D  
Melting Point: N/A  
Pour Point: -39°C (-38°F)

SECTION 10	STABILITY AND REACTIVITY
------------	--------------------------

**REACTIVITY:** See sub-sections below.

**STABILITY:** Material is stable under normal conditions.

**CONDITIONS TO AVOID:** Excessive heat. High energy sources of ignition.

**MATERIALS TO AVOID:** Strong oxidizers

**HAZARDOUS DECOMPOSITION PRODUCTS:** Material does not decompose at ambient temperatures.

**POSSIBILITY OF HAZARDOUS REACTIONS:** Hazardous polymerization will not occur.

SECTION 11	TOXICOLOGICAL INFORMATION
------------	---------------------------

#### INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
<b>Inhalation</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
<b>Ingestion</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
<b>Skin</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
<b>Eye</b>	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
<b>Sensitization</b>	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
<b>Aspiration:</b> Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.



Product Name: MOBIL SHC 629  
Revision Date: 16 Mar 2015  
Page 7 of 10

<b>Germ Cell Mutagenicity:</b> No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
<b>Carcinogenicity:</b> No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
<b>Reproductive Toxicity:</b> No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
<b>Lactation:</b> No end point data for material.	Not expected to cause harm to breast-fed children.
<b>Specific Target Organ Toxicity (STOT)</b>	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

## OTHER INFORMATION

### Contains:

Synthetic base oils: Not expected to cause significant health effects under conditions of normal use, based on laboratory studies with the same or similar materials. Not mutagenic or genotoxic. Not sensitizing in test animals and humans.

The following ingredients are cited on the lists below: None.

### --REGULATORY LISTS SEARCHED--

1 = NTP CARC  
2 = NTP SUS

3 = IARC 1  
4 = IARC 2A

5 = IARC 2B  
6 = OSHA CARC

## SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

### ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

Material -- Not expected to demonstrate chronic toxicity to aquatic organisms.

### MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land.  
Expected to partition to sediment and wastewater solids.

## ECOLOGICAL DATA

### Ecotoxicity



Product Name: MOBIL SHC 629  
Revision Date: 16 Mar 2015  
Page 8 of 10

Test	Duration	Organism Type	Test Results
Aquatic - Acute Toxicity	96 hour(s)	Oncorhynchus mykiss	LL50 1003 mg/l: data for similar materials
Aquatic - Chronic Toxicity	21 day(s)	Daphnia magna	NOELR 1 mg/l: data for similar materials

## SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

### DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

### REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

**Empty Container Warning** Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. **DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.**

## SECTION 14 TRANSPORT INFORMATION

**LAND (DOT):** Not Regulated for Land Transport

**LAND (TDG):** Not Regulated for Land Transport

**SEA (IMDG):** Not Regulated for Sea Transport according to IMDG-Code

**Marine Pollutant:** No

**AIR (IATA):** Not Regulated for Air Transport

Product Name: MOBIL SHC 629  
 Revision Date: 16 Mar 2015  
 Page 9 of 10

## SECTION 15 REGULATORY INFORMATION

**OSHA HAZARD COMMUNICATION STANDARD:** This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

**Listed or exempt from listing/notification on the following chemical inventories:** DSL, KECI, TSCA  
**Special Cases:**

Inventory	Status
AICS	Restrictions Apply
IECSC	Restrictions Apply

**PRODUCT REGISTRATION STATUS:** USA

**EPCRA SECTION 302:** This material contains no extremely hazardous substances.

**SARA (311/312) REPORTABLE HAZARD CATEGORIES:** None.

**SARA (313) TOXIC RELEASE INVENTORY:** This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
PHENOL, 4,4-METHYLENEBIS(2,6-BIS(1,1-DIMETHYLETHYL)-	118-82-1	5

### --REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

## SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

### KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):

H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1

H400: Very toxic to aquatic life; Acute Env Tox, Cat 1

H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1



Product Name: MOBIL SHC 629

Revision Date: 16 Mar 2015

Page 10 of 10

---

**THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:**

Updates made in accordance with implementation of GHS requirements.

---

The information and recommendations contained herein are, to the best of ExxonMobil's knowledge and belief, accurate and reliable as of the date issued. You can contact ExxonMobil to insure that this document is the most current available from ExxonMobil. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. If buyer repackages this product, it is the user's responsibility to insure proper health, safety and other necessary information is included with and/or on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, re-publication or retransmission of this document, in whole or in part, is not permitted. The term, "ExxonMobil" is used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliates in which they directly or indirectly hold any interest.

---

Internal Use Only

MHC: 0B, 0B, 0, 0, 0, 0

PPEC: A

DGN: 2007961XUS (1013314)

---

Copyright 2002 Exxon Mobil Corporation, All rights reserved



Product Name: MOBIL SHC 630  
Revision Date: 17 Mar 2015  
Page 1 of 10

## SAFETY DATA SHEET

### SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

#### PRODUCT

**Product Name:** MOBIL SHC 630  
**Product Description:** Synthetic Base Stocks and Additives  
**Product Code:** 201560500550, 602953-00, 970782  
**Intended Use:** Circulating/gear oil

#### COMPANY IDENTIFICATION

**Supplier:** EXXON MOBIL CORPORATION  
22777 Springwoods Village Parkway  
Spring, TX. 77389 USA  
**24 Hour Health Emergency** 609-737-4411  
**Transportation Emergency Phone** 800-424-9300 or 703-527-3887 CHEMTREC  
**Product Technical Information** 800-662-4525  
**MSDS Internet Address** <http://www.exxon.com>, <http://www.mobil.com>

### SECTION 2 HAZARDS IDENTIFICATION

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

#### Other hazard information:

**HAZARD NOT OTHERWISE CLASSIFIED (HNOC):** None as defined under 29 CFR 1910.1200.

#### PHYSICAL / CHEMICAL HAZARDS

No significant hazards.

#### HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

#### ENVIRONMENTAL HAZARDS

No significant hazards.

<b>NFPA Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0
<b>HMIS Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0

**NOTE:** This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

Product Name: MOBIL SHC 630  
Revision Date: 17 Mar 2015  
Page 2 of 10

### SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

#### Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
1-DECENE, HOMOPOLYMER HYDROGENATED	68037-01-4	20 - < 30%	H304
TRIPHENYL PHOSPHATE	115-86-6	< 0.25%	H400(M factor 1), H410(M factor 1)

\* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

### SECTION 4 FIRST AID MEASURES

#### INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

#### SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

#### EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

#### INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

### SECTION 5 FIRE FIGHTING MEASURES

#### EXTINGUISHING MEDIA

**Appropriate Extinguishing Media:** Use water fog, foam, dry chemical or carbon dioxide (CO<sub>2</sub>) to extinguish flames.

**Inappropriate Extinguishing Media:** Straight Streams of Water

#### FIRE FIGHTING



Product Name: MOBIL SHC 630  
Revision Date: 17 Mar 2015  
Page 3 of 10

**Fire Fighting Instructions:** Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

**Hazardous Combustion Products:** Oxides of carbon, Smoke, Fume, Sulfur oxides, Aldehydes, Incomplete combustion products

#### FLAMMABILITY PROPERTIES

**Flash Point [Method]:** >210°C (410°F) [ASTM D-92]

**Flammable Limits (Approximate volume % in air):** LEL: 0.9 UEL: 7.0

**Autoignition Temperature:** N/D

### SECTION 6

### ACCIDENTAL RELEASE MEASURES

#### NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

#### PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

#### SPILL MANAGEMENT

**Land Spill:** Stop leak if you can do it without risk. Recover by pumping or with suitable absorbent.

**Water Spill:** Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

#### ENVIRONMENTAL PRECAUTIONS

**Large Spills:** Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

### SECTION 7

### HANDLING AND STORAGE

#### HANDLING

Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could



Product Name: MOBIL SHC 630  
Revision Date: 17 Mar 2015  
Page 4 of 10

ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

**Static Accumulator:** This material is a static accumulator.

## STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. Do not store in open or unlabelled containers.

## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE LIMIT VALUES

**Exposure limits/standards (Note: Exposure limits are not additive)**

Substance Name	Form	Limit / Standard			NOTE	Source
1-DECENE, HOMOPOLYMER HYDROGENATED	Aerosols (thoracic fraction)	TWA	5 mg/m <sup>3</sup>		N/A	ExxonMobil
TRIPHENYL PHOSPHATE		TWA	3 mg/m <sup>3</sup>		N/A	OSHA Z1
TRIPHENYL PHOSPHATE		TWA	3 mg/m <sup>3</sup>		N/A	ACGIH

**Exposure limits/standards for materials that can be formed when handling this product:** When mists/aerosols can occur the following are recommended: 5 mg/m<sup>3</sup> - ACGIH TLV (inhalable fraction), 5 mg/m<sup>3</sup> - OSHA PEL.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

### ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

### PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

**Respiratory Protection:** If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

**Hand Protection:** Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

**Eye Protection:** If contact is likely, safety glasses with side shields are recommended.

**Skin and Body Protection:** Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

**Specific Hygiene Measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

## ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

## SECTION 9

## PHYSICAL AND CHEMICAL PROPERTIES

**Note:** Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

### GENERAL INFORMATION

**Physical State:** Liquid  
**Color:** Orange  
**Odor:** Characteristic  
**Odor Threshold:** N/D

### IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

**Relative Density (at 15 °C):** 0.854  
**Flammability (Solid, Gas):** N/A  
**Flash Point [Method]:** >210 °C (410 °F) [ASTM D-92]  
**Flammable Limits (Approximate volume % in air):** LEL: 0.9 UEL: 7.0  
**Autoignition Temperature:** N/D  
**Boiling Point / Range:** > 316 °C (600 °F)  
**Decomposition Temperature:** N/D  
**Vapor Density (Air = 1):** > 2 at 101 kPa  
**Vapor Pressure:** < 0.013 kPa (0.1 mm Hg) at 20 °C  
**Evaporation Rate (n-butyl acetate = 1):** N/D



Product Name: MOBIL SHC 630  
Revision Date: 17 Mar 2015  
Page 6 of 10

**pH:** N/A  
**Log Pow (n-Octanol/Water Partition Coefficient):** > 3.5  
**Solubility in Water:** Negligible  
**Viscosity:** 220 cSt (220 mm<sup>2</sup>/sec) at 40 °C | 28.5 cSt (28.5 mm<sup>2</sup>/sec) at 100 °C  
**Oxidizing Properties:** See Hazards Identification Section.

## OTHER INFORMATION

**Freezing Point:** N/D  
**Melting Point:** N/A  
**Pour Point:** -36 °C (-33 °F)

## SECTION 10 STABILITY AND REACTIVITY

**REACTIVITY:** See sub-sections below.

**STABILITY:** Material is stable under normal conditions.

**CONDITIONS TO AVOID:** Excessive heat. High energy sources of ignition.

**MATERIALS TO AVOID:** Strong oxidizers

**HAZARDOUS DECOMPOSITION PRODUCTS:** Material does not decompose at ambient temperatures.

**POSSIBILITY OF HAZARDOUS REACTIONS:** Hazardous polymerization will not occur.

## SECTION 11 TOXICOLOGICAL INFORMATION

### INFORMATION ON TOXICOLOGICAL EFFECTS

<b>Hazard Class</b>	<b>Conclusion / Remarks</b>
<b>Inhalation</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
<b>Ingestion</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
<b>Skin</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
<b>Eye</b>	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
<b>Sensitization</b>	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
<b>Aspiration:</b> Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.



Product Name: MOBIL SHC 630  
 Revision Date: 17 Mar 2015  
 Page 7 of 10

<b>Germ Cell Mutagenicity:</b> No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
<b>Carcinogenicity:</b> No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
<b>Reproductive Toxicity:</b> No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
<b>Lactation:</b> No end point data for material.	Not expected to cause harm to breast-fed children.
<b>Specific Target Organ Toxicity (STOT)</b>	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

## OTHER INFORMATION

### Contains:

Synthetic base oils: Not expected to cause significant health effects under conditions of normal use, based on laboratory studies with the same or similar materials. Not mutagenic or genotoxic. Not sensitizing in test animals and humans.

The following ingredients are cited on the lists below: None.

### --REGULATORY LISTS SEARCHED--

1 = NTP CARC  
 2 = NTP SUS

3 = IARC 1  
 4 = IARC 2A

5 = IARC 2B  
 6 = OSHA CARC

## SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

### ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

Material -- Not expected to demonstrate chronic toxicity to aquatic organisms.

### MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land.  
 Expected to partition to sediment and wastewater solids.

## ECOLOGICAL DATA

### Ecotoxicity

Product Name: MOBIL SHC 630  
Revision Date: 17 Mar 2015  
Page 8 of 10

Test	Duration	Organism Type	Test Results
Aquatic - Acute Toxicity	96 hour(s)	Oncorhynchus mykiss	LL50 1003 mg/l: data for similar materials
Aquatic - Chronic Toxicity	21 day(s)	Daphnia magna	NOELR 1 mg/l: data for similar materials

### SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

#### DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

#### REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrositivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

**Empty Container Warning** Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. **DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.**

### SECTION 14 TRANSPORT INFORMATION

**LAND (DOT):** Not Regulated for Land Transport

**LAND (TDG):** Not Regulated for Land Transport

**SEA (IMDG):** Not Regulated for Sea Transport according to IMDG-Code

**Marine Pollutant:** No

**AIR (IATA):** Not Regulated for Air Transport

Product Name: MOBIL SHC 630  
 Revision Date: 17 Mar 2015  
 Page 9 of 10

## SECTION 15 REGULATORY INFORMATION

**OSHA HAZARD COMMUNICATION STANDARD:** This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

**Listed or exempt from listing/notification on the following chemical inventories:** TSCA  
**Special Cases:**

Inventory	Status
AICS	Restrictions Apply
IECSC	Restrictions Apply
KECI	Restrictions Apply
NDSL	Restrictions Apply

**PRODUCT REGISTRATION STATUS:** USA

**EPCRA SECTION 302:** This material contains no extremely hazardous substances.

**SARA (311/312) REPORTABLE HAZARD CATEGORIES:** None.

**SARA (313) TOXIC RELEASE INVENTORY:** This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
PHENOL, 4,4-METHYLENEBIS(2,6-BIS(1,1-DIMETHYLETHYL)-	118-82-1	5

### --REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive \*

## SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

### KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):

H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1

H400: Very toxic to aquatic life; Acute Env Tox, Cat 1





Product Name: MOBIL SHC 630  
Revision Date: 17 Mar 2015  
Page 10 of 10

---

H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1

**THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:**

Updates made in accordance with implementation of GHS requirements.

-----

The information and recommendations contained herein are, to the best of ExxonMobil's knowledge and belief, accurate and reliable as of the date issued. You can contact ExxonMobil to insure that this document is the most current available from ExxonMobil. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. If buyer repackages this product, it is the user's responsibility to insure proper health, safety and other necessary information is included with and/or on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, re-publication or retransmission of this document, in whole or in part, is not permitted. The term, "ExxonMobil" is used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliates in which they directly or indirectly hold any interest.

-----

Internal Use Only

MHC: 0B, 0B, 0, 0, 0, 0

PPEC: A

DGN: 2007966XUS (1011899)

-----

Copyright 2002 Exxon Mobil Corporation, All rights reserved

Product Name: MOBIL SHC 632  
Revision Date: 16 Mar 2015  
Page 1 of 10

## SAFETY DATA SHEET

<b>SECTION 1</b>	<b>PRODUCT AND COMPANY IDENTIFICATION</b>
------------------	---

### PRODUCT

**Product Name:** MOBIL SHC 632  
**Product Description:** Synthetic Base Stocks and Additives  
**Product Code:** 201560500560, 602987-00, 970854  
**Intended Use:** Circulating/gear oil

### COMPANY IDENTIFICATION

**Supplier:** EXXON MOBIL CORPORATION  
22777 Springwoods Village Parkway  
Spring, TX. 77389 USA  
**24 Hour Health Emergency** 609-737-4411  
**Transportation Emergency Phone** 800-424-9300 or 703-527-3887 CHEMTREC  
**Product Technical Information** 800-662-4525  
**MSDS Internet Address** <http://www.exxon.com>, <http://www.mobil.com>

<b>SECTION 2</b>	<b>HAZARDS IDENTIFICATION</b>
------------------	-------------------------------

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

### Other hazard information:

**HAZARD NOT OTHERWISE CLASSIFIED (HNOC):** None as defined under 29 CFR 1910.1200.

### PHYSICAL / CHEMICAL HAZARDS

No significant hazards.

### HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

### ENVIRONMENTAL HAZARDS

No significant hazards.

<b>NFPA Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0
<b>HMIS Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0

**NOTE:** This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

Product Name: MOBIL SHC 632  
Revision Date: 16 Mar 2015  
Page 2 of 10

### SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

#### Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
1-DECENE, HOMOPOLYMER HYDROGENATED	68037-01-4	10 - < 20%	H304
TRIPHENYL PHOSPHATE	115-86-6	0.1 - < 1%	H400(M factor 1), H410(M factor 1)

\* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

### SECTION 4 FIRST AID MEASURES

#### INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

#### SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

#### EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

#### INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

### SECTION 5 FIRE FIGHTING MEASURES

#### EXTINGUISHING MEDIA

**Appropriate Extinguishing Media:** Use water fog, foam, dry chemical or carbon dioxide (CO<sub>2</sub>) to extinguish flames.

**Inappropriate Extinguishing Media:** Straight Streams of Water

#### FIRE FIGHTING



Product Name: MOBIL SHC 632  
Revision Date: 16 Mar 2015  
Page 3 of 10

**Fire Fighting Instructions:** Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

**Hazardous Combustion Products:** Aldehydes, Incomplete combustion products, Oxides of carbon, Smoke, Fume, Sulfur oxides

## FLAMMABILITY PROPERTIES

**Flash Point [Method]:** >210°C (410°F) [ASTM D-92]

**Flammable Limits (Approximate volume % in air):** LEL: 0.9 UEL: 7.0

**Autoignition Temperature:** N/D

## SECTION 6

## ACCIDENTAL RELEASE MEASURES

### NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

### PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

### SPILL MANAGEMENT

**Land Spill:** Stop leak if you can do it without risk. Recover by pumping or with suitable absorbent.

**Water Spill:** Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

### ENVIRONMENTAL PRECAUTIONS

**Large Spills:** Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

## SECTION 7

## HANDLING AND STORAGE

### HANDLING

Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could

Product Name: MOBIL SHC 632

Revision Date: 16 Mar 2015

Page 4 of 10

ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

**Static Accumulator:** This material is a static accumulator.

## STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. Do not store in open or unlabelled containers.

## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE LIMIT VALUES

**Exposure limits/standards (Note: Exposure limits are not additive)**

Substance Name	Form	Limit / Standard			NOTE	Source
1-DECENE, HOMOPOLYMER HYDROGENATED	Aerosols (thoracic fraction)	TWA	5 mg/m <sup>3</sup>		N/A	ExxonMobil
TRIPHENYL PHOSPHATE		TWA	3 mg/m <sup>3</sup>		N/A	OSHA Z1
TRIPHENYL PHOSPHATE		TWA	3 mg/m <sup>3</sup>		N/A	ACGIH

**Exposure limits/standards for materials that can be formed when handling this product:** When mists/aerosols can occur the following are recommended: 5 mg/m<sup>3</sup> - ACGIH TLV (inhalable fraction), 5 mg/m<sup>3</sup> - OSHA PEL.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

### ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

### PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

**Respiratory Protection:** If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.



For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

**Hand Protection:** Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

**Eye Protection:** If contact is likely, safety glasses with side shields are recommended.

**Skin and Body Protection:** Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

**Specific Hygiene Measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

## ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9	PHYSICAL AND CHEMICAL PROPERTIES
-----------	----------------------------------

**Note:** Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

## GENERAL INFORMATION

**Physical State:** Liquid  
**Color:** Orange  
**Odor:** Characteristic  
**Odor Threshold:** N/D

## IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

**Relative Density (at 15 °C):** 0.867  
**Flammability (Solid, Gas):** N/A  
**Flash Point [Method]:** >210 °C (410 °F) [ASTM D-92]  
**Flammable Limits (Approximate volume % in air):** LEL: 0.9 UEL: 7.0  
**Autoignition Temperature:** N/D  
**Boiling Point / Range:** > 316 °C (600 °F)  
**Decomposition Temperature:** N/D  
**Vapor Density (Air = 1):** > 2 at 101 kPa  
**Vapor Pressure:** < 0.013 kPa (0.1 mm Hg) at 20 °C  
**Evaporation Rate (n-butyl acetate = 1):** N/D



Product Name: MOBIL SHC 632  
Revision Date: 16 Mar 2015  
Page 6 of 10

**pH:** N/A  
**Log Pow (n-Octanol/Water Partition Coefficient):** > 3.5  
**Solubility in Water:** Negligible  
**Viscosity:** 320 cSt (320 mm<sup>2</sup>/sec) at 40 °C | 38 cSt (38 mm<sup>2</sup>/sec) at 100 °C  
**Oxidizing Properties:** See Hazards Identification Section.

## OTHER INFORMATION

**Freezing Point:** N/D  
**Melting Point:** N/A  
**Pour Point:** -33 °C (-27 °F)

## SECTION 10 STABILITY AND REACTIVITY

**REACTIVITY:** See sub-sections below.

**STABILITY:** Material is stable under normal conditions.

**CONDITIONS TO AVOID:** Excessive heat. High energy sources of ignition.

**MATERIALS TO AVOID:** Strong oxidizers

**HAZARDOUS DECOMPOSITION PRODUCTS:** Material does not decompose at ambient temperatures.

**POSSIBILITY OF HAZARDOUS REACTIONS:** Hazardous polymerization will not occur.

## SECTION 11 TOXICOLOGICAL INFORMATION

### INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
<b>Inhalation</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
<b>Ingestion</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
<b>Skin</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
<b>Eye</b>	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
<b>Sensitization</b>	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
<b>Aspiration:</b> Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.

Product Name: MOBIL SHC 632  
Revision Date: 16 Mar 2015  
Page 7 of 10

<b>Germ Cell Mutagenicity:</b> No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
<b>Carcinogenicity:</b> No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
<b>Reproductive Toxicity:</b> No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
<b>Lactation:</b> No end point data for material.	Not expected to cause harm to breast-fed children.
<b>Specific Target Organ Toxicity (STOT)</b>	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

## OTHER INFORMATION

### Contains:

Synthetic base oils: Not expected to cause significant health effects under conditions of normal use, based on laboratory studies with the same or similar materials. Not mutagenic or genotoxic. Not sensitizing in test animals and humans.

The following ingredients are cited on the lists below: None.

### --REGULATORY LISTS SEARCHED--

1 = NTP CARC  
2 = NTP SUS

3 = IARC 1  
4 = IARC 2A

5 = IARC 2B  
6 = OSHA CARC

## SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

### ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

Material -- Not expected to demonstrate chronic toxicity to aquatic organisms.

### MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land.  
Expected to partition to sediment and wastewater solids.

## ECOLOGICAL DATA

### Ecotoxicity



Product Name: MOBIL SHC 632

Revision Date: 16 Mar 2015

Page 8 of 10

Test	Duration	Organism Type	Test Results
Aquatic - Acute Toxicity	96 hour(s)	Oncorhynchus mykiss	LL50 1003 mg/l: data for similar materials
Aquatic - Chronic Toxicity	21 day(s)	Daphnia magna	NOELR 1 mg/l: data for similar materials

**SECTION 13 DISPOSAL CONSIDERATIONS**

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

**DISPOSAL RECOMMENDATIONS**

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

**REGULATORY DISPOSAL INFORMATION**

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

**Empty Container Warning** Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. **DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.**

**SECTION 14 TRANSPORT INFORMATION**

**LAND (DOT):** Not Regulated for Land Transport

**LAND (TDG):** Not Regulated for Land Transport

**SEA (IMDG):** Not Regulated for Sea Transport according to IMDG-Code

**Marine Pollutant:** No

**AIR (IATA):** Not Regulated for Air Transport





Product Name: MOBIL SHC 632  
Revision Date: 16 Mar 2015  
Page 9 of 10

<b>SECTION 15</b>	<b>REGULATORY INFORMATION</b>
-------------------	-------------------------------

**OSHA HAZARD COMMUNICATION STANDARD:** This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

**Listed or exempt from listing/notification on the following chemical inventories:** TSCA  
**Special Cases:**

Inventory	Status
AICS	Restrictions Apply
KECI	Restrictions Apply

**PRODUCT REGISTRATION STATUS:** USA

**EPCRA SECTION 302:** This material contains no extremely hazardous substances.

**SARA (311/312) REPORTABLE HAZARD CATEGORIES:** None.

**SARA (313) TOXIC RELEASE INVENTORY:** This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
PHENOL, 4,4-METHYLENEBIS(2,6-BIS(1,1-DIMETHYLETHYL)-	118-82-1	5

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

<b>SECTION 16</b>	<b>OTHER INFORMATION</b>
-------------------	--------------------------

N/D = Not determined, N/A = Not applicable

**KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):**

H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1

H400: Very toxic to aquatic life; Acute Env Tox, Cat 1

H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1



Product Name: MOBIL SHC 632  
Revision Date: 16 Mar 2015  
Page 10 of 10

---

**THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:**

Updates made in accordance with implementation of GHS requirements.

---

The information and recommendations contained herein are, to the best of ExxonMobil's knowledge and belief, accurate and reliable as of the date issued. You can contact ExxonMobil to insure that this document is the most current available from ExxonMobil. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. If buyer repackages this product, it is the user's responsibility to insure proper health, safety and other necessary information is included with and/or on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, re-publication or retransmission of this document, in whole or in part, is not permitted. The term, "ExxonMobil" is used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliates in which they directly or indirectly hold any interest.

---

Internal Use Only

MHC: 0B, 0B, 0, 0, 0, 0

PPEC: A

DGN: 2007973XUS (1013491)

---

Copyright 2002 Exxon Mobil Corporation, All rights reserved

Product Name: MOBIL SHC 634  
Revision Date: 16 Mar 2015  
Page 1 of 10

## SAFETY DATA SHEET

### SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

#### PRODUCT

**Product Name:** MOBIL SHC 634  
**Product Description:** Synthetic Base Stocks and Additives  
**Product Code:** 201560500570, 602912-00, 970321  
**Intended Use:** Circulating/gear oil

#### COMPANY IDENTIFICATION

**Supplier:** EXXON MOBIL CORPORATION  
22777 Springwoods Village Parkway  
Spring, TX. 77389 USA  
**24 Hour Health Emergency** 609-737-4411  
**Transportation Emergency Phone** 800-424-9300 or 703-527-3887 CHEMTREC  
**Product Technical Information** 800-662-4525  
**MSDS Internet Address** <http://www.exxon.com>, <http://www.mobil.com>

### SECTION 2 HAZARDS IDENTIFICATION

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

#### Other hazard information:

**HAZARD NOT OTHERWISE CLASSIFIED (HNOC):** None as defined under 29 CFR 1910.1200.

#### PHYSICAL / CHEMICAL HAZARDS

No significant hazards.

#### HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

#### ENVIRONMENTAL HAZARDS

No significant hazards.

<b>NFPA Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0
<b>HMIS Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0

**NOTE:** This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.



Product Name: MOBIL SHC 634  
Revision Date: 16 Mar 2015  
Page 2 of 10

**SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS**

This material is defined as a mixture.

**Hazardous Substance(s) or Complex Substance(s) required for disclosure**

Name	CAS#	Concentration*	GHS Hazard Codes
1-DECENE, HOMOPOLYMER HYDROGENATED	68037-01-4	5 - < 10%	H304
TRIPHENYL PHOSPHATE	115-86-6	0.1 - < 1%	H400(M factor 1), H410(M factor 1)

\* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

**SECTION 4 FIRST AID MEASURES****INHALATION**

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

**SKIN CONTACT**

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

**EYE CONTACT**

Flush thoroughly with water. If irritation occurs, get medical assistance.

**INGESTION**

First aid is normally not required. Seek medical attention if discomfort occurs.

**SECTION 5 FIRE FIGHTING MEASURES****EXTINGUISHING MEDIA**

**Appropriate Extinguishing Media:** Use water fog, foam, dry chemical or carbon dioxide (CO<sub>2</sub>) to extinguish flames.

**Inappropriate Extinguishing Media:** Straight Streams of Water

**FIRE FIGHTING**

Product Name: MOBIL SHC 634  
Revision Date: 16 Mar 2015  
Page 3 of 10

**Fire Fighting Instructions:** Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

**Hazardous Combustion Products:** Aldehydes, Incomplete combustion products, Sulfur oxides, Smoke, Fume, Oxides of carbon

## FLAMMABILITY PROPERTIES

**Flash Point [Method]:** >210°C (410°F) [ASTM D-92]

**Flammable Limits (Approximate volume % in air):** LEL: 0.9 UEL: 7.0

**Autoignition Temperature:** N/D

## SECTION 6

## ACCIDENTAL RELEASE MEASURES

### NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

### PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

### SPILL MANAGEMENT

**Land Spill:** Stop leak if you can do it without risk. Recover by pumping or with suitable absorbent.

**Water Spill:** Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

### ENVIRONMENTAL PRECAUTIONS

**Large Spills:** Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

## SECTION 7

## HANDLING AND STORAGE

### HANDLING

Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could



Product Name: MOBIL SHC 634

Revision Date: 16 Mar 2015

Page 4 of 10

ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

**Static Accumulator:** This material is a static accumulator.

## STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. Do not store in open or unlabelled containers.

## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE LIMIT VALUES

**Exposure limits/standards (Note: Exposure limits are not additive)**

Substance Name	Form	Limit / Standard			NOTE	Source
1-DECENE, HOMOPOLYMER HYDROGENATED	Aerosols (thoracic fraction)	TWA	5 mg/m3		N/A	ExxonMobil
TRIPHENYL PHOSPHATE		TWA	3 mg/m3		N/A	OSHA Z1
TRIPHENYL PHOSPHATE		TWA	3 mg/m3		N/A	ACGIH

**Exposure limits/standards for materials that can be formed when handling this product:** When mists/aerosols can occur the following are recommended: 5 mg/m<sup>3</sup> - ACGIH TLV (inhalable fraction), 5 mg/m<sup>3</sup> - OSHA PEL.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

### ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

### PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

**Respiratory Protection:** If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.



For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

**Hand Protection:** Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

**Eye Protection:** If contact is likely, safety glasses with side shields are recommended.

**Skin and Body Protection:** Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

**Specific Hygiene Measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

## ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

## SECTION 9

## PHYSICAL AND CHEMICAL PROPERTIES

**Note:** Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

### GENERAL INFORMATION

**Physical State:** Liquid  
**Color:** Orange  
**Odor:** Characteristic  
**Odor Threshold:** N/D

### IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

**Relative Density (at 15 °C):** 0.869  
**Flammability (Solid, Gas):** N/A  
**Flash Point [Method]:** >210 °C (410 °F) [ASTM D-92]  
**Flammable Limits (Approximate volume % in air):** LEL: 0.9 UEL: 7.0  
**Autoignition Temperature:** N/D  
**Boiling Point / Range:** > 316 °C (600 °F)  
**Decomposition Temperature:** N/D  
**Vapor Density (Air = 1):** > 2 at 101 kPa  
**Vapor Pressure:** < 0.013 kPa (0.1 mm Hg) at 20 °C  
**Evaporation Rate (n-butyl acetate = 1):** N/D

Product Name: MOBIL SHC 634  
Revision Date: 16 Mar 2015  
Page 6 of 10

pH: N/A  
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5  
Solubility in Water: Negligible  
Viscosity: 460 cSt (460 mm<sup>2</sup>/sec) at 40 °C  
Oxidizing Properties: See Hazards Identification Section.

#### OTHER INFORMATION

Freezing Point: N/D  
Melting Point: N/A  
Pour Point: -30 °C (-22 °F)

SECTION 10	STABILITY AND REACTIVITY
------------	--------------------------

**REACTIVITY:** See sub-sections below.

**STABILITY:** Material is stable under normal conditions.

**CONDITIONS TO AVOID:** Excessive heat. High energy sources of ignition.

**MATERIALS TO AVOID:** Strong oxidizers

**HAZARDOUS DECOMPOSITION PRODUCTS:** Material does not decompose at ambient temperatures.

**POSSIBILITY OF HAZARDOUS REACTIONS:** Hazardous polymerization will not occur.

SECTION 11	TOXICOLOGICAL INFORMATION
------------	---------------------------

#### INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
<b>Inhalation</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
<b>Ingestion</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
<b>Skin</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
<b>Eye</b>	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
<b>Sensitization</b>	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
<b>Aspiration:</b> Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.



Product Name: MOBIL SHC 634

Revision Date: 16 Mar 2015

Page 7 of 10

<b>Germ Cell Mutagenicity:</b> No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
<b>Carcinogenicity:</b> No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
<b>Reproductive Toxicity:</b> No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
<b>Lactation:</b> No end point data for material.	Not expected to cause harm to breast-fed children.
<b>Specific Target Organ Toxicity (STOT)</b>	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

**OTHER INFORMATION****Contains:**

Synthetic base oils: Not expected to cause significant health effects under conditions of normal use, based on laboratory studies with the same or similar materials. Not mutagenic or genotoxic. Not sensitizing in test animals and humans.

The following ingredients are cited on the lists below: None.

**--REGULATORY LISTS SEARCHED--**

1 = NTP CARC

3 = IARC 1

5 = IARC 2B

2 = NTP SUS

4 = IARC 2A

6 = OSHA CARC

**SECTION 12****ECOLOGICAL INFORMATION**

The information given is based on data available for the material, the components of the material, and similar materials.

**ECOTOXICITY**

Material -- Not expected to be harmful to aquatic organisms.

Material -- Not expected to demonstrate chronic toxicity to aquatic organisms.

**MOBILITY**

Base oil component -- Low solubility and floats and is expected to migrate from water to the land.

Expected to partition to sediment and wastewater solids.

**ECOLOGICAL DATA****Ecotoxicity**



Product Name: MOBIL SHC 634

Revision Date: 16 Mar 2015

Page 8 of 10

Test	Duration	Organism Type	Test Results
Aquatic - Acute Toxicity	96 hour(s)	Oncorhynchus mykiss	LL50 1003 mg/l: data for similar materials
Aquatic - Chronic Toxicity	21 day(s)	Daphnia magna	NOELR 1 mg/l: data for similar materials

**SECTION 13 DISPOSAL CONSIDERATIONS**

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

**DISPOSAL RECOMMENDATIONS**

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

**REGULATORY DISPOSAL INFORMATION**

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

**Empty Container Warning** Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. **DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.**

**SECTION 14 TRANSPORT INFORMATION**

**LAND (DOT):** Not Regulated for Land Transport

**LAND (TDG):** Not Regulated for Land Transport

**SEA (IMDG):** Not Regulated for Sea Transport according to IMDG-Code

**Marine Pollutant:** No

**AIR (IATA):** Not Regulated for Air Transport

Product Name: MOBIL SHC 634  
 Revision Date: 16 Mar 2015  
 Page 9 of 10

## SECTION 15 REGULATORY INFORMATION

**OSHA HAZARD COMMUNICATION STANDARD:** This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

**Listed or exempt from listing/notification on the following chemical inventories:** TSCA  
**Special Cases:**

Inventory	Status
AICS	Restrictions Apply
KECI	Restrictions Apply

**PRODUCT REGISTRATION STATUS:** USA

**EPCRA SECTION 302:** This material contains no extremely hazardous substances.

**SARA (311/312) REPORTABLE HAZARD CATEGORIES:** None.

**SARA (313) TOXIC RELEASE INVENTORY:** This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
PHENOL, 4,4-METHYLENEBIS(2,6-BIS(1,1-DIMETHYLETHYL)-	118-82-1	5

### --REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

## SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

### KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):

H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1

H400: Very toxic to aquatic life; Acute Env Tox, Cat 1

H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1



Product Name: MOBIL SHC 634  
Revision Date: 16 Mar 2015  
Page 10 of 10

---

**THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:**

Updates made in accordance with implementation of GHS requirements.

---

The information and recommendations contained herein are, to the best of ExxonMobil's knowledge and belief, accurate and reliable as of the date issued. You can contact ExxonMobil to insure that this document is the most current available from ExxonMobil. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. If buyer repackages this product, it is the user's responsibility to insure proper health, safety and other necessary information is included with and/or on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, re-publication or retransmission of this document, in whole or in part, is not permitted. The term, "ExxonMobil" is used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliates in which they directly or indirectly hold any interest.

---

Internal Use Only

MHC: 0B, 0B, 0, 0, 0, 0

PPEC: A

DGN: 2007946XUS (547900)

---

Copyright 2002 Exxon Mobil Corporation, All rights reserved



# SAFETY DATA SHEET

## Premium #7H Hydraulic Oil

### Section 1: Identification

**Product Identifier:** Super ATF  
**SDS Number:** 778846  
**Intended Use:** Automatic Transmission Fluid  
**Uses Advised Against:** All others  
**Emergency Health and Safety Number:** CHEMTREC 800-424-9300 (24 Hours)  
CHEMTREC Mexico 01-800-681-9531

**Manufacturer:**  
Phillips 66 Lubricants  
P.O. Box 4428  
Houston, TX 77210

**SDS Information:**  
**Phone:** 800-762-0942  
**Email:** SDS@P66.com  
**URL:** www.Phillips66.com

**Customer Service:**  
U.S.: 1-800-822-6457 or International: +1-83-2486-3363  
**Technical Information:** 1-877-445-9198

### Section 2: Hazards Identification

#### Classified Hazards

This material is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1910.1200.

#### Other Hazards

None Known

#### Label Elements

No classified hazards

### Section 3: Composition / Information on Ingredients

Chemical Name	CASRN	Concentration <sup>1</sup>
Distillates, petroleum, hydrotreated heavy paraffinic	64742-54-7	>90
Non-Hazardous Materials	VARIOUS	<10

<sup>1</sup> All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

### Section 4: First Aid Measures

**Eye Contact:** If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

**Skin Contact:** Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops and persists, seek medical attention.

**Inhalation (Breathing):** First aid is not normally required. If breathing difficulties develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. Seek immediate medical attention.

**Ingestion (Swallowing):** First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

**Most important symptoms and effects, both acute and delayed:** Inhalation of oil mists or vapors generated at elevated temperatures may cause respiratory irritation. Accidental ingestion can result in minor irritation of the digestive tract, nausea and diarrhea. Dry skin and possible irritation with repeated or prolonged exposure.

**Notes to Physician:** Acute aspirations of large amounts of oil-laden material may produce a serious aspiration pneumonia. Patients who aspirate these oils should be followed for the development of long-term sequelae. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities.

## Section 5: Fire-Fighting Measures

### NFPA 704 Hazard Class

Health: 0 Flammability: 1 Instability: 0



0 (Minimal)  
1 (Slight)  
2 (Moderate)  
3 (Serious)  
4 (Severe)

**Extinguishing Media:** Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F / 100°C. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

### Specific hazards arising from the chemical

**Unusual Fire & Explosion Hazards:** This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire.

**Hazardous Combustion Products:** Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Oxides of sulfur, nitrogen or phosphorus may also be formed.

**Special protective actions for firefighters:** For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

## Section 6: Accidental Release Measures

**Personal precautions, protective equipment and emergency procedures:** This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

**Environmental Precautions:** Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

**Methods and material for containment and cleaning up:** Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken. See Section 13 for information on appropriate disposal.



## Section 7: Handling and Storage

**Precautions for safe handling:** Keep away from flames and hot surfaces. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8). Spills will produce very slippery surfaces. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes.

**Conditions for safe storage:** Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated area away from heat and all sources of ignition. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

## Section 8: Exposure Controls / Personal Protection

Chemical Name	ACGIH	OSHA	Other
Distillates, petroleum, hydrotreated heavy paraffinic	TWA: 5mg/m <sup>3</sup> STEL: 10 mg/m <sup>3</sup> as Oil Mist, if Generated	TWA: 5mg/m <sup>3</sup> as Oil Mist, if Generated	---

**Note:** State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

**Engineering controls:** If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

**Eye/Face Protection:** The use of eye/face protection is not normally required; however, good industrial hygiene practice suggests the use of eye protection that meets or exceeds ANSI Z.87.1 whenever working with chemicals.

**Skin/Hand Protection:** The use of skin protection is not normally required; however, good industrial hygiene practice suggests the use of gloves or other appropriate skin protection whenever working with chemicals. Suggested protective materials: Nitrile

**Respiratory Protection:** Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with R or P95 filters may be used.

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (as directed by regulation or the manufacturer's instructions), in oxygen deficient (less than 19.5 percent oxygen) situations, or under conditions that are immediately dangerous to life and health (IDLH).

**Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.**

## Section 9: Physical and Chemical Properties

**Note:** Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

**Appearance:** Red, Transparent

**Physical Form:** Liquid

**Odor:** Petroleum

**Odor Threshold:** No data

**pH:** Not applicable

**Vapor Density (air=1):** >1

**Upper Explosive Limits (vol % in air):** No data

**Lower Explosive Limits (vol % in air):** No data

**Flash Point:** Minimum 315 °F / 157 °C

**Test Method:** Pensky-Martens Closed Cup (PMCC), ASTM D93, EPA 1010

**Initial Boiling Point/Range:** No data

**Vapor Pressure:** <1 mm Hg

**Partition Coefficient (n-octanol/water) (Kow):** No data

**Melting/Freezing Point:** No data

**Auto-ignition Temperature:** No data

**Decomposition Temperature:** No data



**Evaporation Rate (nBuAc=1):** <1  
**Particle Size:** N/A  
**Percent Volatile:** Negligible  
**Flammability (solid, gas):** May Ignite

**Specific Gravity (water=1):** 0.85 - 0.86 @ 60°F (15.6°C)  
**Bulk Density:** 7.08 - 7.16 lbs/gal  
**Viscosity:** 6.8 - 7.7 cSt @ 100°C; 30.0 - 34.0 cSt @ 40°C  
**Solubility in Water:** Negligible

## Section 10: Stability and Reactivity

**Reactivity:** Not chemically reactive.

**Chemical stability:** Stable under normal ambient and anticipated conditions of use.

**Possibility of hazardous reactions:** Hazardous reactions not anticipated.

**Conditions to avoid:** Extended exposure to high temperatures can cause decomposition. Avoid all possible sources of ignition.

**Incompatible materials:** Avoid contact with strong oxidizing agents and strong reducing agents.

**Hazardous decomposition products:** Not anticipated under normal conditions of use.

## Section 11: Toxicological Information

### Information on Toxicological Effects of Substance/Mixture

#### Substance / Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Unlikely to be harmful		>5 mg/L (mist, estimated)
Dermal	Unlikely to be harmful		> 2 g/kg (estimated)
Oral	Unlikely to be harmful		> 5 g/kg (estimated)

**Aspiration Hazard:** Not expected to be an aspiration hazard.

**Skin Corrosion/Irritation:** Not expected to be irritating. Repeated exposure may cause skin dryness or cracking.

**Serious Eye Damage/Irritation:** Not expected to be irritating.

**Skin Sensitization:** No information available on the mixture, however none of the components have been classified for skin sensitization (or are below the concentration threshold for classification).

**Respiratory Sensitization:** No information available.

**Specific Target Organ Toxicity (Single Exposure):** No information available on the mixture, however none of the components have been classified for target organ toxicity (or are below the concentration threshold for classification).

**Specific Target Organ Toxicity (Repeated Exposure):** No information available on the mixture, however none of the components have been classified for target organ toxicity (or are below the concentration threshold for classification).

**Carcinogenicity:** No information available on the mixture, however none of the components have been classified for carcinogenicity (or are below the concentration threshold for classification).

**Germ Cell Mutagenicity:** No information available on the mixture, however none of the components have been classified for germ cell mutagenicity (or are below the concentration threshold for classification).

**Reproductive Toxicity:** No information available on the mixture, however none of the components have been classified for reproductive toxicity (or are below the concentration threshold for classification).

### Information on Toxicological Effects of Components

#### Distillates, petroleum, hydrotreated heavy paraffinic

**Carcinogenicity:** This oil has been highly refined by a variety of processes to reduce aromatics and improve performance characteristics. It meets the IP-346 criteria of less than 3 percent PAH's and is not considered a carcinogen by the International Agency for Research on Cancer.

## Section 12: Ecological Information

GHS Classification: No classified hazards

**Toxicity:** All acute aquatic toxicity studies on samples of lubricant base oils show acute toxicity values greater than 100 mg/L for invertebrates, algae and fish. These tests were carried out on water accommodated fractions and the results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon compositions.

**Persistence and Degradability:** The hydrocarbons in this material are not readily biodegradable, but since they can be degraded by microorganisms, they are regarded as inherently biodegradable.

**Bioaccumulative Potential:** Log Kow values measured for the hydrocarbon components of this material are greater than 5.3, and therefore regarded as having the potential to bioaccumulate. In practice, metabolic processes may reduce bioconcentration.

**Mobility in Soil:** Volatilization to air is not expected to be a significant fate process due to the low vapor pressure of this material. In water, base oils will float and spread over the surface at a rate dependent upon viscosity. There will be significant removal of hydrocarbons from the water by sediment adsorption. In soil and sediment, hydrocarbon components will show low mobility with adsorption to sediments being the predominant physical process. The main fate process is expected to be slow biodegradation of the hydrocarbon constituents in soil and sediment.

**Other adverse effects:** None anticipated.

## Section 13: Disposal Considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations. This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste and is not believed to exhibit characteristics of hazardous waste. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the SDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste. This material under most intended uses would become "Used Oil" due to contamination by physical or chemical impurities. Whenever possible, Recycle used oil in accordance with applicable federal and state or local regulations. Container contents should be completely used and containers should be emptied prior to discard.

## Section 14: Transport Information

### U.S. Department of Transportation (DOT)

**Shipping Description:** *Not regulated*

**Note:** *If shipped by land in a packaging having a capacity of 3,500 gallons or more, the provisions of 49 CFR, Part 130 apply. (Contains oil)*

### International Maritime Dangerous Goods (IMDG)

**Shipping Description:** *Not regulated*

**Note:** *U.S. DOT compliance requirements may apply. See 49 CFR 171.22, 23 & 25.*

### Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

### International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)

**UN/ID #:** *Not regulated*

**Note:** *U.S. DOT compliance requirements may apply. See 49 CFR 171.22, 23 & 24.*

	LTD. QTY	Passenger Aircraft	Cargo Aircraft Only
Packaging Instruction #:	---	---	---
Max. Net Qty. Per Package:	---	---	---



## Section 15: Regulatory Information

### CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):

This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

### CERCLA/SARA - Section 311/312 (Title III Hazard Categories)

Acute Health Hazard:	No
Chronic Health Hazard:	No
Fire Hazard:	No
Pressure Hazard:	No
Reactive Hazard:	No

### CERCLA/SARA - Section 313 and 40 CFR 372:

This material does not contain any chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372.

### EPA (CERCLA) Reportable Quantity (in pounds):

This material does not contain any chemicals with CERCLA Reportable Quantities.

### California Proposition 65:

Warning: This material may contain detectable quantities of the following chemicals, known to the State of California to cause cancer, birth defects or other reproductive harm, and which may be subject to the warning requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

Chemical Name	Type of Toxicity
Diethanolamine	Cancer

### International Hazard Classification

#### Canada:

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the Regulations.

#### **WHMIS Hazard Class:**

none

### National Chemical Inventories

All components are either listed on the US TSCA Inventory, or are not regulated under TSCA. All components are either on the DSL, or are exempt from DSL listing requirements.

**U.S. Export Control Classification Number:** EAR99

## Section 16: Other Information

Date of Issue:	Previous Issue Date:	SDS Number:	Status:
17-Feb-2014	24-Oct-2013	778846	FINAL

### **Revised Sections or Basis for Revision:**

Identified Hazards (Section 2); Toxicological (Section 11); Physical Properties (Section 9)

### **Guide to Abbreviations:**

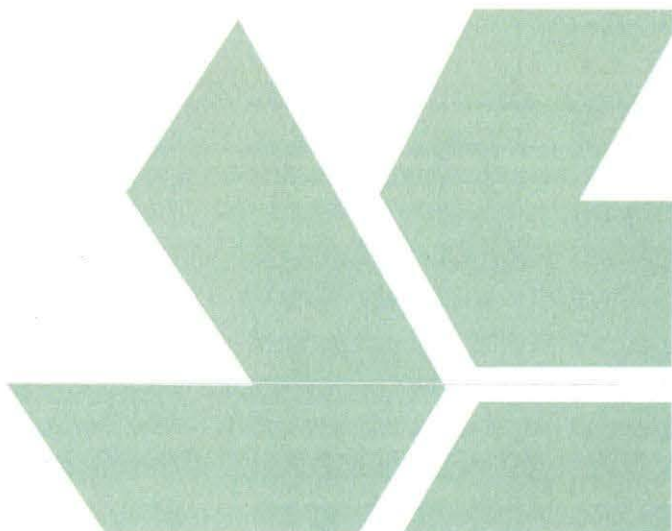
ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

### **Disclaimer of Expressed and implied Warranties:**

The information presented in this Safety Data Sheet is based on data believed to be accurate as of the date this Safety Data Sheet was prepared.



HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.



Product Name: MOBIL VACUOLINE 525

Revision Date: 11 Apr 2016

Page 1 of 12

## SAFETY DATA SHEET

### SECTION 1

### PRODUCT AND COMPANY IDENTIFICATION

#### PRODUCT

**Product Name:** MOBIL VACUOLINE 525

**Product Description:** Base Oil and Additives

**Product Code:** 201560504055, 608257-00, 970151

**Intended Use:** Circulating oil

#### COMPANY IDENTIFICATION

**Supplier:**

**EXXON MOBIL CORPORATION**

22777 Springwoods Village Parkway  
Spring, TX. 77253 USA

**24 Hour Health Emergency**

609-737-4411

**Transportation Emergency Phone**

800-424-9300 or 703-527-3887 CHEMTREC

**Product Technical Information**

800-662-4525

**MSDS Internet Address**

<http://www.exxon.com>, <http://www.mobil.com>

### SECTION 2

### HAZARDS IDENTIFICATION

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

**Other hazard information:**

**HAZARD NOT OTHERWISE CLASSIFIED (HNOC):** None as defined under 29 CFR 1910.1200.

**PHYSICAL / CHEMICAL HAZARDS**



Product Name: MOBIL VACUOLINE 525

Revision Date: 11 Apr 2016

Page 2 of 12

No significant hazards.

#### HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

#### ENVIRONMENTAL HAZARDS

No significant hazards.

NFPA Hazard ID: Health: 0 Flammability: 1 Reactivity: 0  
HMIS Hazard ID: Health: 0 Flammability: 1 Reactivity: 0

**NOTE:** This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

### SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

#### Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
NAPHTHALENESULFONIC ACID, DINONYL-, CALCIUM SALT	57855-77-3	0.1 - < 1%	H315, H318, H317
ZINC DITHIOPHOSPHATE	68649-42-3	0.1 - < 1%	H315, H318, H401, H411

\* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

### SECTION 4 FIRST AID MEASURES

#### INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

#### SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by



Product Name: MOBIL VACUOLINE 525

Revision Date: 11 Apr 2016

Page 3 of 12

---

a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

#### EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

#### INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

<b>SECTION 5</b>	<b>FIRE FIGHTING MEASURES</b>
------------------	-------------------------------

#### EXTINGUISHING MEDIA

**Appropriate Extinguishing Media:** Use water fog, foam, dry chemical or carbon dioxide (CO<sub>2</sub>) to extinguish flames.

**Inappropriate Extinguishing Media:** Straight Streams of Water

#### FIRE FIGHTING

**Fire Fighting Instructions:** Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

**Hazardous Combustion Products:** Aldehydes, Incomplete combustion products, Oxides of carbon, Smoke, Fume, Sulfur oxides

#### FLAMMABILITY PROPERTIES

**Flash Point [Method]:** >224°C (435°F) [ASTM D-92]

**Flammable Limits (Approximate volume % in air):** LEL: 0.9 UEL: 7.0

**Autoignition Temperature:** N/D

<b>SECTION 6</b>	<b>ACCIDENTAL RELEASE MEASURES</b>
------------------	------------------------------------

#### NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

#### PROTECTIVE MEASURES

Product Name: MOBIL VACUOLINE 525

Revision Date: 11 Apr 2016

Page 4 of 12

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: respiratory protection will be necessary only in special cases, e.g., formation of mists. Half-face or full-face respirator with filter(s) for dust/organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to hydrocarbons are recommended. Gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

#### **SPILL MANAGEMENT**

**Land Spill:** Stop leak if you can do it without risk. Recover by pumping or with suitable absorbent.

##### **Water Spill:**

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

#### **ENVIRONMENTAL PRECAUTIONS**

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

<b>SECTION 7</b>
------------------

<b>HANDLING AND STORAGE</b>
-----------------------------

#### **HANDLING**

Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

**Static Accumulator:** This material is a static accumulator.

#### **STORAGE**

The type of container used to store the material may affect static accumulation and dissipation. Do not store in



Product Name: MOBIL VACUOLINE 525

Revision Date: 11 Apr 2016

Page 5 of 12

---

open or unlabelled containers. Keep away from incompatible materials.

## SECTION 8

## EXPOSURE CONTROLS / PERSONAL PROTECTION

**Exposure limits/standards for materials that can be formed when handling this product:** When mists/aerosols can occur the following are recommended: 5 mg/m<sup>3</sup> - ACGIH TLV (inhalable fraction), 5 mg/m<sup>3</sup> - OSHA PEL.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

### ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

### PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

**Respiratory Protection:** If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

**Hand Protection:** Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

**Eye Protection:** If contact is likely, safety glasses with side shields are recommended.



Product Name: MOBIL VACUOLINE 525

Revision Date: 11 Apr 2016

Page 6 of 12

**Skin and Body Protection:** Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

**Specific Hygiene Measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

#### ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

#### SECTION 9

#### PHYSICAL AND CHEMICAL PROPERTIES

**Note:** Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

#### GENERAL INFORMATION

**Physical State:** Liquid  
**Color:** Amber  
**Odor:** Characteristic  
**Odor Threshold:** N/D

#### IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

**Relative Density (at 15 °C):** 0.88  
**Flammability (Solid, Gas):** N/A  
**Flash Point [Method]:** >224°C (435°F) [ASTM D-92]  
**Flammable Limits (Approximate volume % in air):** LEL: 0.9 UEL: 7.0  
**Autoignition Temperature:** N/D  
**Boiling Point / Range:** > 316°C (600°F)  
**Decomposition Temperature:** N/D  
**Vapor Density (Air = 1):** > 2 at 101 kPa  
**Vapor Pressure:** < 0.013 kPa (0.1 mm Hg) at 20 °C  
**Evaporation Rate (n-butyl acetate = 1):** N/D  
**pH:** N/A  
**Log Pow (n-Octanol/Water Partition Coefficient):** > 3.5  
**Solubility in Water:** Negligible  
**Viscosity:** 88.9 cSt (88.9 mm<sup>2</sup>/sec) at 40 °C | 10.7 cSt (10.7 mm<sup>2</sup>/sec) at 100°C [ASTM D 445]  
**Oxidizing Properties:** See Hazards Identification Section.

#### OTHER INFORMATION

**Freezing Point:** N/D

Product Name: MOBIL VACUOLINE 525

Revision Date: 11 Apr 2016

Page 7 of 12

**Melting Point:** N/A  
**Pour Point:** -12°C (10°F)  
**DMSO Extract (mineral oil only), IP-346:** < 3 %wt

<b>SECTION 10</b>	<b>STABILITY AND REACTIVITY</b>
-------------------	---------------------------------

**REACTIVITY:** See sub-sections below.

**STABILITY:** Material is stable under normal conditions.

**CONDITIONS TO AVOID:** Excessive heat. High energy sources of ignition.

**MATERIALS TO AVOID:** Strong oxidizers

**HAZARDOUS DECOMPOSITION PRODUCTS:** Material does not decompose at ambient temperatures.

**POSSIBILITY OF HAZARDOUS REACTIONS:** Hazardous polymerization will not occur.

<b>SECTION 11</b>	<b>TOXICOLOGICAL INFORMATION</b>
-------------------	----------------------------------

**INFORMATION ON TOXICOLOGICAL EFFECTS**

<b>Hazard Class</b>	<b>Conclusion / Remarks</b>
<b>Inhalation</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
<b>Ingestion</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
<b>Skin</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
<b>Eye</b>	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
<b>Sensitization</b>	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
<b>Aspiration:</b> Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.

Product Name: MOBIL VACUOLINE 525

Revision Date: 11 Apr 2016

Page 8 of 12

<b>Germ Cell Mutagenicity:</b> No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
<b>Carcinogenicity:</b> No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
<b>Reproductive Toxicity:</b> No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
<b>Lactation:</b> No end point data for material.	Not expected to cause harm to breast-fed children.
<b>Specific Target Organ Toxicity (STOT)</b>	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.

#### OTHER INFORMATION

##### For the product itself:

Component concentrations in this formulation would not be expected to cause skin sensitization, based on tests of the components or similar formulations.

##### Contains:

Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitizing in test animals.

The following ingredients are cited on the lists below: None.

##### --REGULATORY LISTS SEARCHED--

1 = NTP CARC

3 = IARC 1

5 = IARC 2B

2 = NTP SUS

4 = IARC 2A

6 = OSHA CARC

#### SECTION 12

#### ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

##### ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

##### MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.



Product Name: MOBIL VACUOLINE 525

Revision Date: 11 Apr 2016

Page 9 of 12

---

## **PERSISTENCE AND DEGRADABILITY**

### **Biodegradation:**

Base oil component -- Expected to be inherently biodegradable

## **BIOACCUMULATION POTENTIAL**

Base oil component -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

<b>SECTION 13</b>	<b>DISPOSAL CONSIDERATIONS</b>
-------------------	--------------------------------

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

## **DISPOSAL RECOMMENDATIONS**

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

## **REGULATORY DISPOSAL INFORMATION**

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

**Empty Container Warning** Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. **DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.**

<b>SECTION 14</b>	<b>TRANSPORT INFORMATION</b>
-------------------	------------------------------

**LAND (DOT):** Not Regulated for Land Transport

Product Name: MOBIL VACUOLINE 525

Revision Date: 11 Apr 2016

Page 10 of 12

**LAND (TDG):** Not Regulated for Land Transport

**SEA (IMDG):** Not Regulated for Sea Transport according to IMDG-Code

**Marine Pollutant:** No

**AIR (IATA):** Not Regulated for Air Transport

<b>SECTION 15</b>	<b>REGULATORY INFORMATION</b>
-------------------	-------------------------------

**OSHA HAZARD COMMUNICATION STANDARD:** This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

**Listed or exempt from listing/notification on the following chemical inventories:** AICS, DSL, ENCS, IECSC, KECI, PICCS, TSCA

**SARA 302:** No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302

**SARA (311/312) REPORTABLE HAZARD CATEGORIES:** None.

**SARA (313) TOXIC RELEASE INVENTORY:** This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
ZINC DITHIOPHOSPHATE	68649-42-3	15, 19

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

Product Name: MOBIL VACUOLINE 525

Revision Date: 11 Apr 2016

Page 11 of 12

<b>SECTION 16</b>	<b>OTHER INFORMATION</b>
-------------------	--------------------------

N/D = Not determined, N/A = Not applicable

**KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):**

H315: Causes skin irritation; Skin Corr/Irritation, Cat 2

H317: May cause allergic skin reaction; Skin Sensitization, Cat 1

H318: Causes serious eye damage; Serious Eye Damage/Irr, Cat 1

H401: Toxic to aquatic life; Acute Env Tox, Cat 2

H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2

**THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:**

Composition: Component Table information was modified.

Section 01: Company Mailing Address information was modified.

Section 06: Accidental Release - Spill Management - Water information was deleted.

Section 07: Handling and Storage - Handling information was modified.

Section 07: Handling and Storage - Storage Phrases information was modified.

Section 09: Flash Point C(F) information was modified.

Section 09: Vapor Pressure information was added.

Section 09: Viscosity information was modified.

Section 11: Other Health Effects Header information was modified.

Section 11: Other Health Effects information was added.

Section 14: Marine Pollutant information was modified.

Section 15: Community RTK - Header information was modified.

Section 16: HCode Key information was modified.

Section 16: Revision Information - Implementation of GHS requirements phrase. information was deleted.

The information and recommendations contained herein are, to the best of ExxonMobil's knowledge and belief, accurate and reliable as of the date issued. You can contact ExxonMobil to insure that this document is the most current available from ExxonMobil. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. If buyer repackages this product, it is the user's responsibility to insure proper health, safety and other necessary information is included with and/or on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, re-publication or retransmission of this document, in whole or in part, is not permitted. The term, "ExxonMobil" is used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliates in which they directly or indirectly hold any interest.

Internal Use Only

MHC: 0B, 0B, 0, 0, 0, 0

PPEC: A

DGN: 2008729XUS (548033)





Product Name: MOBIL VACUOLINE 525

Revision Date: 11 Apr 2016

Page 12 of 12

---

Copyright 2002 Exxon Mobil Corporation, All rights reserved

## Safety Data Sheet

**1. Identification of the substance/preparation and company/undertaking**

<b>Material Name</b>	:	<b>Gas and Process Fluid VG 32</b>
<b>Product Use</b>	:	Turbine oil.
<b>Product Code</b>	:	6970 3906 28
<b>Manufacturer/Supplier</b>	:	<b>Atlas Copco Energas GmbH</b> Schlehenweg 15, 50999 Cologne, Germany
<b>Telephone</b>	:	Please contact the Atlas Copco Energas Germany +49 2236 9650 0 (08: 00-05: 00 CET)
<b>Email Contact for Safety Data Sheet</b>	:	If you have questions about the content of this MSDS please email: aftermarket.gap@de.atlascopco.com
<b>Emergency Telephone Number</b>	:	Only for issues related medical, please contact the Medical Service of Atlas Copco Airpower in Belgium: +32 3 870 2105 (08: 00-17: 00 CET)

## 2. Hazards Identification

NON-HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS.  
Not classified as hazardous according to the criteria of NOHSC, and not classified as Dangerous Goods according to the Australian Dangerous Goods Code

2.1	Symbol(s)	: No Hazard Symbol required
2.2	R-phrases(s)	: Not classified.
2.3	S-phrases(s)	: Not classified.
2.4	Health Hazards	: Not expected to be a health hazard when used under normal conditions. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis. Used oil may contain harmful impurities.
2.5	Signs and Symptoms:	Oil acne/folliculitis signs and symptoms may include formation of black pustules and spots on the skin of exposed areas. Ingestion may result in nausea, vomiting and/or diarrhoea.
2.6	Safety Hazards	: Not classified as flammable but will burn.
2.7	Environmental Hazards	: Not classified as dangerous for the environment

### 3. Composition/information on ingredients

**3.1 Mixture Description :** Highly refined mineral oils and additives.

## Safety Data Sheet

### 3.2 Hazardous Components

Chemical Identity	CAS	EINECS	Symbol(s)	R-phrases	Conc.
N-phenyl-1- naphthylamine	90-30-2	201-983-0	Xi, N	R43; R50/53	0.10 - 0.24 %

- 3.3 Additional Information : The highly refined mineral oil contains <3% (w/w) DMSO extract, according to IP346. Refer to chapter 16 for full text of EC R-phrases.

### 4. First aid measures

- 4.1 General Information : Not expected to be a health hazard when used under normal conditions.
- 4.2 Inhalation : No treatment necessary under normal conditions of use. If symptoms persist, obtain medical advice.
- 4.3 Skin Contact : Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention.
- 4.4 Eye Contact : Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
- 4.5 Ingestion : In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.
- 4.6 Advice to Physician : Treat symptomatically.

### 5. Fire-fighting measures

Clear fire area of all non-emergency personnel.

- 5.1 Specific Hazards : Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds.
- 5.2 Suitable Extinguishing Media : Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
- 5.3 Unsuitable Extinguishing Media : Do not use water in a jet.
- 5.4 Protective Equipment for Firefighters : Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

### 6. Accidental release measures

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe the relevant local and international regulations.



## Safety Data Sheet

- 6.1 **Protective measures** : Avoid contact with skin and eyes. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers.
- 6.2 **Clean Up Methods** : Slippery when spilt. Avoid accidents, clean up immediately. Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly.
- 6.3 **Additional Advice** : Local authorities should be advised if significant spillages cannot be contained.

## 7. Handling and storage

- 7.1 **General Precautions** : Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
- 7.2 **Handling** : Avoid prolonged or repeated contact with skin. Avoid inhaling vapour and/or mists. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires.
- 7.3 **Storage** : Keep container tightly closed and in a cool, well-ventilated place. Use properly labelled and closeable containers. Store at ambient temperature.
- 7.4 **Product Transfer** : This material has the potential to be a static accumulator. Proper grounding and bonding procedures should be used during all bulk transfer operations.
- 7.5 **Recommended Materials** : For containers or container linings, use mild steel or high density polyethylene.
- 7.6 **Unsuitable Materials** : PVC.
- 7.7 **Additional Information** : Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

## 8. Exposure controls / personal protection

### 8.1 Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
Oil mist, mineral	ACGIH	TWA (Inhalable fraction.)		5 mg/m3	
	AU OEL	TWA (Mist.)		5 mg/m3	

### 8.2 Biological Exposure Index (BEI)

No biological limit allocated.

## Safety Data Sheet

- 8.3 Exposure Controls** : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances.  
Appropriate measures include: Adequate ventilation to control airborne concentrations. Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated. Define procedures for safe handling and maintenance of controls. Educate and train workers in the hazards and control measures relevant to normal activities associated with this product. Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation. Drain down system prior to equipment break-in or maintenance.  
Retain drain downs in sealed storage pending disposal or for subsequent recycle. Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.
- 8.4 Personal Protective Equipment** : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.
- 8.5 Respiratory Protection** : No respiratory protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation.  
Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for combined particulate/organic gases and vapours [boiling point >65°C(149 °F)].
- 8.6 Hand Protection** : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection: PVC, neoprene or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced.  
Personal hygiene is a key element of effective hand care.  
Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended. For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same, but recognise that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time may be acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material.



## Safety Data Sheet

- 8.7 **Eye Protection** : Wear safety glasses or full face shield if splashes are likely to occur.
- 8.8 **Protective Clothing** : Skin protection not ordinarily required beyond standard issue work clothes.
- 8.9 **Monitoring Methods** : Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate. Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory. Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available.  
National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods <http://www.cdc.gov/niosh/>  
Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods <http://www.osha.gov/>  
Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances <http://www.hse.gov.uk/>  
Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA), Germany. <http://www.dguv.de/inhalt/index.jsp>  
L'Institut National de Recherche et de Sécurité, (INRS), France <http://www.inrs.fr/accueil>
- 8.10 **Environmental Exposure Controls** : Take appropriate measures to fulfil the requirements of relevant environmental protection legislation. Avoid contamination of the environment by following advice given in Chapter 6. If necessary, prevent undissolved material from being discharged to waste water. Waste water should be treated in a municipal or industrial waste water treatment plant before discharge to surface water. Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.

## 9. Physical and chemical properties

- 9.1
- |   |  |
|---|--|
| Appearance                                      | : Amber. Liquid at room temperature.             |
| Odour   | : Slight hydrocarbon                             |
| pH  | : Not applicable.                                |
| Initial Boiling Point and Boiling Range         | : > 280 °C / 536 °F estimated value(s)           |
| Pour point                                      | : Typical -29 °C / -20 °F                        |
| Flash point                                     | : > 205 °C / 401 °F (COC)                        |
| Upper / lower Flammability or Explosion limits  | : Typical 1 - 10 %(V) (based on mineral oil)     |
| Auto-ignition temperature                       | : > 320 °C / 608 °F                              |
| Vapour pressure                                 | : < 0.5 Pa at 20 °C / 68 °F (estimated value(s)) |
| Specific gravity                                | : Typical 0.85 at 15 °C / 59 °F                  |
| Density   | : Typical 850 kg/m <sup>3</sup> at 15 °C / 59 °F |
| Water solubility                                | : Negligible.                                    |
| Solubility in other solvents                    | : Data not available                             |
| n-octanol/water partition coefficient (log Pow) | : > 6 (based on information on similar products) |



## Safety Data Sheet

Kinematic viscosity	: Typical 32 mm <sup>2</sup> /s at 40 °C / 104 °F
Vapour density (air=1)	: > 1 (estimated value(s))
Electrical conductivity	: This material is not expected to be a static accumulator.
Evaporation rate (nBuAc=1)	: Data not available

### 10. Stability and reactivity

10.1	Stability	: Stable.
10.2	Conditions to Avoid	: Extremes of temperature and direct sunlight.
10.3	Materials to Avoid	: Strong oxidising agents.
10.4	Hazardous Decomposition Products	: Hazardous decomposition products are not expected to form during normal storage.

### 11. Toxicological information

11.1	Basis for Assessment	: Information given is based on data on the components and the toxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).
11.2	Acute Oral Toxicity	: Expected to be of low toxicity: LD50 > 5000 mg/kg, Rat
11.3	Acute Dermal Toxicity	: Expected to be of low toxicity: LD50 > 5000 mg/kg, Rabbit
11.4	Acute Inhalation Toxicity	: Not considered to be an inhalation hazard under normal conditions of use.
11.5	Skin Irritation	: Expected to be slightly irritating.
11.6	Eye Irritation	: Expected to be slightly irritating.
11.7	Respiratory Irritation	: Inhalation of vapours or mists may cause irritation.
11.8	Sensitisation	: Not expected to be a skin sensitiser.
11.9	Repeated Dose Toxicity	: Not expected to be a hazard.
11.10	Mutagenicity	: Not considered a mutagenic hazard.
11.11	Carcinogenicity	: Not expected to be carcinogenic. Product contains mineral oils of types shown to be non-carcinogenic in animal skin-painting studies. Highly refined mineral oils are not classified as carcinogenic by the International Agency for Research on Cancer (IARC).

Material	: Carcinogenicity Classification
Highly refined mineral oil (IP346 <3%)	: ACGIH Group A4: Not classifiable as a human carcinogen.
Highly refined mineral oil (IP346 <3%)	: IARC 3: Not classifiable as to carcinogenicity to humans.
Highly refined mineral oil (IP346 <3%)	: GHS / CLP: No carcinogenicity classification

11.12	Reproductive and Developmental Toxicity	: Not expected to be a hazard.
-------	---	--------------------------------

## Safety Data Sheet

### 11.13 Additional Information

Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible.

## 12. Ecological information

Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

- 12.1 **Aquatic Ecotoxicity** : Poorly soluble mixture. May cause physical fouling of aquatic organisms. Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l (to aquatic organisms) LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract. Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l.
- 12.2 **Mobility** : Liquid under most environmental conditions. If it enters soil, it will adsorb to soil particles and will not be mobile. Floats on water.
- 12.3 **Persistence/degradability** : Expected to be not readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.
- 12.4 **Bioaccumulation** : Contains components with the potential to bioaccumulate.
- 12.5 **Other Adverse Effects** : Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities. Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.

## 13. Disposal considerations

- 13.1 **Material Disposal** : Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses.
- 13.2 **Container Disposal** : Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.
- 13.3 **Local Legislation** : Disposal should be in accordance with applicable regional, national, and local laws and regulations.

## 14 Transport information

- 14.1 **ADG** : This material is not classified as dangerous according to the Australian Dangerous Goods Code.

## Safety Data Sheet

- 14.2 **IMDG** : This material is not classified as dangerous under IMDG regulations.
- 14.3 **IATA (Country variations may apply)** : This material is either not classified as dangerous under IATA regulations or needs to follow country specific requirements.
- Additional Information : MARPOL Annex 1 rules apply for bulk shipments by sea.

### 15. Regulatory information

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

#### 15.1 Chemical Inventory Status

- EINECS : All components listed or polymer exempt.
- TSCA : All components listed.
- AICS : All components listed.

#### 15.2 Sensitiser not sufficient to classify

- : Contains N-phenyl-1-naphthylamine. May produce an allergic reaction.

#### 15.3 Other Information

- : National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011] List of Designated Hazardous Substances [NOHSC:10005]. Approved Criteria for Classifying Hazardous Substances [NOHSC:1008]. Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:1003]. Australian Dangerous Goods Code. Standard for the Uniform Scheduling of Medicines and Poisons.

### 16. Other information

- R-phrases : Not classified.
- R43 : May cause sensitization by skin contact.
- R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- 16.1 **SDS Version Number** : 2.0
- 16.2 **SDS Effective Date** : 01.06.2015
- 16.3 **SDS Revisions** : A vertical bar (|) in the left margin indicates an amendment from the previous version.
- 16.4 **SDS Regulation** :
- 16.5 **SDS Distribution** : The information in this document should be made available to all who may handle the product.
- 16.6 **Disclaimer** : This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.



Product Name: MOBILGREASE XHP 222 SPECIAL  
Revision Date: 29 Sep 2015  
Page 1 of 10

## SAFETY DATA SHEET

<b>SECTION 1</b>	<b>PRODUCT AND COMPANY IDENTIFICATION</b>
------------------	---

### PRODUCT

**Product Name:** MOBILGREASE XHP 222 SPECIAL  
**Product Description:** Base Oil and Additives  
**Product Code:** 2015A0202531, 530550-00, 97G870  
**Intended Use:** Grease

### COMPANY IDENTIFICATION

**Supplier:** EXXON MOBIL CORPORATION  
22777 Springwoods Village Parkway  
Spring, TX. 77253 USA  
**24 Hour Health Emergency** 609-737-4411  
**Transportation Emergency Phone** 800-424-9300 or 703-527-3887 CHEMTREC  
**Product Technical Information** 800-662-4525  
**MSDS Internet Address** <http://www.exxon.com>, <http://www.mobil.com>

<b>SECTION 2</b>	<b>HAZARDS IDENTIFICATION</b>
------------------	-------------------------------

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

### Other hazard information:

**HAZARD NOT OTHERWISE CLASSIFIED (HNOC):** None as defined under 29 CFR 1910.1200.

### PHYSICAL / CHEMICAL HAZARDS

No significant hazards.

### HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

### ENVIRONMENTAL HAZARDS

No significant hazards.

<b>NFPA Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0
<b>HMIS Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0

**NOTE:** This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary

Product Name: MOBILGREASE XHP 222 SPECIAL  
Revision Date: 29 Sep 2015  
Page 2 of 10

from person to person.

### SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

#### Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
BENZENAMINE, N-PHENYL-, REACTION PRODUCTS WITH 2,4,4-TRIMETHYLPENTENE	68411-46-1	1 - < 5%	H402, H412
ZINC DITHIOPHOSPHATE	68649-42-3	1 - < 2.5%	H315, H318, H401, H411

\* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

### SECTION 4 FIRST AID MEASURES

#### INHALATION

Under normal conditions of intended use, this material is not expected to be an inhalation hazard.

#### SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

#### EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

#### INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

### SECTION 5 FIRE FIGHTING MEASURES

#### EXTINGUISHING MEDIA

**Appropriate Extinguishing Media:** Use water fog, foam, dry chemical or carbon dioxide (CO<sub>2</sub>) to extinguish flames.

**Inappropriate Extinguishing Media:** Straight Streams of Water

#### FIRE FIGHTING

**Fire Fighting Instructions:** Evacuate area. Prevent runoff from fire control or dilution from entering streams,



Product Name: MOBILGREASE XHP 222 SPECIAL

Revision Date: 29 Sep 2015

Page 3 of 10

sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

**Hazardous Combustion Products:** Aldehydes, Incomplete combustion products, Oxides of carbon, Smoke, Fume, Sulfur oxides

#### FLAMMABILITY PROPERTIES

**Flash Point [Method]:** >204 °C (400 °F) [EST. FOR OIL, ASTM D-92 (COC)]

**Flammable Limits (Approximate volume % in air):** LEL: N/D UEL: N/D

**Autoignition Temperature:** N/D

### SECTION 6

### ACCIDENTAL RELEASE MEASURES

#### NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

#### PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: respiratory protection will be necessary only in special cases, e.g., formation of mists. Half-face or full-face respirator with filter(s) for dust/organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to hydrocarbons are recommended. Gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

#### SPILL MANAGEMENT

**Land Spill:** Scrape up spilled material with shovels into a suitable container for recycle or disposal.

**Water Spill:** Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Skim from surface.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

#### ENVIRONMENTAL PRECAUTIONS

Prevent entry into waterways, sewers, basements or confined areas.



Product Name: MOBILGREASE XHP 222 SPECIAL  
Revision Date: 29 Sep 2015  
Page 4 of 10

<b>SECTION 7</b>	<b>HANDLING AND STORAGE</b>
------------------	-----------------------------

#### **HANDLING**

Prevent small spills and leakage to avoid slip hazard.

**Static Accumulator:** This material is not a static accumulator.

#### **STORAGE**

Do not store in open or unlabelled containers.

<b>SECTION 8</b>	<b>EXPOSURE CONTROLS / PERSONAL PROTECTION</b>
------------------	--

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

#### **ENGINEERING CONTROLS**

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

#### **PERSONAL PROTECTION**

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

**Respiratory Protection:** If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No protection is ordinarily required under normal conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

**Hand Protection:** Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

**Eye Protection:** If contact is likely, safety glasses with side shields are recommended.

Product Name: MOBILGREASE XHP 222 SPECIAL  
Revision Date: 29 Sep 2015  
Page 5 of 10

**Skin and Body Protection:** Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

**Specific Hygiene Measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

## ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9	PHYSICAL AND CHEMICAL PROPERTIES
-----------	----------------------------------

**Note:** Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

## GENERAL INFORMATION

**Physical State:** Solid  
**Form:** Semi-fluid  
**Color:** Dark Gray  
**Odor:** Characteristic  
**Odor Threshold:** N/D

## IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

**Relative Density (at 15 °C):** 0.914  
**Flammability (Solid, Gas):** N/A  
**Flash Point [Method]:** >204 °C (400 °F) [EST. FOR OIL, ASTM D-92 (COC)]  
**Flammable Limits (Approximate volume % in air):** LEL: N/D UEL: N/D  
**Autoignition Temperature:** N/D  
**Boiling Point / Range:** > 316 °C (600 °F) [Estimated]  
**Decomposition Temperature:** N/D  
**Vapor Density (Air = 1):** N/D  
**Vapor Pressure:** < 0.013 kPa (0.1 mm Hg) at 20 °C [Estimated]  
**Evaporation Rate (n-butyl acetate = 1):** N/D  
**pH:** N/A  
**Log Pow (n-Octanol/Water Partition Coefficient):** > 3.5 [Estimated]  
**Solubility in Water:** Negligible  
**Viscosity:** 220 cSt (220 mm<sup>2</sup>/sec) at 40 °C | >16 cSt (16 mm<sup>2</sup>/sec) at 100 °C  
**Oxidizing Properties:** See Hazards Identification Section.

## OTHER INFORMATION

**Freezing Point:** N/D  
**Melting Point:** >260 °C (500 °F)  
**DMSO Extract (mineral oil only), IP-346:** < 3 %wt

NOTE: Most physical properties above are for the oil component in the material.



Product Name: MOBILGREASE XHP 222 SPECIAL  
Revision Date: 29 Sep 2015  
Page 6 of 10

<b>SECTION 10</b>	<b>STABILITY AND REACTIVITY</b>
-------------------	---------------------------------

**REACTIVITY:** See sub-sections below.

**STABILITY:** Material is stable under normal conditions.

**CONDITIONS TO AVOID:** Excessive heat. High energy sources of ignition.

**MATERIALS TO AVOID:** Strong oxidizers

**HAZARDOUS DECOMPOSITION PRODUCTS:** Material does not decompose at ambient temperatures.

**POSSIBILITY OF HAZARDOUS REACTIONS:** Hazardous polymerization will not occur.

<b>SECTION 11</b>	<b>TOXICOLOGICAL INFORMATION</b>
-------------------	----------------------------------

**INFORMATION ON TOXICOLOGICAL EFFECTS**

<u>Hazard Class</u>	<u>Conclusion / Remarks</u>
<b>Inhalation</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
<b>Ingestion</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
<b>Skin</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
<b>Eye</b>	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
<b>Sensitization</b>	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
<b>Aspiration:</b> Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.
<b>Germ Cell Mutagenicity:</b> No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
<b>Carcinogenicity:</b> No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
<b>Reproductive Toxicity:</b> No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
<b>Lactation:</b> No end point data for material.	Not expected to cause harm to breast-fed children.
<b>Specific Target Organ Toxicity (STOT)</b>	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: No end point data for	Not expected to cause organ damage from prolonged or repeated



Product Name: MOBILGREASE XHP 222 SPECIAL  
Revision Date: 29 Sep 2015  
Page 7 of 10

material.	exposure. Based on assessment of the components.
-----------	--

## OTHER INFORMATION

### Contains:

Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitizing in test animals.

Middle distillates: Carcinogenic in animal tests. Lifetime skin painting tests produced tumors, but the mechanism is due to repeated cycles of skin damage and restorative hyperplasia. This mechanism is considered unlikely in humans where such prolonged skin irritation would not be tolerated. Did not cause mutations In Vitro. Inhalation of vapors did not result in reproductive or developmental effects in laboratory animals. Inhalation of high concentrations in animals resulted in respiratory tract irritation, lung changes and some reduction in lung function. Non-sensitizing in test animals.

The following ingredients are cited on the lists below: None.

### --REGULATORY LISTS SEARCHED--

1 = NTP CARC  
2 = NTP SUS

3 = IARC 1  
4 = IARC 2A

5 = IARC 2B  
6 = OSHA CARC

SECTION 12	ECOLOGICAL INFORMATION
------------	------------------------

The information given is based on data available for the material, the components of the material, and similar materials.

### ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

### MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land.  
Expected to partition to sediment and wastewater solids.

### PERSISTENCE AND DEGRADABILITY

#### Biodegradation:

Base oil component -- Expected to be inherently biodegradable

### BIOACCUMULATION POTENTIAL

Base oil component -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.



Product Name: MOBILGREASE XHP 222 SPECIAL  
Revision Date: 29 Sep 2015  
Page 8 of 10

<b>SECTION 13</b>	<b>DISPOSAL CONSIDERATIONS</b>
-------------------	--------------------------------

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

#### DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

#### REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

**Empty Container Warning** Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. **DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.**

<b>SECTION 14</b>	<b>TRANSPORT INFORMATION</b>
-------------------	------------------------------

**LAND (DOT):** Not Regulated for Land Transport

**LAND (TDG):** Not Regulated for Land Transport

**SEA (IMDG):** Not Regulated for Sea Transport according to IMDG-Code

**Marine Pollutant:** No

**AIR (IATA):** Not Regulated for Air Transport

<b>SECTION 15</b>	<b>REGULATORY INFORMATION</b>
-------------------	-------------------------------

**OSHA HAZARD COMMUNICATION STANDARD:** This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

**Listed or exempt from listing/notification on the following chemical inventories:** AICS, ENCS, IECSC, KECI, PICCS, TSCA

**Special Cases:**

Inventory	Status
-----------	--------



Product Name: MOBILGREASE XHP 222 SPECIAL  
Revision Date: 29 Sep 2015  
Page 9 of 10

NDSL

Restrictions Apply

**EPCRA SECTION 302:** This material contains no extremely hazardous substances.

**SARA (311/312) REPORTABLE HAZARD CATEGORIES:** None.

**SARA (313) TOXIC RELEASE INVENTORY:**

Chemical Name	CAS Number	Typical Value
ZINC DITHIOPHOSPHATE	68649-42-3	1 - < 2.5%

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
NAPHTHENIC ACIDS, ZINC SALTS	12001-85-3	15
ZINC DITHIOPHOSPHATE	68649-42-3	13, 15, 17, 19
ZINC NEODECANOATE	27253-29-8	15

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

**SECTION 16**

**OTHER INFORMATION**

N/D = Not determined, N/A = Not applicable

**KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):**

H315: Causes skin irritation; Skin Corr/Irritation, Cat 2  
H318: Causes serious eye damage; Serious Eye Damage/Irr, Cat 1  
H401: Toxic to aquatic life; Acute Env Tox, Cat 2  
H402: Harmful to aquatic life; Acute Env Tox, Cat 3  
H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2  
H412: Harmful to aquatic life with long lasting effects; Chronic Env Tox, Cat 3

**THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:**

Revision Changes:

Section 01: Company Mailing Address information was modified.

Section 05: Hazardous Combustion Products information was modified.





Product Name: MOBILGREASE XHP 222 SPECIAL

Revision Date: 29 Sep 2015

Page 10 of 10

---

Section 14: Marine Pollutant information was modified.

Section 09: Flammability (Solid, Gas) information was added.

Section 16: Revision Information - Implementation of GHS requirements phrase. information was deleted.

---

The information and recommendations contained herein are, to the best of ExxonMobil's knowledge and belief, accurate and reliable as of the date issued. You can contact ExxonMobil to insure that this document is the most current available from ExxonMobil. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. If buyer repackages this product, it is the user's responsibility to insure proper health, safety and other necessary information is included with and/or on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, re-publication or retransmission of this document, in whole or in part, is not permitted. The term, "ExxonMobil" is used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliates in which they directly or indirectly hold any interest.

---

Internal Use Only

MHC: 0B, 0B, 0, 0, 0, 0

PPEC: A

DGN: 2006163XUS (550276)

---

Copyright 2002 Exxon Mobil Corporation, All rights reserved

Product Name: MOBILGREASE XHP 222  
Revision Date: 13 May 2015  
Page 1 of 10

## SAFETY DATA SHEET

### SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

#### PRODUCT

**Product Name:** MOBILGREASE XHP 222  
**Product Description:** Base Oil and Additives  
**Product Code:** 2015A0202530, 2015A0202530, 530436-00, 97E898  
**Intended Use:** Grease

#### COMPANY IDENTIFICATION

**Supplier:** EXXON MOBIL CORPORATION  
22777 Springwoods Village Parkway  
Spring, TX. 77389 USA  
**24 Hour Health Emergency** 609-737-4411  
**Transportation Emergency Phone** 800-424-9300 or 703-527-3887 CHEMTREC  
**Product Technical Information** 800-662-4525  
**MSDS Internet Address** <http://www.exxon.com>, <http://www.mobil.com>

### SECTION 2 HAZARDS IDENTIFICATION

This material is not hazardous according to regulatory guidelines (see (M)SDS Section 15).

#### Other hazard information:

**HAZARD NOT OTHERWISE CLASSIFIED (HNOC):** None as defined under 29 CFR 1910.1200.

#### PHYSICAL / CHEMICAL HAZARDS

No significant hazards.

#### HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

#### ENVIRONMENTAL HAZARDS

No significant hazards.

<b>NFPA Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0
<b>HMIS Hazard ID:</b>	Health: 0	Flammability: 1	Reactivity: 0

**NOTE:** This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

Product Name: MOBILGREASE XHP 222  
Revision Date: 13 May 2015  
Page 2 of 10

### SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

#### Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
BENZENAMINE, N-PHENYL-, REACTION PRODUCTS WITH 2,4,4-TRIMETHYLPENTENE	68411-46-1	1 - < 5%	H402, H412
ZINC DIALKYL DITHIOPHOSPHATE	68457-79-4	1 - < 2.5%	H315, H318, H401, H411
ZINC DINONYLNAPHTHALENE SULFONATE	28016-00-4	0.1 - < 1%	H315, H319(2A), H317

\* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

### SECTION 4 FIRST AID MEASURES

#### INHALATION

Under normal conditions of intended use, this material is not expected to be an inhalation hazard.

#### SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

#### EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

#### INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

### SECTION 5 FIRE FIGHTING MEASURES

#### EXTINGUISHING MEDIA

**Appropriate Extinguishing Media:** Use water fog, foam, dry chemical or carbon dioxide (CO<sub>2</sub>) to extinguish flames.

**Inappropriate Extinguishing Media:** Straight Streams of Water

#### FIRE FIGHTING

**Fire Fighting Instructions:** Evacuate area. Prevent runoff from fire control or dilution from entering streams,



Product Name: MOBILGREASE XHP 222  
Revision Date: 13 May 2015  
Page 3 of 10

sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

**Hazardous Combustion Products:** Aldehydes, Oxides of carbon, Sulfur oxides, Smoke, Fume, Incomplete combustion products

#### FLAMMABILITY PROPERTIES

**Flash Point [Method]:** >204°C (400°F) [EST. FOR OIL, ASTM D-92 (COC)]

**Flammable Limits (Approximate volume % in air):** LEL: N/D UEL: N/D

**Autoignition Temperature:** N/D

### SECTION 6

### ACCIDENTAL RELEASE MEASURES

#### NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

#### PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: respiratory protection will be necessary only in special cases, e.g., formation of mists. Half-face or full-face respirator with filter(s) for dust/organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to hydrocarbons are recommended. Gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

#### SPILL MANAGEMENT

**Land Spill:** Allow spilled material to solidify and scrape up with shovels into a suitable container for recycle or disposal. Scrape up spilled material with shovels into a suitable container for recycle or disposal.

**Water Spill:** Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Skim from surface.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

#### ENVIRONMENTAL PRECAUTIONS

Prevent entry into waterways, sewers, basements or confined areas.

Product Name: MOBILGREASE XHP 222  
Revision Date: 13 May 2015  
Page 4 of 10

<b>SECTION 7</b>	<b>HANDLING AND STORAGE</b>
------------------	-----------------------------

#### **HANDLING**

Prevent small spills and leakage to avoid slip hazard.

**Static Accumulator:** This material is not a static accumulator.

#### **STORAGE**

Do not store in open or unlabelled containers.

<b>SECTION 8</b>	<b>EXPOSURE CONTROLS / PERSONAL PROTECTION</b>
------------------	--

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

#### **ENGINEERING CONTROLS**

The level of protection and types of controls necessary will vary depending upon potential exposure conditions.

Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

#### **PERSONAL PROTECTION**

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

**Respiratory Protection:** If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No protection is ordinarily required under normal conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

**Hand Protection:** Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

**Eye Protection:** If contact is likely, safety glasses with side shields are recommended.



Product Name: MOBILGREASE XHP 222  
Revision Date: 13 May 2015  
Page 5 of 10

**Skin and Body Protection:** Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

**Specific Hygiene Measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

## ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9	PHYSICAL AND CHEMICAL PROPERTIES
-----------	----------------------------------

**Note:** Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

## GENERAL INFORMATION

**Physical State:** Solid  
**Form:** Semi-fluid  
**Color:** Dark Blue  
**Odor:** Characteristic  
**Odor Threshold:** N/D

## IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

**Relative Density (at 15 °C):** 0.88  
**Flammability (Solid, Gas):** N/A  
**Flash Point [Method]:** >204°C (400°F) [EST. FOR OIL, ASTM D-92 (COC)]  
**Flammable Limits (Approximate volume % in air):** LEL: N/D UEL: N/D  
**Autoignition Temperature:** N/D  
**Boiling Point / Range:** > 316°C (600°F)  
**Decomposition Temperature:** N/D  
**Vapor Density (Air = 1):** N/D  
**Vapor Pressure:** < 0.013 kPa (0.1 mm Hg) at 20 °C  
**Evaporation Rate (n-butyl acetate = 1):** N/D  
**pH:** N/A  
**Log Pow (n-Octanol/Water Partition Coefficient):** > 3.5  
**Solubility in Water:** Negligible  
**Viscosity:** >200 cSt (200 mm<sup>2</sup>/sec) at 40 °C | >16 cSt (16 mm<sup>2</sup>/sec) at 100 °C  
**Oxidizing Properties:** See Hazards Identification Section.

## OTHER INFORMATION

**Freezing Point:** N/D  
**Melting Point:** >260°C (500°F)  
**DMSO Extract (mineral oil only), IP-346:** < 3 %wt

NOTE: Most physical properties above are for the oil component in the material.



Product Name: MOBILGREASE XHP 222  
Revision Date: 13 May 2015  
Page 6 of 10

<b>SECTION 10</b>	<b>STABILITY AND REACTIVITY</b>
-------------------	---------------------------------

**REACTIVITY:** See sub-sections below.

**STABILITY:** Material is stable under normal conditions.

**CONDITIONS TO AVOID:** Excessive heat. High energy sources of ignition.

**MATERIALS TO AVOID:** Strong oxidizers

**HAZARDOUS DECOMPOSITION PRODUCTS:** Material does not decompose at ambient temperatures.

**POSSIBILITY OF HAZARDOUS REACTIONS:** Hazardous polymerization will not occur.

<b>SECTION 11</b>	<b>TOXICOLOGICAL INFORMATION</b>
-------------------	----------------------------------

**INFORMATION ON TOXICOLOGICAL EFFECTS**

<u>Hazard Class</u>	<u>Conclusion / Remarks</u>
<b>Inhalation</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
<b>Ingestion</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
<b>Skin</b>	
Acute Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.
<b>Eye</b>	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.
<b>Sensitization</b>	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer. Based on assessment of the components.
<b>Aspiration:</b> Data available.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.
<b>Germ Cell Mutagenicity:</b> No end point data for material.	Not expected to be a germ cell mutagen. Based on assessment of the components.
<b>Carcinogenicity:</b> No end point data for material.	Not expected to cause cancer. Based on assessment of the components.
<b>Reproductive Toxicity:</b> No end point data for material.	Not expected to be a reproductive toxicant. Based on assessment of the components.
<b>Lactation:</b> No end point data for material.	Not expected to cause harm to breast-fed children.
<b>Specific Target Organ Toxicity (STOT)</b>	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.

Product Name: MOBILGREASE XHP 222

Revision Date: 13 May 2015

Page 7 of 10

Repeated Exposure: No end point data for material.	Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components.
--	--

## OTHER INFORMATION

### Contains:

Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitizing in test animals.

C.I. Solvent blue: Positive in the Ames and Mouse Lymphoma mutagenicity assay.

The following ingredients are cited on the lists below: None.

### --REGULATORY LISTS SEARCHED--

1 = NTP CARC

3 = IARC 1

5 = IARC 2B

2 = NTP SUS

4 = IARC 2A

6 = OSHA CARC

## SECTION 12

## ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

### ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

### MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land.

Expected to partition to sediment and wastewater solids.

### PERSISTENCE AND DEGRADABILITY

#### Biodegradation:

Base oil component -- Expected to be inherently biodegradable

### BIOACCUMULATION POTENTIAL

Base oil component -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

## SECTION 13

## DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable



Product Name: MOBILGREASE XHP 222  
Revision Date: 13 May 2015  
Page 8 of 10

laws and regulations, and material characteristics at time of disposal.

#### DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

#### REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

**Empty Container Warning** Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

<b>SECTION 14</b>	<b>TRANSPORT INFORMATION</b>
-------------------	------------------------------

**LAND (DOT):** Not Regulated for Land Transport

**LAND (TDG):** Not Regulated for Land Transport

**SEA (IMDG):** Not Regulated for Sea Transport according to IMDG-Code

**Marine Pollutant:** No

**AIR (IATA):** Not Regulated for Air Transport

<b>SECTION 15</b>	<b>REGULATORY INFORMATION</b>
-------------------	-------------------------------

**OSHA HAZARD COMMUNICATION STANDARD:** This material is not considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

**Listed or exempt from listing/notification on the following chemical inventories:** AICS, IECSC, PICCS, TSCA

**EPCRA SECTION 302:** This material contains no extremely hazardous substances.



Product Name: MOBILGREASE XHP 222  
 Revision Date: 13 May 2015  
 Page 9 of 10

**SARA (311/312) REPORTABLE HAZARD CATEGORIES:** None.

**SARA (313) TOXIC RELEASE INVENTORY:**

Chemical Name	CAS Number	Typical Value
ZINC DIALKYL DITHIOPHOSPHATE	68457-79-4	1 - < 2.5%

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
XYLENES	1330-20-7	15
ZINC DIALKYL DITHIOPHOSPHATE	68457-79-4	13, 15, 17, 19
ZINC DINONYLNAPHTHALENE SULFONATE	28016-00-4	15

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

<b>SECTION 16</b>	<b>OTHER INFORMATION</b>
-------------------	--------------------------

N/D = Not determined, N/A = Not applicable

**KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):**

H315: Causes skin irritation; Skin Corr/Irritation, Cat 2  
 H317: May cause allergic skin reaction; Skin Sensitization, Cat 1  
 H318: Causes serious eye damage; Serious Eye Damage/Irr, Cat 1  
 H319(2A): Causes serious eye irritation; Serious Eye Damage/Irr, Cat 2A  
 H401: Toxic to aquatic life; Acute Env Tox, Cat 2  
 H402: Harmful to aquatic life; Acute Env Tox, Cat 3  
 H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2  
 H412: Harmful to aquatic life with long lasting effects; Chronic Env Tox, Cat 3

**THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:**

Updates made in accordance with implementation of GHS requirements.

The information and recommendations contained herein are, to the best of ExxonMobil's knowledge and belief, accurate and reliable as of the date issued. You can contact ExxonMobil to insure that this document is the most current available from ExxonMobil. The information and recommendations are offered for the user's consideration and



Product Name: MOBILGREASE XHP 222

Revision Date: 13 May 2015

Page 10 of 10

examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. If buyer repackages this product, it is the user's responsibility to insure proper health, safety and other necessary information is included with and/or on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, re-publication or retransmission of this document, in whole or in part, is not permitted. The term, "ExxonMobil" is used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliates in which they directly or indirectly hold any interest.

---

Internal Use Only

MHC: 0B, 0B, 0, 0, 0, 0

PPEC: A

DGN: 2006153XUS (1023053)

---

Copyright 2002 Exxon Mobil Corporation, All rights reserved



# XIAMETER(R) Material Safety Data Sheet

Page: 1 of 7

Version: 1.2

Revision Date: 2013/05/16

## XIAMETER(R) PMX-561 TRANSFORMER LIQUID

### 1. PRODUCT AND COMPANY IDENTIFICATION

Dow Corning Corporation  
South Saginaw Road  
Midland, Michigan 48686

**24 Hour Emergency Telephone: (989) 496-5900**

Customer Service: (989) 496-4430

Product Disposal Information: (989) 496-6315

CHEMTREC: (800) 424-9300

MSDS No.: 04088521

Revision Date: 2013/05/16

Generic Description: Silicone  
Physical Form: Liquid  
Color: Colorless  
Odor: Characteristic odor

NFPA Profile: Health 0 Flammability 1 Instability/Reactivity 0

Note: NFPA = National Fire Protection Association

### 2. HAZARDS IDENTIFICATION

#### POTENTIAL HEALTH EFFECTS

##### Acute Effects

Eye: Direct contact may cause temporary redness and discomfort.  
Skin: No significant irritation expected from a single short-term exposure.  
Inhalation: No significant effects expected from a single short-term exposure.  
Oral: Low ingestion hazard in normal use.

##### Prolonged/Repeated Exposure Effects

Skin: No known applicable information.  
Inhalation: No known applicable information.  
Oral: No known applicable information.

##### Signs and Symptoms of Overexposure

No known applicable information.

##### Medical Conditions Aggravated by Exposure

No known applicable information.

The above listed potential effects of overexposure are based on actual data, results of studies performed upon similar compositions, component data and/or expert review of the product. Please refer to Section 11 for the detailed toxicology information.





# XIAMETER(R) Material Safety Data Sheet

Page: 2 of 7

Version: 1.2

Revision Date: 2013/05/16

## XIAMETER(R) PMX-561 TRANSFORMER LIQUID

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

None present. This is not a hazardous material as defined in the OSHA Hazard Communication Standard.

### 4. FIRST AID MEASURES

Eye:	If irritation occurs, flush eye(s) with lukewarm gently flowing water for 5 minutes. Obtain medical attention.
Skin:	No health effects expected. If irritation does occur flush with lukewarm, gently flowing water for 5 minutes. If irritation persists, obtain medical advice.
Inhalation:	If symptoms are experienced remove source of contamination or move victim to fresh air. If irritation persists, obtain medical advice.
Oral:	If irritation or discomfort occur, obtain medical advice.
Notes to Physician:	Treat according to person's condition and specifics of exposure.

### 5. FIRE FIGHTING MEASURES

Flash Point:	> 213.8 °F / > 101 °C (Closed Cup)
Autoignition Temperature:	Not determined.
Flammability Limits in Air:	Not determined.
Extinguishing Media:	On large fires use dry chemical, foam or water spray. On small fires use carbon dioxide (CO <sub>2</sub> ), dry chemical or water spray. Water can be used to cool fire exposed containers.
Fire Fighting Measures:	Self-contained breathing apparatus and protective clothing should be worn in fighting large fires involving chemicals. Determine the need to evacuate or isolate the area according to your local emergency plan. Use water spray to keep fire exposed containers cool.
Unusual Fire Hazards:	None.

### 6. ACCIDENTAL RELEASE MEASURES

**XIAMETER(R) PMX-561 TRANSFORMER LIQUID**

**Containment/Clean up:** Determine whether to evacuate or isolate the area according to your local emergency plan. Observe all personal protection equipment recommendations described in Sections 5 and 8. For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbant. Clean area as appropriate since spilled materials, even in small quantities, may present a slip hazard. Final cleaning may require use of steam, solvents or detergents. Dispose of saturated absorbant or cleaning materials appropriately, since spontaneous heating may occur. Local, state and federal laws and regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which federal, state and local laws and regulations are applicable. Sections 13 and 15 of this MSDS provide information regarding certain federal and state requirements.

Note: See Section 8 for Personal Protective Equipment for Spills.

**7. HANDLING AND STORAGE**

Use with adequate ventilation. Avoid eye contact.

Use reasonable care and store away from oxidizing materials.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**Component Exposure Limits**

There are no components with workplace exposure limits.

**Engineering Controls**

Local Ventilation: None should be needed.

General Ventilation: Recommended.

**Personal Protective Equipment for Routine Handling**

Eyes: Use proper protection - safety glasses as a minimum.

Skin: Washing at mealtime and end of shift is adequate.

Suitable Gloves: Handle in accordance with good industrial hygiene and safety practices.

Inhalation: No respiratory protection should be needed.

Suitable Respirator: None should be needed.

**Personal Protective Equipment for Spills**

# XIAMETER(R) Material Safety Data Sheet

Page: 4 of 7

Version: 1.2

Revision Date: 2013/05/16

## XIAMETER(R) PMX-561 TRANSFORMER LIQUID

Eyes: Use proper protection - safety glasses as a minimum.

Skin: Washing at mealtime and end of shift is adequate.

Inhalation/Suitable  
Respirator: No respiratory protection should be needed.

Precautionary Measures: Avoid eye contact. Use reasonable care.

Note: These precautions are for room temperature handling. Use at elevated temperature or aerosol/spray applications may require added precautions. For further information regarding aerosol inhalation toxicity, please refer to the guidance document regarding the use of silicone-based materials in aerosol applications that has been developed by the silicone industry ([www.SEHSC.com](http://www.SEHSC.com)) or contact the Dow Corning customer service group.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Form: Liquid

Color: Colorless

Odor: Characteristic odor

Specific Gravity @ 25°C: 0.96

Viscosity: 50 cSt

Freezing/Melting Point: Not determined.

Boiling Point: > 65 °C

Vapor Pressure @ 25°C: Not determined.

Vapor Density: Not determined.

Solubility in Water: Not determined.

pH: Not determined.

Volatile Content: Not determined.

Flash Point: > 213.8 °F / > 101 °C (Closed Cup)

Autoignition Temperature: Not determined.

Flammability Limits in Air: Not determined.

Note: The above information is not intended for use in preparing product specifications.

### 10. STABILITY AND REACTIVITY

Chemical Stability: Stable.

Hazardous Polymerization: Hazardous polymerization will not occur.

Conditions to Avoid: None.

Materials to Avoid: Oxidizing material can cause a reaction.

#### Hazardous Decomposition Products

Thermal breakdown of this product during fire or very high heat conditions may evolve the following decomposition products: Carbon oxides and traces of incompletely burned carbon compounds. Silicon dioxide. Formaldehyde.



### XIAMETER(R) PMX-561 TRANSFORMER LIQUID

#### 11. TOXICOLOGICAL INFORMATION

##### Acute Toxicology Data for Product

	<u>Species</u>	<u>Test Results</u>
Oral LD50:	Rat	> 15,400 mg/kg
Dermal LD50:	Rabbit	> 2,000 mg/kg

##### Special Hazard Information on Components

No known applicable information.

#### 12. ECOLOGICAL INFORMATION

##### Environmental Fate and Distribution

Complete information is not yet available.

##### Environmental Effects

Complete information is not yet available.

##### Fate and Effects in Waste Water Treatment Plants

Complete information is not yet available.

##### Ecotoxicity Classification Criteria

Hazard Parameters (LC50 or EC50)	High	Medium	Low
Acute Aquatic Toxicity (mg/L)	≤1	>1 and ≤100	>100
Acute Terrestrial Toxicity	≤100	>100 and ≤ 2000	>2000

This table is adapted from "Environmental Toxicology and Risk Assessment", ASTM STP 1179, p.34, 1993.

This table can be used to classify the ecotoxicity of this product when ecotoxicity data is listed above. Please read the other information presented in the section concerning the overall ecological safety of this material.

#### 13. DISPOSAL CONSIDERATIONS

##### RCRA Hazard Class (40 CFR 261)

When a decision is made to discard this material, as received, is it classified as a hazardous waste? No

State or local laws may impose additional regulatory requirements regarding disposal.

#### 14. TRANSPORT INFORMATION



# XIAMETER(R) Material Safety Data Sheet

Page: 6 of 7

Version: 1.2

Revision Date: 2013/05/16

## XIAMETER(R) PMX-561 TRANSFORMER LIQUID

### DOT Road Shipment Information (49 CFR 172.101)

Not subject to DOT.

### Ocean Shipment (IMDG)

Not subject to IMDG code.

### Air Shipment (IATA)

Not subject to IATA regulations.

## 15. REGULATORY INFORMATION

Contents of this MSDS comply with the OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA Status: All chemical substances in this material are included on or exempted from listing on the TSCA Inventory of Chemical Substances.

### EPA SARA Title III Chemical Listings

#### **Section 302 Extremely Hazardous Substances (40 CFR 355):**

None.

#### **Section 304 CERCLA Hazardous Substances (40 CFR 302):**

None.

#### **Section 311/312 Hazard Class (40 CFR 370):**

Acute: No  
Chronic: No  
Fire: No  
Pressure: No  
Reactive: No

#### **Section 313 Toxic Chemicals (40 CFR 372):**

None present or none present in regulated quantities.

Note: Chemicals are listed under the 313 Toxic Chemicals section only if they meet or exceed a reporting threshold.

### Supplemental State Compliance Information

#### **California**

Warning: This product contains the following chemical(s) listed by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) as being known to cause cancer, birth defects or other reproductive harm.



# XIAMETER(R) Material Safety Data Sheet

Page: 7 of 7

Version: 1.2

Revision Date: 2013/05/16

## XIAMETER(R) PMX-561 TRANSFORMER LIQUID

None known.

### New Jersey

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
63148-62-9	85.0 - 100.0	Polydimethylsiloxane

### Pennsylvania

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
63148-62-9	85.0 - 100.0	Polydimethylsiloxane

## 16. OTHER INFORMATION

Prepared by: Dow Corning Corporation

These data are offered in good faith as typical values and not as product specifications. No warranty, either expressed or implied, is hereby made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate.

XIAMETER(R) is a trademark of Dow Corning Corporation

<http://www.xiameter.com>



## SAFETY DATA SHEET

SDS: 2001A

# 2001 WIRELIFE® MONOLEC® PENETRATING LUBRICANT

Issuing Date 04-24-2012

Revision Date 11-02-2015

Revision Number 7

### 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

**Product Identifier**

**Product Name** 2001 WIRELIFE® MONOLEC® PENETRATING LUBRICANT

**Other means of identification**

**UN-No** 1950

**Synonyms** No information available

**Recommended use of the chemical and restrictions on use**

**Identified uses** Lubricant

**Uses advised against** Consumer use

**Details of the supplier of the safety data sheet**

**Manufacturer**

Lubrication Engineers Inc.  
300 Bailey Avenue  
Fort Worth, TX 76107  
USA  
(817) 916-3200

**Emergency Telephone Number**

CHEMTREC: +1-703-527-3887 (INTERNATIONAL)  
1-800-424-9300 (NORTH AMERICA)

SDS: 2001A

# 2001 WIRELIFE® MONOLEC® PENETRATING LUBRICANT

Issuing Date 04-24-2012

Revision Date 11-02-2015

Revision Number 7

## 2. HAZARDS IDENTIFICATION

### Classification

### OSHA Regulatory Status

Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2A
Specific target organ toxicity (single exposure)	Category 3
Aspiration toxicity	Category 1
Flammable Aerosols	Category 1
Gases Under Pressure	Compressed Gas

### Label Elements

#### Emergency Overview

**Signal Word**  
DANGER

#### Hazard Statements

Causes skin irritation  
Causes serious eye irritation  
May cause respiratory irritation. May cause drowsiness or dizziness  
May be fatal if swallowed and enters airways  
Extremely flammable aerosol  
Contains gas under pressure; may explode if heated



The product contains no substances which at their given concentration, are considered to be hazardous to health

**appearance** purple

**Physical state** Aerosol

**Odor** Hydrocarbon-like

### Precautionary Statements - Prevention

Wash face, hands and any exposed skin thoroughly after handling. Avoid breathing dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area. Keep away from heat/sparks/open flames/hot surfaces. — No smoking. Do not spray on an open flame or other ignition source. Pressurized container: Do not pierce or burn, even after use. Wear protective gloves/protective clothing/eye protection/face protection. Keep cool.

### Response

Call a POISON CENTER or doctor/physician if you feel unwell.

### Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

### Skin

IF ON SKIN: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.

SDS: 2001A

**2001 WIRELIFE® MONOLEC® PENETRATING  
LUBRICANT**

Issuing Date 04-24-2012

Revision Date 11-02-2015

Revision Number 7

**Inhalation**

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

**Ingestion**

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Do NOT induce vomiting.

**Fire**

In case of fire: Use CO<sub>2</sub>, dry chemical, or foam for extinction. Explosion risk in case of fire. Eliminate all ignition sources if safe to do so.

**Spill**

None.

**Storage**

Store locked up. Store in a well-ventilated place. Keep container tightly closed. Protect from sunlight. Do not expose to temperatures exceeding 50 °C/122 °F. Protect from sunlight.

**Disposal**

Dispose of contents/container to an approved waste disposal plant.

**Hazards not otherwise classified (HNOC)**

None

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

Chemical Name	CAS-No	Weight %
Acetone	67-64-1	20 - 30
Distillates (petroleum), hydrotreated light	64742-47-8	10 - 20
Carbon dioxide	124-38-9	10 - 20
Sodium Sulfonate	70024-73-6	5 - 10

The producer of "2001" declares that it contains less than 3% DMSO extractable material by IP-346

**4. FIRST AID MEASURES****First Aid Measures****General Advice**

If symptoms develop move victim to fresh air. Show this safety data sheet to the doctor in attendance. Do not breathe dust/fume/gas/mist/vapors/spray.

**Eye Contact**

Rinse thoroughly with plenty of water, also under the eyelids. Keep eye wide open while rinsing.

**Skin Contact**

Consult a physician if necessary. Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes.

**Inhalation**

Move to fresh air. Consult a physician. If not breathing, give artificial respiration.

**Ingestion**

May cause adverse kidney effects. Drink plenty of water. Do NOT induce vomiting.

**Protection of First-aiders**

Use personal protective equipment.

**Most important symptoms and effects, both acute and delayed****Symptoms**

None known.



SDS: 2001A

# 2001 WIRELIFE® MONOLEC® PENETRATING LUBRICANT

Issuing Date 04-24-2012

Revision Date 11-02-2015

Revision Number 7

## Indication of any immediate medical attention and special treatment needed

Notes to Physician      Treat symptomatically.

## 5. FIRE-FIGHTING MEASURES

Flash Point      --20 °C / -4 °F

Suitable Extinguishing Media      Water spray, Carbon dioxide (CO<sub>2</sub>), Foam, Dry chemical

Unsuitable Extinguishing Media      Do not use a solid water stream as it may scatter and spread fire.

Specific Hazards Arising from the Chemical      Thermal decomposition can lead to release of irritating gases and vapors.

### Explosion Data

Sensitivity to Mechanical Impact      Not impact sensitive.

Sensitivity to Static Discharge      May be ignited by friction, heat, sparks or flames.

Protective Equipment and Precautions for Firefighters      In the event of fire and/or explosion do not breathe fumes.

NFPA      Health hazard 2      Flammability 3      Stability 0

## 6. ACCIDENTAL RELEASE MEASURES

### Personal precautions, protective equipment and emergency procedures

Personal Precautions      Avoid contact with eyes. Avoid breathing vapors or mists.

### Environmental Precautions

Environmental Precautions      Prevent entry into waterways, sewers, basements or confined areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.

### Methods and material for containment and cleaning up

Methods for Containment      Prevent further leakage or spillage if safe to do so. Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container.

Methods for Cleaning up      Use personal protective equipment. Take up mechanically and collect in suitable container for disposal. Clean contaminated surface thoroughly.

## 7. HANDLING AND STORAGE

### Precautions for safe handling

Advice on safe handling      Keep away from open flames, hot surfaces and sources of ignition. Use only in an area containing flame proof equipment. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.

### Conditions for safe storage, including any incompatibilities

Technical measures/Storage conditions      Keep tightly closed in a dry and cool place. Keep in properly labeled containers.

SDS: 2001A

# 2001 WIRELIFE® MONOLEC® PENETRATING LUBRICANT

Issuing Date 04-24-2012

Revision Date 11-02-2015

Revision Number 7

Incompatible products. Strong oxidizing agents. Strong acids. Strong bases.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Control parameters

#### Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Acetone 67-64-1	STEL 750 ppm TWA: 500 ppm	TWA: 1000 ppm TWA: 2400 mg/m <sup>3</sup> (vacated) TWA: 750 ppm (vacated) TWA: 1800 mg/m <sup>3</sup> (vacated) STEL: 2400 mg/m <sup>3</sup> (vacated) STEL: 1000 ppm	IDLH: 2500 ppm TWA: 250 ppm TWA: 590 mg/m <sup>3</sup>
Carbon dioxide 124-38-9	STEL 30000 ppm TWA: 5000 ppm	TWA: 5000 ppm TWA: 9000 mg/m <sup>3</sup> (vacated) TWA: 10000 ppm (vacated) TWA: 18000 mg/m <sup>3</sup> (vacated) STEL: 30000 ppm (vacated) STEL: 54000 mg/m <sup>3</sup>	IDLH: 40000 ppm TWA: 5000 ppm TWA: 9000 mg/m <sup>3</sup> STEL: 30000 ppm STEL: 54000 mg/m <sup>3</sup>
Isopropyl alcohol 67-63-0	STEL 400 ppm TWA: 200 ppm	TWA: 400 ppm TWA: 980 mg/m <sup>3</sup> (vacated) TWA: 400 ppm (vacated) TWA: 980 mg/m <sup>3</sup> (vacated) STEL: 500 ppm (vacated) STEL: 1225 mg/m <sup>3</sup>	IDLH: 2000 ppm TWA: 400 ppm TWA: 980 mg/m <sup>3</sup> STEL: 500 ppm STEL: 1225 mg/m <sup>3</sup>

### Appropriate engineering controls

#### Engineering Measures

Showers  
Eyewash stations  
Ventilation systems.

### Individual protection measures, such as personal protective equipment

Eye/Face Protection	Tightly fitting safety goggles.
Skin and Body Protection	Long sleeved clothing. Protective gloves.
Respiratory Protection	No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.
Hygiene Measures	When using, do not eat, drink or smoke.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### 9.1. Information on basic physical and chemical properties

Physical state	Aerosol
appearance	purple
Odor	Hydrocarbon-like
Odor threshold	No information available

#### Property

pH	6 - 8
Melting point/freezing point	No data available
Boiling Point/Range	no data available

#### Property

SDS: 2001A

# 2001 WIRELIFE® MONOLEC® PENETRATING LUBRICANT

Issuing Date 04-24-2012

Revision Date 11-02-2015

Revision Number 7

Flash Point	--20 °C / -4 °F
Vapor pressure	No data available
Vapor Density	< 1 ( Air = 1 )
Specific Gravity	0.89
Water solubility	negligible
Partition Coefficient: n-octanol/water	no data available
Autoignition Temperature	No data available
Decomposition Temperature	No data available
Viscosity, kinematic	not applicable

## 10. STABILITY AND REACTIVITY

<u>reactivity</u>	No information available
<u>Chemical stability</u>	Stable under recommended storage conditions.
<u>Possibility of Hazardous Reactions</u>	None under normal processing.
<u>Conditions to Avoid</u>	Heat, flames and sparks. Contact with other chemicals
<u>Incompatible Materials</u>	Strong oxidizing agents. Strong acids. Strong bases.
<u>Hazardous Decomposition Products</u>	Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke)

## 11. TOXICOLOGICAL INFORMATION

### Information on likely routes of exposure

<b>Product Information</b>	Product does not present an acute toxicity hazard based on known or supplied information
<b>Inhalation</b>	May cause irritation of respiratory tract.
<b>Eye Contact</b>	Contact with eyes may cause irritation.
<b>Skin Contact</b>	May cause irritation.
<b>Ingestion</b>	There is no data available for this product.

### Component Information

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Acetone 67-64-1	= 5800 mg/kg ( Rat )	-	-
Distillates (petroleum), hydrotreated light 64742-47-8	> 5000 mg/kg ( Rat )	> 2000 mg/kg ( Rabbit )	> 5.2 mg/L ( Rat ) 4 h

### Information on toxicological effects

<b>Symptoms</b>	No information available.
-----------------	---------------------------

### Delayed and immediate effects as well as chronic effects from short and long-term exposure

The producer of "2001" declares that it contains less than 3% DMSO extractable material by IP-346



SDS: 2001A

# 2001 WIRELIFE® MONOLEC® PENETRATING LUBRICANT

Issuing Date 04-24-2012

Revision Date 11-02-2015

Revision Number 7

<b>Sensitization</b>	No information available.
<b>Mutagenic Effects</b>	No information available.
<b>Carcinogenicity</b>	No information available.
<b>Reproductive toxicity</b>	No information available.
<b>Target Organ Effects</b>	Central Vascular System (CVS), Respiratory system.

## Numerical measures of toxicity - Product Information

The following values are calculated based on chapter 3.1 of the GHS document .

ATEmix (oral)	19397 mg/kg
ATEmix (dermal)	6011 mg/kg
ATEmix (inhalation-dust/mist)	581.7 mg/l

## 12. ECOLOGICAL INFORMATION

### Ecotoxicity

Chemical Name	Algae/aquatic plants	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to daphnia and other aquatic invertebrates
Acetone 67-64-1	-	LC50 4.74 - 6.33 mL/L Oncorhynchus mykiss 96 h LC50 6210 - 8120 mg/L Pimephales promelas 96 h LC50= 8300 mg/L Lepomis macrochirus 96 h	EC50 = 14500 mg/L 15 min	EC50 10294 - 17704 mg/L 48 h EC50 12600 - 12700 mg/L 48 h
Distillates (petroleum), hydrotreated light 64742-47-8	-	-	-	-

**Persistence and Degradability** No information available.

### Bioaccumulation

**Mobility** The product is insoluble and floats on water.

Chemical Name	Log Pow
Acetone 67-64-1	-0.24
Isopropyl alcohol 67-63-0	0.05
Naphtha (petroleum), heavy aromatic 64742-94-5	2.9 - 6.1

### Other Adverse Effects

## 13. DISPOSAL CONSIDERATIONS

SDS: 2001A

# 2001 WIRELIFE® MONOLEC® PENETRATING LUBRICANT

Issuing Date 04-24-2012

Revision Date 11-02-2015

Revision Number 7

## Waste treatment methods

**Waste Disposal Methods** Dispose of in accordance with local regulations.

**Contaminated Packaging** Do not re-use empty containers. Empty containers should be taken to an approved waste handling site for recycling or disposal.

**US EPA Waste Number** D001

Chemical Name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Acetone 67-64-1		Included in waste stream: F039		Ignitable waste

This product contains one or more substances that are listed with the State of California as a hazardous waste

Chemical Name	California Hazardous Waste Status
Acetone 67-64-1	Ignitable
Isopropyl alcohol 67-63-0	Toxic Ignitable

## 14. TRANSPORT INFORMATION

### DOT

**UN-No** 1950  
**Proper Shipping Name** Aerosol  
**Hazard Class** 2.1  
**Special Provisions** 49 CFR 173.115  
**Description** Compressed Gas.  
**Emergency Response Guide Number** 126

### IMDG

**UN-No** 1950  
**Proper Shipping Name** Aerosol  
**Hazard Class** 2  
**Subsidiary Class** 2.1  
**Special Provisions** SP63  
**Description** Limited quantity (LQ)

## 15. REGULATORY INFORMATION

### International Inventories

TSCA	Complies
DSL/NDL	Not determined
NDL	Not determined
EINECS	Not determined
ELINCS	Not determined
ENCS	Complies

SDS: 2001A

# 2001 WIRELIFE® MONOLEC® PENETRATING LUBRICANT

Issuing Date 04-24-2012

Revision Date 11-02-2015

Revision Number 7

IECSC	Complies
KECL	Not determined
PICCS	Not determined
AICS	Not determined

**TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory  
**DSL/NDL** - Canadian Domestic Substances List/Non-Domestic Substances List  
**EINECS/ELINCS** - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances  
**ENCS** - Japan Existing and New Chemical Substances  
**IECSC** - China Inventory of Existing Chemical Substances  
**KECL** - Korean Existing and Evaluated Chemical Substances  
**PICCS** - Philippines Inventory of Chemicals and Chemical Substances  
**AICS** - Australian Inventory of Chemical Substances

## U.S. Federal Regulations

### SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical Name	CAS-No	Weight %	SARA 313 - Threshold Values %
Isopropyl alcohol - 67-63-0	67-63-0	0.1 - 1	1.0

### SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	Yes
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

### Clean Water Act

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

### CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302):

Chemical Name	Hazardous Substances RQs	CERCLA/SARA RQ	Reportable Quantity (RQ)
Acetone 67-64-1	5000 lb	-	RQ 5000 lb final RQ RQ 2270 kg final RQ

## U.S. State Regulations

### California Proposition 65

This product does not contain any Proposition 65 chemicals.

### U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Acetone 67-64-1	X	X	X



SDS: 2001A

**2001 WIRELIFE® MONOLEC® PENETRATING  
LUBRICANT**

Issuing Date 04-24-2012

Revision Date 11-02-2015

Revision Number 7

Carbon dioxide 124-38-9	X	X	X
Isopropyl alcohol 67-63-0	X	X	X
Petroleum distillates, hydrotreated light naphthenic 64742-53-6		X	

**16. OTHER INFORMATION**

Issuing Date 04-24-2012

Revision Date 11-02-2015

Reason for revision Change to composition.

**Disclaimer**

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**End of Safety Data Sheet**



Tanner Industries, Inc.

## SAFETY DATA SHEET

### Section 1. Identification

Product Name: **Ammonia, Anhydrous**  
Synonyms: Ammonia  
CAS REGISTRY NO: 7664-41-7  
Supplier: Tanner Industries, Inc.  
735 Davisville Road, Third Floor  
Southampton, PA 18966  
Website: [www.tannerind.com](http://www.tannerind.com)  
Telephone (General): 215-322-1238  
**Corporate Emergency Telephone Number: 800-643-6226**  
**Emergency Telephone Number: Chemtree: 800-424-9300**  
Recommended Use: Various Industrial / Agricultural

### Section 2. Hazard(s) Identification

Hazard: Acute Toxicity, Corrosive, Gases Under Pressure, Flammable Gas, Acute Aquatic Toxicity  
Classification: Acute Toxicity, Inhalation (Category 4) Note: (1 - Most Severe / 4 - Least Severe)  
Skin Corrosion / Irritation (Category 1B)  
Serious Eye Damage / Irritation (Category 1)  
Gases Under Pressure (Liquefied gas)  
Flammable Gases (Category 2)  
Acute Aquatic Toxicity (Category 1)

Pictogram:



Signal word: **Danger**

Hazard statements: Harmful if inhaled.  
Causes severe skin burns and serious eye damage.  
Flammable gas.  
Contains gas under pressure; may explode if heated.  
Very toxic to aquatic life.

Precautionary statements: Avoid breathing gas/vapors.  
Use only outdoors or in well-ventilated area.  
Wear protective gloves, protective clothing, eye protection, face protection.  
Keep away from heat, sparks, open flames and other ignition sources. No smoking.

Precautionary statements  
(continued):

IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a doctor/physician and seek medical attention for severe exposure or if symptoms persist. Specific treatment, see supplemental first aid instructions in Section 4 (First Aid Measures).

IF ON SKIN: Rinse immediately with plenty of water before removing clothes. Contaminated clothing could possibly be frozen to skin. Rinse skin with water or shower (minimum of 20 minutes). Specific treatment, see supplemental first aid instructions in Section 4 (First Aid Measures).

IF IN EYES: Immediately call a doctor/physician and seek medical attention. Rinse continuously with water for several minutes (minimum of 20 minutes). Specific treatment, see supplemental first aid instructions in Section 4 (First Aid Measures).

Wash contaminated clothing before reuse.

Store in a well-ventilated place. Keep container tightly closed. Protect from sunlight. Store locked up.

In case of leakage: Eliminate all ignition sources, if safe to do so.

In case of leaking gas fire: Stop flow of gas before extinguishing.

Dispose of contents/container in accordance with local, regional, national, international regulations as applicable. See section 13 (Disposal Considerations).

**NFPA Rating:**



**NFPA Numbering System:**  
0 = Least Hazardous / 4 = Most Hazardous

**HMIS Classification:**

ANHYDROUS AMMONIA	
HEALTH	3
FLAMMABILITY	1
REACTIVITY	0
PERSONAL PROTECTION	II

**HMIS Hazard Index:**  
0 = Minimal, 1 = Slight, 2 = Moderate, 3 = Serious, 4 = Severe

**Section 3. Composition / Information on Ingredients**

**CHEMICAL NAME:** Ammonia, Anhydrous

**CAS REGISTRY NO:** 7664-41-7

**SYNONYMS:** Ammonia

**CHEMICAL FAMILY:** Inorganic nitrogen compounds

**COMPOSITION:** 99+% Ammonia

**Section 4. First Aid Measures**

IF INHALED: Immediately remove person to fresh air and keep comfortable for breathing. In case of severe exposure or if irritation persists, breathing difficulties or respiratory symptoms arise, seek medical attention. If not breathing, administer artificial respiration. If trained to do so, administer supplemental oxygen, if required.

IF ON SKIN: Immediately rinse skin and contaminated clothing with plenty of water before removing clothes. Clothing that has been contacted by liquid ammonia may freeze to the skin. Thaw frozen clothing from skin before removing. Flush skin with copious amounts of tepid water for a minimum of 20 minutes. Do not rub or apply topical, occlusive compounds, such as ointments, certain creams, etc., on affected area. For liquid ammonia contact, seek immediate medical attention. For severe vapor contact or if irritation persists, seek medical attention.

IF IN EYES: Immediately rinse continuously with copious amounts of tepid water for a minimum of 20 minutes. Eyelids should be held apart and away from eyeball for thorough rinsing. Do not rub or apply topical, occlusive compounds, such as ointments, certain creams, etc., on affected area. Seek medical attention.

IF SWALLOWED: Rinse mouth. Do not induce vomiting. If conscious, give large amounts of water to drink. May drink orange juice, citrus juice or diluted vinegar (1:4) to counteract ammonia. If unconscious, do not give anything by mouth. Seek medical attention.

**NOTE TO PHYSICIAN:** Respiratory injury may appear as a delayed phenomenon. Pulmonary edema may follow chemical bronchitis. Supportive treatment with necessary ventilation actions, including oxygen, may warrant consideration.



## **Section 5. Fire Fighting Measures**

### **EXTINGUISHING MEDIA:**

Water Spray, Water Fog, Dry Chemical, Carbon Dioxide (CO<sub>2</sub>) or foam.

### **SPECIAL FIRE FIGHTING PROCEDURES:**

Must wear protective clothing and a positive pressure SCBA.

Stop flow of gas or liquid if possible.

Approach fire upwind and evacuate area downwind if needed.

Use water spray to keep fire-exposed containers cool and control vapors.

If a portable container (such as a cylinder or trailer) can be moved from the fire area without risk to the individual, do so to prevent the pressure relief valve of the trailer or portable container from discharging or the cylinder from rupturing. If relief valves are inoperative, heat exposed storage containers may become explosion hazards due to over pressurization.

Stay upwind when containers are threatened.

### **UNUSUAL FIRE AND EXPLOSION HAZARDS:**

Outdoors, ammonia is not generally a fire hazard. Indoors, in confined areas, ammonia may be a fire hazard, especially if oil or other combustible materials are present.

Combustion may form toxic nitrogen oxides (NO<sub>x</sub>).

## **Section 6. Accidental Release Measures**

### **GENERAL:**

Only properly trained and equipped persons should respond to an ammonia release.

Wear eye, hand and respiratory protection and protective clothing; see Section 8, Exposure Controls / Personal Protection.

Stop source of leak if possible, provided it can be done in a safe manner.

Leave the area of a spill by moving laterally and upwind.

Isolate the affected area. Non-responders should evacuate the area, or shelter in place.

### **SPECIFIC STEPS TO BE TAKEN:**

For a hazardous material release response, Level A and/or Level B ensemble including positive-pressure SCBA should be used. A positive pressure SCBA is required for entry into ammonia atmospheres at or above 300 ppm (IDLH).

Stay upwind and use water spray downwind of container to absorb the evolved gas.

Do not apply water directly to container, unless there is heat impingement, as ammonia boils at -28 °F (direct water will heat container), and more vapors will be released.

**Caution:** Adding water directly to liquid spills will increase volatilization of ammonia, thus increasing the possibility of exposure.

Contain spill and runoff from entering drains, sewers, streams, lakes and water systems by utilizing methods such as diking, containment, and absorption.

## **Section 7. Handling and Storage**

### **SPECIAL PRECAUTIONS:**

Only trained persons should handle anhydrous ammonia. Store in well-ventilated areas, with containers tightly closed. Protect from temperatures exceeding 120 °F (48.8 °C). Protect containers from physical damage. Keep away from ignition sources, especially in indoor spaces. Do not use plastic. Do not use any non-ferrous metals such as copper, brass, bronze, tin, zinc or galvanized metals. Use only stainless steel, carbon steel or black iron for anhydrous ammonia containers or piping.

OSHA 29 CFR 1910.111 prescribes handling and storage requirements for anhydrous ammonia.

Refer to Compressed Gas Association (CGA) G-2.1 for the recommendations for the storage and handling of anhydrous ammonia.

### **VENTILATION:**

Local exhaust should be sufficient to keep ammonia vapor below applicable exposure standards.

### **WORKPLACE PROTECTIVE EQUIPMENT:**

Protective equipment should be stored near, but outside of anhydrous ammonia area. Water for first aid, such as an eyewash station and safety shower, should be kept available in the immediate vicinity. See 29 CFR 1910.111 for workplace requirements.

### **DISPOSAL:**

See Section 13, Disposal Considerations. Classified as Resource Conservation and Recovery Act (RCRA) Hazardous Waste due to corrosivity with designation D002, if disposed of in original form.

## Section 8. Exposure Controls / Personal Protection

### EXPOSURE LIMITS FOR AMMONIA: (Vapor)

OSHA	50 ppm,	35 mg / m <sup>3</sup> PEL	8 hour TWA
NIOSH	35 ppm,	27 mg / m <sup>3</sup> STEL	15 minutes
	25 ppm,	18 mg / m <sup>3</sup> REL	10 hour TWA
	300 ppm,	IDLH	
ACGIH	25 ppm,	18 mg / m <sup>3</sup> TLV	8 hour TWA
	35 ppm,	27 mg / m <sup>3</sup> STEL	15 minutes

### PROTECTIVE EQUIPMENT:

**EYE/FACE PROTECTION:** Chemical splash goggles should be worn when handling anhydrous ammonia. A face shield can be worn over chemical splash goggles as additional protection. Do not wear contact lenses when handling anhydrous ammonia. Refer to 29 CFR 1910.133 for OSHA eye protection requirements.

**SKIN PROTECTION:** Ammonia impervious gloves and clothing (such as neoprene, butyl and Teflon) should be worn to prevent contact during normal operations, such as loading/unloading and transfers. Chemical boots can be worn as additional protection.

**RESPIRATORY PROTECTION:** Respiratory protection approved by NIOSH for ammonia must be used when applicable safety and health exposure limits are exceeded. For escape in emergencies, NIOSH approved respiratory protection should be used, such as a full-face gas mask and canisters/cartridges approved for ammonia or SCBA. A positive pressure SCBA is required for entry into ammonia atmospheres at or above 300 ppm (IDLH).

Refer to 29 CFR 1910.134 and ANSI: Z88.2 for OSHA respiratory protection requirements.

Also refer to 29 CFR 1910.111 for respiratory protection requirements at bulk installations.

**VENTILATION:** Local exhaust should be sufficient to keep ammonia vapor below applicable exposure standards.

**FOR A HAZARDOUS MATERIAL RELEASE RESPONSE:** Level A and/or Level B ensemble including positive-pressure SCBA should be used. A positive pressure SCBA is required for entry into ammonia atmospheres at or above 300 ppm (IDLH).

## Section 9. Physical and Chemical Properties

<b>APPEARANCE AND ODOR:</b>	Colorless liquid or gas with a pungent odor. Odor threshold 2 - 5 ppm.
<b>SOLUBILITY IN WATER:</b>	(per 100 pounds of water): 86.9 pounds at 32 °F, 51 pounds at 68 °F
<b>SPECIFIC GRAVITY OF GAS (air = 1):</b>	0.596 at 32 °F
<b>SPECIFIC GRAVITY OF LIQUID (water = 1):</b>	0.682 at -28 °F (Compared to water at 39 °F).
<b>WEIGHT (per gallon):</b>	5.15 pounds at 60 °F
<b>PH:</b>	Not applicable (Highly alkaline/base).
<b>BOILING POINT:</b>	-28 °F at 1 Atm.
<b>FORMULA:</b>	NH <sub>3</sub>
<b>MOLECULAR WEIGHT:</b>	17.03 (NH <sub>3</sub> )
<b>FLAMMABILITY</b>	
<b>FLASHPOINT:</b>	None
<b>FLAMMABLE LIMITS OF VAPOR IN AIR:</b>	LEL/UEL 16% to 25% (listed in the <i>NIOSH Pocket Guide to Chemical Hazards</i> 15% to 28%).
<b>AUTO IGNITION TEMPERATURE:</b>	1,204 °F (If catalyzed). 1,570 °F (If un-catalyzed).
<b>CRITICAL TEMPERATURE:</b>	271.4 °F
<b>DECOMPOSITION TEMPERATURE:</b>	-108.4 °F
<b>GAS SPECIFIC VOLUME:</b>	20.78 Ft <sup>3</sup> /Lb at 32 °F and 1 Atm.
<b>VAPOR DENSITY:</b>	0.0481 Lb/Ft <sup>3</sup> at 32 °F
<b>LIQUID DENSITY:</b>	38.00 Lb/Ft <sup>3</sup> at 70 °F
<b>VISCOSITY:</b>	0.00982 cP at 68 °F
<b>EVAPORATION RATE:</b>	Not applicable
<b>APPROXIMATE FREEZING POINT:</b>	-108 °F
<b>VAPOR PRESSURE:</b>	114 psig at 70 °F
<b>SURFACE TENSION:</b>	23.4 Dynes / cm at 52 °F
<b>CRITICAL PRESSURE:</b>	111.5 Atm
<b>PARTITION COEFFICIENT:</b>	-114 at 77 °F

## Section 10. Stability and Reactivity

### **REACTIVITY:**

Anhydrous ammonia has potentially explosive reactions with strong oxidizers. Anhydrous ammonia forms explosive mixtures in air with hydrocarbons, chlorine, fluorine and silver nitrate. Anhydrous ammonia reacts to form explosive products, mixtures or compounds with mercury, gold, silver, iodine, bromine, silver oxide and silver chloride.

### **CHEMICAL STABILITY:**

Stable under normal ambient conditions of temperature and pressure. Heating a closed container causes vapor pressure to increase. Will not polymerize.

### **POSSIBILITY OF HAZARDOUS REACTIONS:**

Will react exothermically with acids and water.

### **CONDITIONS TO AVOID:**

Avoid anhydrous ammonia contact with chlorine, which forms a chloramine gas, which is a primary skin irritant and sensitizer. Avoid contact with galvanized surfaces, copper, brass, bronze, mercury, gold and silver. A corrosive reaction will occur.

### **INCOMPATIBLE MATERIALS:**

Anhydrous ammonia is incompatible with acetaldehyde, acrolein, boron, chloric acid, chlorine monoxide, chlorites, nitrogen tetroxide, perchlorate, sulfur, tin and strong acids.

### **HAZARDOUS DECOMPOSITION PRODUCTS:**

Anhydrous ammonia decomposes to hydrogen and nitrogen gases above 450 °C (842 °F). Decomposition temperatures may be lowered by contact with certain metals, such as iron, nickel and zinc and by catalytic surfaces such as porcelain and pumice.

## Section 11. Toxicological Information

**Potential health effects:** Ammonia is an irritant and corrosive to the skin, eyes, respiratory tract and mucous membranes. Exposure to liquid or rapidly expanding gases may cause severe chemical burns and frostbite to the eyes, lungs and skin. Skin and respiratory related diseases could be aggravated by exposure. The extent of injury produced by exposure to ammonia depends on the duration of the exposure, the concentration of the liquid, gas or vapor and the depth of inhalation.

### **Exposure Routes:**

Inhalation (vapors, gas), skin and/or eye contact (vapors, liquid, gas).

### **Symptoms of acute exposure:**

- Inhalation:** Exposure may result in severe irritation and/or burns of the nose, throat and respiratory tract. May cause dyspnea (breathing difficulty), wheezing, chest pain, bronchospasm, pink frothy sputum, pulmonary edema or respiratory arrest. Extreme exposure may result in death from spasm, inflammation or edema. Respiratory injury may appear as a delayed phenomenon. Pulmonary edema may follow chemical bronchitis. Brief inhalation exposure to 5,000 ppm may be fatal.
- Skin:** Irritation, corrosive burns, blister formation (vesiculation) may result. Contact with liquid may produce freeze burns (frostbite) and caustic burns.
- Eyes:** Vapors may cause severe irritation. Tearing, eye burns, permanent eye damage or blindness may occur. Effects of direct contact may range from irritation and lacrimation to severe injury and blindness.
- Ingestion:** Ingestion is unlikely since the material is a gas under normal atmospheric conditions. If ingested, it may cause burns and corrosion, severe pain of the mouth, throat, esophagus and stomach or may be fatal

### **Chronic Exposure:**

Repeated exposure to ammonia may cause chronic irritation of the eyes and respiratory tract.

### **Toxicity:**

LC<sub>50</sub> - 5131 mg/m<sup>3</sup> (7338 ppm) to 11,592 mg/m<sup>3</sup> (16,600 ppm), 60 minute exposure, Rat.  
LD<sub>50</sub> - 350 mg / kg (Oral / Rat).

Not listed in the National Toxicology Program (NTP).

Not recognized by OSHA as a carcinogen.

Not listed as a carcinogen by the International Agency for Research on Cancer (IARC monograph).

Germ cell mutagenicity information is not available. Reproductive toxicity information is not available.



## Section 12. Ecological Information

Ammonia is harmful to aquatic life at very low concentrations. Notify local health and wildlife officials and operators of any nearby water intakes upon contamination of surface water.

### Toxicity:

Terrestrial plants: LOEC = 3-250 ppm NH<sub>3</sub>.

Aquatic plants: LOEC = 0.5-500 mg NH<sub>3</sub>-N/L.

Acute toxicity to invertebrates: 48 h LC50 = 2.94 mg un-ionized NH<sub>3</sub>-N/L.

Chronic toxicity to invertebrates: NOEC = 0.163- 0.42 mg un-ionized NH<sub>3</sub>/L.

Acute toxicity to fish: 96-h: LC50 = 0.09 – 3.51 mg un-ionized NH<sub>3</sub>/L.

Chronic toxicity to fish: NOEC = 0.025-1.2 mg un-ionized NH<sub>3</sub>/L.

**Environmental Fate Information:** Ammonia dissipates relatively quickly in ambient air and rapidly returns to the soil via combination with sulfate ions or washout by rainfall. Ammonia strongly adsorbs to soil, sediment particles and colloids in water under aerobic conditions. Biodegradation of ammonia to nitrate occurs in water under aerobic conditions resulting in a biological oxygen demand (BOD).

### Persistence/Degradability:

Biodegradable in soil. Ozonation in the air. Soluble in water.

### Bioaccumulative Potential:

Not applicable.

### Mobility in Soil:

No additional information available.

### Other Adverse Effects:

No additional information available.

## Section 13. Disposal Considerations

Dispose of unused contents/container in accordance with local/regional/national/international regulations as applicable.

Listed as hazardous substance under the Clean Water Act (CWA) (40 CFR 116.4 and 40 CFR 117.3).

Classified as hazardous waste under the Resource Conservation and Recovery Act (RCRA) (40 CFR 261.22 Corrosive #D002).

Comply with all regulations.

Suitably diluted product may be utilized as fertilizer on agricultural land.

For hazardous waste regulations information call the RCRA Hotline (800) 424-9346, or visit the US EPA website.

## Section 14. Transport Information

### US Department of Transportation

#### HAZARD CLASS:

(US Domestic): 2.2 (Non-Flammable Gas)

(International): 2.3 (Poison Gas), subsidiary 8 (Corrosive)

#### PROPER SHIPPING DESCRIPTION:

(US Domestic): UN1005, Ammonia, Anhydrous, 2.2, RQ, Inhalation Hazard

(International): UN1005, Ammonia, Anhydrous, 2.3, (8), RQ, Poison-Inhalation Hazard Zone "D"

#### LABEL / PLACARD:

(US Domestic): Non-Flammable Gas



(International): Poison Gas, Corrosive (Subsidiary)



#### IDENTIFICATION NUMBER:

UN 1005

#### ENVIRONMENTAL HAZARDS:

IMDG, Known Marine Pollutant: No  
United Nations Model Regulations, Environmentally Hazardous: No

### Section 15. Regulatory Information

Subject to the reporting requirements of Section 302, Section 304, Section 312 and Section 313, Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and 40 CFR 372.

Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), Section 103, any environmental release of this chemical equal to or over the reportable quantity of 100 pounds must be reported promptly to the National Response Center, Washington, D.C. (1-800-424-8802).

Emergency Planning & Community Right to Know Act, (EPCRA) extremely hazardous substance, 40 CFR 355, Title III, Section 302 – Ammonia, Threshold Planning Quantity (TPQ) 500 pounds.

Toxic Substances Control Act (TSCA): Listed in the TSCA Inventory.

EPA Hazard Categories – Immediate: Yes; Delayed: No; Fire: No; Sudden Release: Yes; Reactive: No

Clean Air Act – Section 112(r): Listed under EPA's Risk Management Program (RMP), 40 CFR Part 68, at storage/process amounts greater than the Threshold Quantity (TQ) of 10,000 pounds (ammonia, anhydrous).

Anhydrous ammonia is listed under Department of Homeland Security regulation 6 CFR Part 27, Chemical Facility Anti-Terrorism Standards at storage / process amounts greater than the threshold quantity of 10,000 pounds (ammonia, anhydrous).

Occupational Safety & Health Administration (OSHA): This material is considered to be hazardous as defined by the OSHA Hazard Communication Standard 29 CFR 1910.1200. This material is subject to Process Safety Management requirements of 29 CFR 1910.119 if maintained on-site, including storage / process, in quantities of 10,000 pounds (ammonia, anhydrous) or greater.

### Section 16. Other Information

Preparation Information: Revision Date May 1, 2015  
Replaces all previously dated versions.

Prepared by: HJS

Revisions to this Safety Data Sheet have been created to comply with the requirements of the OSHA Hazard Communication Final Rule issued in 2012 (HazCom 2012).

#### Acronyms:

ACGIH: American Conference of Governmental Industrial Hygienists  
ANSI: American National Standards Institute  
CAS: Chemical Abstracts Service  
CFR: Code of Federal Regulations  
DHS: Department of Homeland Security  
DOT: Department of Transportation  
EPA: Environmental Protection Agency  
HMIS: Hazardous Materials Identification System  
IARC: International Agency for Research on Cancer  
IDLH: Immediately Dangerous to Life or Health  
IMDG: International Maritime Dangerous Goods  
NFPA: National Fire Protection Association  
NIOSH: National Institute for Occupational Safety and Health  
NTP: National Toxicology Program  
OSHA: Occupational Safety and Health Administration  
PEL: Permissible Exposure Limit  
PPM: Parts Per Million  
RCRA: Resource Conservation and Recovery Act  
REL: Recommended Exposure Limit  
SCBA: Self Contained Breathing Apparatus

STEL: Short Term Exposure Limit

TLV: Threshold Limit Value

TWA: Time Weighted Average

Disclaimer:

The information, data, and recommendations in this safety data sheet relate only to the specific material designated herein and do not relate to use in combination with any other material or in any process. To the best of our knowledge, the information, data, and recommendations set forth herein are believed to be accurate. We make no warranties, either expressed or implied, with respect thereto and assume no liability in connection with any use of such information, data, and recommendations. Judgements as to the suitability of the information contained herein for the party's own use or purposes are solely the responsibility of that party. Any party handling, transferring, transporting, storing, applying or otherwise using this product should review thoroughly all applicable laws, rules, regulations, standards and good engineering practices. Such thorough review should occur before the party handles, transfers, transports, stores, applies or otherwise uses this product.



**1. Identification**

<b>Product identifier</b>	<b>AMMONIUM HYDROXIDE 21 BE</b>	
<b>Other means of identification</b>	None.	
<b>Recommended use</b>	ALL PROPER AND LEGAL PURPOSES	
<b>Recommended restrictions</b>	None known.	
<b>Manufacturer/Importer/Supplier/Distributor information</b>		
<b>Manufacturer</b>		
<b>Company name</b>	Brenntag Mid-South, Inc.	
<b>Address</b>	1405 Highway 136, West Henderson, KY 42420	
<b>Telephone</b>	270-830-1222	
<b>E-mail</b>	Not available.	
<b>Emergency phone number</b>	800-424-9300	CHEMTREC

**2. Hazard(s) identification**

<b>Physical hazards</b>	Not classified.	
<b>Health hazards</b>	Skin corrosion/irritation	Category 1
	Serious eye damage/eye irritation	Category 1
<b>Environmental hazards</b>	Hazardous to the aquatic environment, acute hazard	Category 2
	Hazardous to the aquatic environment, long-term hazard	Category 2
<b>OSHA defined hazards</b>	Not classified.	
<b>Label elements</b>		



<b>Signal word</b>	Danger
<b>Hazard statement</b>	Causes severe skin burns and eye damage. Causes serious eye damage. Toxic to aquatic life. Toxic to aquatic life with long lasting effects.
<b>Precautionary statement</b>	
<b>Prevention</b>	Do not breathe mist or vapor. Wash thoroughly after handling. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.
<b>Response</b>	If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. Wash contaminated clothing before reuse. Collect spillage.
<b>Storage</b>	Store locked up.
<b>Disposal</b>	Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Hazard(s) not otherwise classified (HNOC)</b>	None known.
<b>Supplemental information</b>	None.

**3. Composition/information on ingredients**

Mixtures

Chemical name	Common name and synonyms	CAS number	%
AMMONIA		7664-41-7	19.4922
Other components below reportable levels			80.5078

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

#### 4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.
Ingestion	Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
Most important symptoms/effects, acute and delayed	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim under observation. Symptoms may be delayed.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

#### 5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

#### 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	<p>This material is classified as a water pollutant under the Clean Water Act and should be prevented from contaminating soil or from entering sewage and drainage systems which lead to waterways.</p> <p>Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.</p> <p>Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.</p>
Environmental precautions	<p>Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.</p> <p>Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground. Inform appropriate managerial or supervisory personnel of all environmental releases.</p>

## 7. Handling and storage

### Precautions for safe handling

Do not breathe mist or vapor. Do not get in eyes, on skin, or on clothing. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. Avoid release to the environment. Observe good industrial hygiene practices.

### Conditions for safe storage, including any incompatibilities

Store locked up. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

## 8. Exposure controls/personal protection

### Occupational exposure limits

#### US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
AMMONIA (CAS 7664-41-7)	PEL	35 mg/m <sup>3</sup>
		50 ppm

#### US. ACGIH Threshold Limit Values

Components	Type	Value
AMMONIA (CAS 7664-41-7)	STEL	35 ppm
	TWA	25 ppm

#### US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
AMMONIA (CAS 7664-41-7)	STEL	27 mg/m <sup>3</sup>
		35 ppm
	TWA	18 mg/m <sup>3</sup>
		25 ppm

### Biological limit values

No biological exposure limits noted for the ingredient(s).

### Appropriate engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

### Individual protection measures, such as personal protective equipment

#### Eye/face protection

Wear safety glasses with side shields (or goggles) and a face shield.

#### Skin protection

##### Hand protection

Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.

##### Other

Wear appropriate chemical resistant clothing.

#### Respiratory protection

In case of insufficient ventilation, wear suitable respiratory equipment.

#### Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

### General hygiene considerations

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

### Appearance

Physical state Liquid.

Form Liquid.

Color Not available.

Odor Not available.

Odor threshold Not available.

pH Not available.

Melting point/freezing point -107.86 °F (-77.7 °C) estimated / 999 °F (537.22 °C)

Initial boiling point and boiling range 165.21 °F (74.01 °C) estimated

Material name: AMMONIUM HYDROXIDE 21 BE

770975 Version #: 01 Issue date: 03-23-2015

SDS US

3 / 7



Flash point	999.0 °F (537.2 °C)
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
<b>Upper/lower flammability or explosive limits</b>	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	975.81 hPa estimated
Vapor density	Not available.
Relative density	Not available.
<b>Solubility(ies)</b>	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	1204 °F (651.11 °C) estimated
Decomposition temperature	Not available.
Viscosity	Not available.
<b>Other information</b>	
Density	0.01 lbs/gal estimated
Flammability class	Combustible IIIB estimated
Percent volatile	80.51 % estimated
Specific gravity	0.0008 estimated

## 10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Acids. Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

## 11. Toxicological information

### Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns.

Symptoms related to the physical, chemical and toxicological characteristics	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.
--	---

### Information on toxicological effects

#### Acute toxicity

Components	Species	Test Results
AMMONIA (CAS 7664-41-7)		
Acute		
Inhalation		
LC50	Cat	0.746 mg/l, 1 Hours

Components	Species	Test Results
	Mouse	7.105 mg/l, 10 Minutes
		3.36 mg/l, 1 Hours
		3.31 mg/l, 2 Hours
	Rabbit	7.05 mg/l, 1 Hours
	Rat	4000 ppm, 1 Hours
		7.6 mg/l, 2 Hours
Oral LD50	Rat	5.1 mg/l, 1 Hours
		350 mg/kg

\* Estimates for product may be based on additional component data not shown.

<b>Skin corrosion/irritation</b>	Causes severe skin burns and eye damage.
<b>Serious eye damage/eye irritation</b>	Causes serious eye damage.
<b>Respiratory or skin sensitization</b>	
Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Carcinogenicity</b>	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	
Not listed.	
<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.
<b>Specific target organ toxicity - single exposure</b>	Not classified.
<b>Specific target organ toxicity - repeated exposure</b>	Not classified.
<b>Aspiration hazard</b>	Not an aspiration hazard.
<b>Chronic effects</b>	Prolonged inhalation may be harmful.

## 12. Ecological information

<b>Ecotoxicity</b>	Toxic to aquatic life with long lasting effects.
--------------------	--

Components	Species	Test Results
AMMONIA (CAS 7664-41-7)		
<b>Aquatic</b>		
Fish	LC50 Chinook salmon (Oncorhynchus tshawytscha)	0.43 - 0.47 mg/l, 96 hours

\* Estimates for product may be based on additional component data not shown.

<b>Persistence and degradability</b>	No data is available on the degradability of this product.
<b>Bioaccumulative potential</b>	No data available.
<b>Mobility in soil</b>	No data available.
<b>Other adverse effects</b>	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

## 13. Disposal considerations

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

**Waste from residues / unused products** Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

**Contaminated packaging** Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

#### 14. Transport information

##### DOT

**UN number** UN2672  
**UN proper shipping name** AMMONIA SOLUTIONS ( RQ = RQ)  
**Transport hazard class(es)**  
**Class** 80  
**Subsidiary risk** -  
**Packing group** III  
**Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.  
**ERG number** 154  
 DOT information on packaging may be different from that listed.

**General information** DOT Regulated Marine Pollutant. IMDG Regulated Marine Pollutant.

#### 15. Regulatory information

**US federal regulations** This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.  
 All components are on the U.S. EPA TSCA Inventory List.

##### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

##### CERCLA Hazardous Substance List (40 CFR 302.4)

AMMONIA (CAS 7664-41-7) Listed.

##### SARA 304 Emergency release notification

AMMONIA (CAS 7664-41-7) 100 LBS

##### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

##### Superfund Amendments and Reauthorization Act of 1986 (SARA)

**Hazard categories**  
 Immediate Hazard - Yes  
 Delayed Hazard - No  
 Fire Hazard - No  
 Pressure Hazard - No  
 Reactivity Hazard - No

##### SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity	Threshold planning quantity	Threshold planning quantity, lower value	Threshold planning quantity, upper value
AMMONIA	7664-41-7	100	500 lbs		

**SARA 311/312 Hazardous chemical** No

##### SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
AMMONIA	7664-41-7	19.4922

##### Other federal regulations

##### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

##### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

AMMONIA (CAS 7664-41-7)

**Safe Drinking Water Act (SDWA)** Not regulated.

##### US state regulations

##### US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.



**US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))**

AMMONIA (CAS 7664-41-7)

**US. Massachusetts RTK - Substance List**

AMMONIA (CAS 7664-41-7)

**US. New Jersey Worker and Community Right-to-Know Act**

AMMONIA (CAS 7664-41-7)

**US. Pennsylvania Worker and Community Right-to-Know Law**

AMMONIA (CAS 7664-41-7)

**US. Rhode Island RTK**

AMMONIA (CAS 7664-41-7)

**US. California Proposition 65**

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**International Inventories**

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

**16. Other information, including date of preparation or last revision**

**Issue date** 03-23-2015

**Version #** 01

**HMIS® ratings** Health: 3  
Flammability: 0  
Physical hazard: 0

**NFPA ratings** Health: 3  
Flammability: 0  
Instability: 0

**Disclaimer** BNA cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

# C&H 14EX Spray Detergent

## Safety Data Sheet A014EXX

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 04/15/2015

Version: 1.0

### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1. Product identifier

Product form : Mixture  
Product name : C&H 14EX Spray Detergent  
Product code : A014EXX-050-001

#### 1.2. Relevant identified uses of the substance or mixture and uses advised against

#### 1.3. Details of the supplier of the safety data sheet

Seacole-CRC, LLC  
13505 Industrial Park Blvd  
Plymouth, MN 55441 - USA  
T 763-582-1140  
[www.Seacole.com](http://www.Seacole.com)

#### 1.4. Emergency telephone number

Emergency number : Infotrac - 800-535-5053

### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture

##### Classification (GHS-US)

Skin Corr. 1A H314  
Eye Dam. 1 H318  
STOT SE 3 H335

Full text of H-phrases: see section 16

#### 2.2. Label elements

##### GHS-US labeling

##### Hazard pictograms (GHS-US)



GHS05

GHS07

##### Signal word (GHS-US)

: Danger

##### Hazard statements (GHS-US)

: H314 - Causes severe skin burns and eye damage  
H318 - Causes serious eye damage  
H335 - May cause respiratory irritation

##### Precautionary statements (GHS-US)

: P260 - Do not breathe dust  
P261 - Avoid breathing dust  
P264 - Wash hands, forearms and face, clothing thoroughly after handling  
P271 - Use only outdoors or in a well-ventilated area  
P280 - Wear eye protection, face protection, protective clothing, protective gloves  
P301+P330+P331 - If swallowed: rinse mouth. Do NOT induce vomiting  
P303+P361+P353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower  
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing  
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
P310 - Immediately call a doctor, a POISON CENTER  
P312 - Call a doctor, a POISON CENTER if you feel unwell  
P321 - Specific treatment (see a doctor on this label)  
P363 - Wash contaminated clothing before reuse  
P403+P233 - Store in a well-ventilated place. Keep container tightly closed  
P405 - Store locked up  
P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation

#### 2.3. Other hazards

No additional information available

# C&H 14EX Spray Detergent

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### 2.4. Unknown acute toxicity (GHS US)

Not applicable

## SECTION 3: Composition/information on ingredients

### 3.1. Substance

Not applicable

### 3.2. Mixture

Name	Product identifier	%	Classification (GHS-US)
Sodium Carbonate	(CAS No) 497-19-8	20 - 50	Skin Corr. 1A, H314 Eye Dam. 1, H318
Sodium Metasilicate	(CAS No) 6834-92-0	20 - 50	Skin Corr. 1A, H314 Eye Dam. 1, H318 STOT SE 3, H335
Sodium Tripolyphosphate	(CAS No) 7758-29-4	10 - 20	Skin Irrit. 2, H315 Eye Irrit. 2A, H319
Oxirane, Methyl-, Polymer	(CAS No) 9003-11-6	5 - 10	Skin Irrit. 2, H315 Eye Irrit. 2A, H319 Aquatic Acute 3, H402
Diethylene Glycol Mono-Butyl Ether	(CAS No) 112-34-5	1 - 3	Eye Irrit. 2A, H319

Full text of H-phrases: see section 16

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

- First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).
- First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a poison center or doctor/physician. Call a POISON CENTER or doctor/physician if you feel unwell.
- First-aid measures after skin contact : Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Immediately call a poison center or doctor/physician.
- First-aid measures after eye contact : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.
- First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Immediately call a poison center or doctor/physician.

### 4.2. Most important symptoms and effects, both acute and delayed

- Symptoms/injuries : Causes severe skin burns and eye damage.
- Symptoms/injuries after inhalation : May cause respiratory irritation.
- Symptoms/injuries after eye contact : Causes serious eye damage.

### 4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

- Suitable extinguishing media : Foam. Dry powder. Carbon dioxide. Water spray. Sand.
- Unsuitable extinguishing media : Do not use a heavy water stream.

### 5.2. Special hazards arising from the substance or mixture

- Reactivity : Thermal decomposition generates : Corrosive vapors.

### 5.3. Advice for firefighters

- Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.
- Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

#### 6.1.1. For non-emergency personnel

- Emergency procedures : Evacuate unnecessary personnel.

#### 6.1.2. For emergency responders

- Protective equipment : Equip cleanup crew with proper protection.
- Emergency procedures : Ventilate area.



# C&H 14EX Spray Detergent

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### 6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

### 6.3. Methods and material for containment and cleaning up

Methods for cleaning up : On land, sweep or shovel into suitable containers. Minimize generation of dust. Store away from other materials.

### 6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor. Do not breathe dust/fume/gas/mist/vapors/spray. Avoid contact during pregnancy/while nursing. Avoid breathing dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area.

Hygiene measures : Wash ... thoroughly after handling.

### 7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations.

Storage conditions : Keep only in the original container in a cool, well ventilated place away from : Keep container tightly closed.

Incompatible products : Strong bases. Strong acids.

Incompatible materials : Sources of ignition. Direct sunlight.

### 7.3. Specific end use(s)

No additional information available

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

C&H 14EX Spray Detergent		
ACGIH	Not applicable	
OSHA	Not applicable	
Sodium Carbonate (497-19-8)		
ACGIH	Not applicable	
OSHA	Not applicable	
Sodium Metasilicate (6834-92-0)		
ACGIH	Not applicable	
OSHA	Not applicable	
Diethylene Glycol Mono-Butyl Ether (112-34-5)		
ACGIH	ACGIH TWA (ppm)	10 ppm
ACGIH	ACGIH STEL (ppm)	10 ppm
OSHA	Not applicable	
Oxirane, Methyl-, Polymer (9003-11-6)		
ACGIH	Not applicable	
OSHA	Not applicable	
Sodium Tripolyphosphate (7758-29-4)		
ACGIH	Not applicable	
OSHA	Not applicable	

### 8.2. Exposure controls

Personal protective equipment : Avoid all unnecessary exposure.

# C&H 14EX Spray Detergent

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Hand protection	: Wear protective gloves.
Eye protection	: Chemical goggles or face shield.
Skin and body protection	: Wear suitable protective clothing.
Respiratory protection	: Wear appropriate mask.
Other information	: Do not eat, drink or smoke during use.

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

Physical state	: Solid
Color	: White
Odor	: characteristic
Odor threshold	: No data available
pH	: No data available
pH solution	: 12.5 (2% wt.)
Melting point	: No data available
Freezing point	: No data available
Boiling point	: No data available
Flash point	: No data available
Relative evaporation rate (butyl acetate=1)	: No data available
Flammability (solid, gas)	: No data available
Explosion limits	: No data available
Explosive properties	: No data available
Oxidizing properties	: No data available
Vapor pressure	: No data available
Relative density	: No data available
Relative vapor density at 20 °C	: No data available
Solubility	: Water: Solubility in water of component(s) of the mixture : •: 22 g/100ml •: > 18 g/100ml •: 64 g/100ml •: •: •: 55 g/100ml •: •: g/100ml • •: 15 g/100ml •:
Log Pow	: No data available
Log Kow	: No data available
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available

#### 9.2. Other information

No additional information available

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

Thermal decomposition generates : Corrosive vapors.

#### 10.2. Chemical stability

Not established.

#### 10.3. Possibility of hazardous reactions

Not established.

#### 10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures.

#### 10.5. Incompatible materials

Strong acids. Strong bases.

#### 10.6. Hazardous decomposition products

fume. Carbon monoxide. Carbon dioxide. Thermal decomposition generates : Corrosive vapors.



# C&H 14EX Spray Detergent

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

Acute toxicity : Not classified

<b>Sodium Carbonate (497-19-8)</b>	
LD50 oral rat	2800 mg/kg (Rat; Experimental value)
LD50 dermal rabbit	> 2000 mg/kg (Rabbit; Experimental value)
ATE US (oral)	2800.000 mg/kg body weight

<b>Sodium Metasilicate (6834-92-0)</b>	
LD50 dermal rat	> 5000 mg/kg body weight (Rat; Read-across; OECD 402: Acute Dermal Toxicity)

<b>Diethylene Glycol Mono-Butyl Ether (112-34-5)</b>	
LD50 dermal rabbit	2764 mg/kg body weight (Rabbit; Experimental value; Equivalent or similar to OECD 402)
ATE US (dermal)	2764.000 mg/kg body weight

<b>Sodium Tripolyphosphate (7758-29-4)</b>	
LD50 oral rat	> 2000 mg/kg (Rat)
LD50 dermal rabbit	> 4640 mg/kg (Rabbit)

Skin corrosion/irritation : Causes severe skin burns and eye damage.  
Serious eye damage/irritation : Causes serious eye damage.  
Respiratory or skin sensitization : Not classified  
Germ cell mutagenicity : Not classified  
Carcinogenicity : Not classified

Reproductive toxicity : Not classified  
Specific target organ toxicity (single exposure) : May cause respiratory irritation.

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

Potential Adverse human health effects and symptoms : Based on available data, the classification criteria are not met.  
Symptoms/injuries after inhalation : May cause respiratory irritation.  
Symptoms/injuries after eye contact : Causes serious eye damage.

### SECTION 12: Ecological information

#### 12.1. Toxicity

<b>Sodium Carbonate (497-19-8)</b>	
LC50 fish 1	300 mg/l (96 h; Lepomis macrochirus)
EC50 Daphnia 1	< 424 mg/l (48 h; Daphnia magna)
EC50 other aquatic organisms 1	14 mg/l (168 h; Plankton)
LC50 fish 2	740 mg/l (96 h; Gambusia affinis)
EC50 Daphnia 2	265 mg/l (48 h; Daphnia magna)
TLM fish 1	300 ppm (96 h; Lepomis macrochirus)
TLM other aquatic organisms 1	500 ppm (96 h; Daphnia magna)
Threshold limit algae 1	242 mg/l (5 days; Algae)

<b>Sodium Metasilicate (6834-92-0)</b>	
LC50 fish 1	210 mg/l (96 h; Brachydanio rerio)
EC50 Daphnia 1	216 mg/l (96 h; Daphnia magna; GLP)
LC50 fish 2	2320 mg/l (96 h; Gambusia affinis)
EC50 Daphnia 2	632 mg/l (96 h; Lymnaea sp.)
Threshold limit algae 1	207 mg/l (72 h; Scenedesmus subspicatus; GLP)



# C&H 14EX Spray Detergent

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Diethylene Glycol Mono-Butyl Ether (112-34-5)	
LC50 fish 1	1300 mg/l (96 h; Lepomis macrochirus)
EC50 Daphnia 1	4950 mg/l (48 h; Daphnia magna)
Threshold limit algae 1	> 100 mg/l (96 h; Desmodesmus subspicatus)

Sodium Tripolyphosphate (7758-29-4)	
LC50 fish 1	1650 mg/l (48 h; Leuciscus idus)
EC50 Daphnia 1	1089 mg/l (505 h; Daphnia magna)
EC50 other aquatic organisms 1	> 1000 mg/l (3 h; Activated sludge)
EC50 Daphnia 2	1154 mg/l (25 h; Daphnia magna)

### 12.2. Persistence and degradability

C&H 14EX Spray Detergent	
Persistence and degradability	Not established.

Sodium Carbonate (497-19-8)	
Persistence and degradability	Biodegradability: not applicable. Low potential for adsorption in soil.
ThOD	Not applicable (inorganic)

Sodium Metasilicate (6834-92-0)	
Persistence and degradability	Biodegradability: not applicable. No (test) data on mobility of the substance available.
Biochemical oxygen demand (BOD)	Not applicable
Chemical oxygen demand (COD)	Not applicable
ThOD	Not applicable
BOD (% of ThOD)	Not applicable

Diethylene Glycol Mono-Butyl Ether (112-34-5)	
Persistence and degradability	Readily biodegradable in water. Low potential for adsorption in soil. Photooxidation in the air.

Oxirane, Methyl-, Polymer (9003-11-6)	
Persistence and degradability	Not readily biodegradable in water.

Sodium Tripolyphosphate (7758-29-4)	
Persistence and degradability	Biodegradability: not applicable.
Biochemical oxygen demand (BOD)	Not applicable
Chemical oxygen demand (COD)	Not applicable
ThOD	Not applicable
BOD (% of ThOD)	Not applicable

### 12.3. Bioaccumulative potential

C&H 14EX Spray Detergent	
Bioaccumulative potential	Not established.

Sodium Carbonate (497-19-8)	
Log Pow	-6.19 (Estimated value)
Bioaccumulative potential	Low potential for bioaccumulation (Log Kow < 4).

Sodium Metasilicate (6834-92-0)	
Bioaccumulative potential	Bioaccumulation: not applicable.

Diethylene Glycol Mono-Butyl Ether (112-34-5)	
Log Pow	1 (Test data; Equivalent or similar to OECD 107; 20 °C)
Bioaccumulative potential	Low potential for bioaccumulation (Log Kow < 4).

Oxirane, Methyl-, Polymer (9003-11-6)	
Bioaccumulative potential	Not bioaccumulative.

Sodium Tripolyphosphate (7758-29-4)	
Bioaccumulative potential	Not bioaccumulative.

### 12.4. Mobility in soil

# C&H 14EX Spray Detergent

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### Diethylene Glycol Mono-Butyl Ether (112-34-5)

Surface tension	0.0069 N/m (20 °C)
-----------------	--------------------

#### 12.5. Other adverse effects

Effect on the global warming : No known ecological damage caused by this product.

Other information : Avoid release to the environment.

### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations.

Ecology - waste materials : Avoid release to the environment.

### SECTION 14: Transport information

#### Department of Transportation (DOT)

In accordance with DOT

Not regulated for transport

#### Additional information

Other information : No supplementary information available.

#### ADR

No additional information available

#### Transport by sea

No additional information available

#### Air transport

No additional information available

### SECTION 15: Regulatory information

#### 15.1. US Federal regulations

##### Sodium Carbonate (497-19-8)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

##### Sodium Metasilicate (6834-92-0)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

##### Diethylene Glycol Mono-Butyl Ether (112-34-5)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

SARA Section 313 - Emission Reporting	100 % Glycol Ethers
---------------------------------------	---------------------

##### Oxirane, Methyl-, Polymer (9003-11-6)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

##### Sodium Tripolyphosphate (7758-29-4)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Not listed on the United States SARA Section 313

RQ (Reportable quantity, section 304 of EPA's List of Lists)	5000 lb
--	---------

#### 15.2. International regulations

##### CANADA

No additional information available

##### EU-Regulations

No additional information available

##### Classification according to Regulation (EC) No. 1272/2008 [CLP]

No additional information available



# C&H 14EX Spray Detergent

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

### Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

Not classified

### National regulations

No additional information available

### 15.3. US State regulations

#### Sodium Tripolyphosphate (7758-29-4)

U.S. - Massachusetts - Right To Know List

U.S. - Pennsylvania - RTK (Right to Know) List

## SECTION 16: Other information

Other information : None.

Full text of H-phrases:

Aquatic Acute 3	Hazardous to the aquatic environment - Acute Hazard Category 3
Eye Dam. 1	Serious eye damage/eye irritation Category 1
Eye Irrit. 2A	Serious eye damage/eye irritation Category 2A
Skin Corr. 1A	Skin corrosion/irritation Category 1A
Skin Irrit. 2	Skin corrosion/irritation Category 2
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
H314	Causes severe skin burns and eye damage
H315	Causes skin irritation
H318	Causes serious eye damage
H319	Causes serious eye irritation
H335	May cause respiratory irritation
H402	Harmful to aquatic life

SDS US (GHS HazCom 2012)

*The information contained herein is based upon data believed to be reliable. SEACOLE-CRC, LLC provides no warranties, either expressed or implied and assumes no responsibility for the accuracy or completeness of the data contained herein. This information is offered for your information, consideration, and investigation. You should satisfy yourself that you have all current data relevant to your particular use. SEACOLE-CRC, LLC knows of no medical condition, other than those noted on this safety data sheet, which are generally recognized as being aggravated by exposure to this product.*





# Diesel Exhaust Fluid

## Safety Data Sheet

According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations

Version DEF.001

### SECTION 1: IDENTIFICATION

#### 1.1. Product Identifier

Product Form: Mixture

Product Name: CAM2 Blue Blood DEF

Synonyms: none

#### 1.2. Intended Use of the Product

Diesel Fuel Additive – Consumer Product

#### 1.3. Name, Address, and Telephone of the Responsible Party

##### Company

CAM2 International, LLC

683 Haining Road

Vicksburg, MS 39183

(800) 338-2262

www.CAM2.com

#### 1.4. Emergency Telephone Number

Emergency Number : 1-800-633-8253

### SECTION 2: HAZARDS IDENTIFICATION

#### 2.1. Classification of the Substance or Mixture

Classification (GHS-US)

Not Hazardous

Full text of H-phrases: see section 16

#### 2.2. Label Elements

GHS-US Labeling

Hazard Pictograms (GHS-US) : None Required

Signal Word (GHS-US) : N/A

Hazard Statements (GHS-US) : N/A

Precautionary Statements (GHS-US) : N/A

#### 2.3. Other Hazards

None Known

#### 2.4. Unknown Acute Toxicity (GHS-US)

None of this product contains unknown toxicity.

### SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

#### 3.1. Substances

Name	Product Identifier	% (w/w)	Classification (GHS-US)
Water	(CAS No) 7732-18-5	60 -70	None
Urea	(CAS No) 57-13-6	30 – 40	None

\*The specific chemical identity and/or exact percentage of composition have been withheld as a trade secret within the meaning of the OSHA Hazard Communication Standard [29 CFR 1910.1200].

#### 3.2. Mixture

Not Applicable

05/11/2015

EN (English US)

Page 1 of 6

## Diesel Exhaust Fluid

### Safety Data Sheet

According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations

Version DEF.001

Full text of H-phrases: see section 16

#### SECTION 4: FIRST AID MEASURES

##### 4.1. Description of First Aid Measures

**General:** If you feel unwell, seek medical advice (show the label if possible).

**Inhalation:** Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

**Skin Contact:** Wash skin thoroughly with soap and water or use recognized skin cleanser. Continue to rinse for at least 10 minutes. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

**Eye Contact:** Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 5 minutes. Get medical attention.

**Ingestion:** Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Aspiration hazard if swallowed. Can enter lungs and cause damage. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

##### 4.2. Most Important Symptoms and Effects Both Acute and Delayed

**General:** see below

**Inhalation:** No known significant effects or critical hazards.

**Skin Contact:** May cause slight skin irritation, redness.

**Eye Contact:** May cause slight irritation, watering, redness

**Ingestion:** Can cause gastrointestinal irritation.

**Chronic Symptoms:** No known significant effects or critical hazards.

##### 4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

If you feel unwell, seek medical advice (show the label where possible).

#### SECTION 5: FIRE-FIGHTING MEASURES

##### 5.1. Extinguishing Media

**Suitable Extinguishing Media:** This product is not combustible. Use any media that is appropriate for the surrounding fire.

**Unsuitable Extinguishing Media:** none known

##### 5.2. Special Hazards Arising From the Substance or Mixture

**Fire Hazard:** This product is not combustible

**Explosion Hazard:** Product is not an explosive hazard.

**Reactivity:** Hazardous reactions will not occur under normal conditions.

##### 5.3. Advice for Firefighters

**Precautionary Measures Fire:** Exercise caution when fighting any chemical fire. Under fire conditions, hazardous fumes will be present.

**Firefighting Instructions:** Use water spray or fog for cooling exposed containers.

**Protection During Firefighting:** Do not enter fire area without proper protective equipment, including respiratory protection.

**Hazardous Combustion Products:** Under fire conditions, may produce fumes, smoke, oxides of carbon and hydrocarbons.

**Other Information:** Refer to Section 9 for flammability properties.

##### Reference to Other Sections

Refer to section 9 for flammability properties.

#### SECTION 6: ACCIDENTAL RELEASE MEASURES

##### 6.1. Personal Precautions, Protective Equipment and Emergency Procedures

**General Measures:** Avoid all contact with skin, eyes, or clothing.

###### 6.1.1. For Non-Emergency Personnel

**Protective Equipment:** Use appropriate personal protection equipment (PPE).

**Emergency Procedures:** Evacuate unnecessary personnel.  
05/11/2015 EN (English US)



## Diesel Exhaust Fluid

### Safety Data Sheet

According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations

Version DEF.001

#### 6.1.2. For Emergency Personnel

**Protective Equipment:** Equip cleanup crew with proper protection.

**Emergency Procedures:** Stop leak if safe to do so.

#### 6.2. Environmental Precautions

Prevent entry to sewers and public waters.

#### 6.3. Methods and Material for Containment and Cleaning Up

**For Containment:** Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams.

**Methods for Cleaning Up:** Clean up spills immediately and dispose of waste safely. Spills should be contained with mechanical barriers. Transfer spilled material to a suitable container for disposal.

#### 6.4. Reference to Other Sections

See Heading 8. Exposure controls and personal protection. For further information refer to section 13.

### SECTION 7: HANDLING AND STORAGE

#### 7.1. Precautions for Safe Handling

**Additional Hazards When Processed:** Put on appropriate personal protective equipment (see Section 8). Do not swallow.

Avoid contact with eyes, skin and clothing. Do not reuse container unless properly cleaned.

**Hygiene Measures:** Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

#### 7.2. Conditions for Safe Storage, Including Any Incompatibilities

**Technical Measures:** Comply with applicable regulations.

**Storage Conditions:** Store in a dry, cool place.

**Incompatible Materials:** strong acids, oxidizing materials

#### 7.3. Specific End Use(s)

Diesel Fuel Additive – Consumer Product

### SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

#### 8.1. Control Parameters

For substances listed in section 3 that are not listed here, there are no established Exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), NIOSH (REL), OSHA (PEL), Canadian provincial governments, or the Mexican government.

Urea	
AIHA WEEL	TWA: 10 mg/m <sup>3</sup>

#### 8.2. Exposure Controls

**Appropriate Engineering Controls:** Ensure adequate ventilation, especially in confined areas. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure all national/local regulations are observed.

**Personal Protective Equipment:** Protective goggles. Gloves.



**Materials for Protective Clothing:** Chemically resistant materials and fabrics.

**Hand Protection:** Wear chemically resistant rubber or neoprene protective gloves for prolonged contact.

**Eye Protection:** Chemical goggles or safety glasses if splashing is possible.

**Skin and Body Protection:** Wear suitable protective clothing.

**Respiratory Protection:** Use a NIOSH-approved respirator or self-contained breathing apparatus whenever exposure may exceed established Occupational Exposure Limits.

**Environmental Exposure Controls:** Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable limits. Do not allow the product to be released into the environment.

**Consumer Exposure Controls:** Do not eat, drink or smoke during use.



# Diesel Exhaust Fluid

## Safety Data Sheet

According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations

Version DEF.001

### SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

#### 9.1. Information on Basic Physical and Chemical Properties

Physical State	: Liquid
Appearance	: Colorless
Odor	: Not available
Odor Threshold	: Not available
pH	: 9.3 – 9.8
Evaporation Rate	: Not available
Melting Point	: 11.3 – 11.5 F (-11.5 – 11.4 C)
Freezing Point	: Not available
Boiling Point	: 220F (104.4C)
Flash Point	: None to 216F
Auto-ignition Temperature	: Not available
Decomposition Temperature	: Not available
Flammability (solid, gas)	: Not flammable
Lower Flammable Limit	: Not available
Upper Flammable Limit	: Not available
Vapor Pressure	: Not available
Relative Vapor Density at 20 °C	: Not available
Relative Density	: 1.091 – 1.092
Specific Gravity	: Not available
Solubility	: Water: 100%
Partition Coefficient: N-Octanol/Water	: Not available
Viscosity	: Not available
Viscosity, Kinematic	: Not available

### SECTION 10: STABILITY AND REACTIVITY

- 10.1. **Reactivity:** No specific test data related to reactivity available for this product or its ingredients.
- 10.2. **Chemical Stability:** Stable under recommended handling and storage conditions (see section 7).
- 10.3. **Possibility of Hazardous Reactions:** Under normal condition of storage and use, hazardous reactions will not occur.
- 10.4. **Conditions to Avoid:** none known
- 10.5. **Incompatible Materials:** strong acids, oxidizing materials
- 10.6. **Hazardous Decomposition Products:** Thermal decomposition may produce oxides of nitrogen.

### SECTION 11: TOXICOLOGICAL INFORMATION

#### 11.1. Information on Toxicological Effects - Product

Acute Toxicity:

LD50 and LC50 Data:

Urea	
LD50 Oral Rat	8471 mg/kg

**Skin Corrosion/Irritation, Eye Damage/Irritation:** Not classified

**Respiratory or Skin Sensitization:** Not classified

**Germ Cell Mutagenicity:** Not classified

**Teratogenicity:** Not classified

**Carcinogenicity:** Not Classified

**Specific Target Organ Toxicity (Repeated Exposure):** Not Classified

**Reproductive Toxicity:** Not classified

**Specific Target Organ Toxicity (Single Exposure):** Not Classified

**Aspiration Hazard:** Not Classified

05/11/2015

EN (English US)

Page 4 of 6



# Diesel Exhaust Fluid

## Safety Data Sheet

According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations

Version DEF.001

**Symptoms/Injuries After Inhalation:** Inhalation is not expected to be hazardous. Inhalation of large amounts of mist may cause mucous membrane irritation.

**Symptoms/Injuries After Skin Contact:** Skin contact is not expected to be hazardous. Prolonged excessive contact may cause mild irritation.

**Symptoms/Injuries After Eye Contact:** Liquid or mist in the eye may cause discomfort in the eye with persistent conjunctivitis, seen as slight excessive redness.

**Symptoms/Injuries After Ingestion:** Ingestion of small amounts is not expected to be acutely hazardous. Ingestion of large amounts may cause gastrointestinal irritation.

**Chronic Symptoms:** Not classified

### 11.2. Information on Toxicological Effects - Ingredient(s)

See 11.1

## SECTION 12: ECOLOGICAL INFORMATION

### 12.1. Toxicity

**Ecology - General:** None available

**12.2. Persistence and Degradability:** Urea is rapidly hydrolyzed to ammonia and carbon dioxide in environmental systems by the extracellular enzyme, urease, which originates from microorganisms and plant roots.

**12.3. Bioaccumulative Potential:** Urea: The potential for bioconcentration in aquatic organisms is low.

**12.4. Mobility in Soil:** Urea: Very high mobility in soil

### 12.5. Other Adverse Effects

**Other Information:** Avoid release to the environment.

## SECTION 13: DISPOSAL CONSIDERATIONS

### 13.1. Waste treatment methods

**Sewage Disposal Recommendations:** none known

**Waste Disposal Recommendations:** Dispose of waste material in accordance with all local, regional, national, provincial, territorial and international regulations.

## SECTION 14: TRANSPORT INFORMATION

	DOT Classification	TDG Classification	IMDG	IATA
Diesel Exhaust Fluid	Not classified	Not classified	Not classified	Not classified

**Special Precautions to the user:** None known

## SECTION 15: REGULATORY INFORMATION

### 15.1. US Federal Regulations

SARA Section 311/312 Hazard Classes	Not Classified
SARA Section 313 Form R Reporting	Not Required
SARA Section 313 Supplier Notification	Not Required
TSCA 8(a) CDR Exempt/Partial exemption	All components are listed or exempted.

### 15.2. US State Regulations

No special regulations

California Prop. 65- this product does not contain chemicals regulated under California Proposition 65.

### 15.3. Canadian Regulations

This material is listed or exempted.



## Diesel Exhaust Fluid

### Safety Data Sheet

According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations

Version DEF.001

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all of the information required by CPR.

#### SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

**Revision Date** : 05/11/2015

**Other Information** : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

**GHS Full Text Phrases:** None listed

#### Party Responsible for the Preparation of This Document

CAM2 International, LLC  
683 Haining Road  
Vicksburg, MS 39183  
(800) 338-2262  
[www.CAM2.com](http://www.CAM2.com)

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.*

North America GHS US 2012 & WHMIS 2





## Univar USA Inc Material Safety Data Sheet

---

MSDS No:

Version No:

Order No:

Univar USA Inc., 17425 NE Union Hill Rd., Redmond WA 98052  
(425) 889 3400

---

### Emergency Assistance

For emergency assistance involving chemicals call  
Chemtrec - (800) 424-9300

The Version Date and Number for this MSDS is : 02/27/2009 - #021

PRODUCT NAME: CAUSTIC SODA LIQUID (ALL GRADES)  
MSDS NUMBER: OZ32415  
DATE ISSUED: 01/07/2009  
SUPERSEDES: 11/12/2008  
ISSUED BY: 008730

\*\*\*\*\*  
\*\*\*\*\*

#### MATERIAL SAFETY DATA SHEET

##### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Distributed by:  
Univar USA Inc.  
17425 NE Union Hill Rd.  
Redmond, WA 98052  
425-889-3400

Trade Name:  
Caustic Soda Diaphragm Grade 10%, 15%, 18%, 20%, 25%, 30%, 35%, 40%, 50%,  
Caustic Soda Rayon Grade 18%, 20%, 25%, 30%, 50%, 50% Caustic Soda Rayon  
Grade OS, Caustic Soda Membrane 6%, 18%, 20%, 25%, 30%, 48%, 50%, 50% Caustic  
Soda Membrane OS, 50% Caustic Soda Diaphragm OS, Caustic Soda Low Salt 50%,  
25% Caustic Soda Purified, 50% Caustic Soda Purified, 50% Caustic Soda  
Purified OS, Caustic Soda Liquid 70/30, Membrane Blended, 50% Caustic Soda  
Membrane (Northeast), 50% Caustic Soda Diaphragm (West Coast), 50% Blended  
Rayon Grade Blended, Membrane Cell Liquor

Synonyms: Sodium hydroxide solution, Liquid Caustic, Lye Solution, Caustic,  
Lye, Soda Lye

Product Use: Metal finishing, Cleaner, Process chemical, Petroleum industry

##### 2. HAZARDS IDENTIFICATION EMERGENCY OVERVIEW:

Color: Colorless to slightly colored  
Physical State: Liquid  
Odor: Odorless  
Signal Word: Danger

MAJOR HEALTH HAZARDS: CORROSIVE. CAUSES BURNS TO THE RESPIRATORY TRACT, SKIN,  
EYES AND GASTROINTESTINAL TRACT. CAUSES PERMANENT EYE DAMAGE.

PHYSICAL HAZARDS: CORROSIVE. Mixing with water, acid or incompatible materials may cause splattering and release of heat.

ECOLOGICAL HAZARDS: Keep out of water supplies and sewers. This material is alkaline and may raise the pH of surface waters. This material has exhibited moderate toxicity to aquatic organisms.

PRECAUTIONARY STATEMENTS: Avoid breathing vapors or mist. Avoid contact with skin, eyes and clothing. Keep container tightly closed. Wash thoroughly after handling. Use only with adequate ventilation.

POTENTIAL HEALTH EFFECTS:

Inhalation: May cause irritation (possibly severe), chemical burns, and pulmonary edema.

Skin contact: May cause irritation (possibly severe) and chemical burns.

Eye contact: May cause irritation (possibly severe), chemical burns, eye damage, and blindness.

Ingestion: May cause irritation (possibly severe), chemical burns, nausea, and vomiting.

Target Organs Effected: Respiratory System, Skin, Eye

Medical Conditions Aggravated by Exposure: Asthma, Respiratory disorders

See Section 11: TOXICOLOGICAL INFORMATION

3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Component	Concentration (by weight %)	CAS - No.
Water	48.5 - 94.5	7732-18-5
Sodium hydroxide	5.5 - 51.5	1310-73-2
Sodium chloride (NaCl)	1 - 5	7647-14-5

4. FIRST AID MEASURES

Inhalation: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. If respiration or pulse has stopped, have a trained person administer basic life support (Cardio-Pulmonary Resuscitation/Automatic External Defibrillator) and CALL FOR EMERGENCY SERVICES IMMEDIATELY.

Skin Contact: Immediately flush contaminated areas with water. Remove contaminated clothing, jewelry, and shoes immediately. Wash contaminated areas with soap and water. Thoroughly clean and dry contaminated clothing before reuse. Discard contaminated leather goods. GET MEDICAL ATTENTION



IMMEDIATELY.

Eye Contact: Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

Ingestion: Never give anything by mouth to an unconscious or convulsive person. If swallowed, do not induce vomiting. Give large amounts of water. If vomiting occurs spontaneously, keep airway clear. Give more water when vomiting stops. GET MEDICAL ATTENTION IMMEDIATELY.

Notes to Physician: The absence of visible signs or symptoms of burns does NOT reliably exclude the presence of actual tissue damage. Probable mucosal damage may contraindicate the use of gastric lavage.

#### 5. FIRE-FIGHTING MEASURES

Fire Hazard: Negligible fire hazard.

Extinguishing Media: Use media appropriate for surrounding fire

Fire Fighting: Move container from fire area if it can be done without risk. Cool containers with water. Avoid contact with skin.

Sensitivity to Mechanical Impact: Not sensitive.

Sensitivity to Static Discharge: Not sensitive.

Flash point: Not flammable

#### 6. ACCIDENTAL RELEASE MEASURES

Occupational Release:

Wear appropriate personal protective equipment recommended in Section 8 of the MSDS. Completely contain spilled material with dikes, sandbags, etc. Shovel dry material into suitable container. Liquid material may be removed with a vacuum truck. Remaining material may be diluted with water and neutralized with dilute acid, then absorbed and collected. Flush spill area with water, if appropriate. Keep product and flush water out of water supplies and sewers. This material is alkaline and may raise the pH of surface waters with low buffering capacity. Releases should be reported, if required, to appropriate agencies.

#### 7. HANDLING AND STORAGE

Storage Conditions: Store and handle in accordance with all current regulations and standards. Keep container tightly closed and properly labeled. Do not store in aluminum container or use aluminum fittings or transfer lines, as flammable hydrogen gas may be generated. Keep separated

from incompatible substances.

Handling Procedures: Avoid breathing vapor or mist. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. When mixing, slowly add to water to minimize heat generation and spattering.

#### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

OSHA Regulatory Exposure limit(s):

Hazardous Component	CAS-No.	OSHA Final PEL	OSHA Final PEL	OSHA Final PEL
		TWA	STEL	Ceiling
Sodium hydroxide	1310-73-2	2 mg/m3		

Non-Regulatory Exposure Limit(s):

The Non-Regulatory OSHA limits shown in the table are the Vacated 1989 PEL's (vacated by 58 FR 35338, June 30, 1993).

Hazardous Component	CAS-No.	ACGIH TWA	ACGIH STEL	ACGIH Ceiling	OSHA TWA (Vacated)	OSHA STEL (Vacated)	OSHA Ceiling (Vacated)
Sodium hydroxide	1310-73-2			2 mg/m3			2 mg/m3

ENGINEERING CONTROLS: Provide local exhaust ventilation where dust or mist may be generated. Ensure compliance with applicable exposure limits.

#### PERSONAL PROTECTIVE EQUIPMENT:

Eye Protection: Wear chemical safety goggles with a faceshield to protect against eye and skin contact when appropriate. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin and Body Protection: Wear chemical resistant clothing and rubber boots when potential for contact with the material exists. Contaminated clothing should be removed, then discarded or laundered.

Hand Protection: Wear appropriate chemical resistant gloves Protective Material Types: Natural rubber, Neoprene, Nitrile

Hazardous Component	Immediately Dangerous to Life/ Health (IDLH)
Sodium hydroxide	10 mg/m3 IDLH

Respiratory Protection: A NIOSH approved respirator with N95 (dust, fume, mist) cartridges may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits, or when symptoms have been observed that are indicative of overexposure. If eye

irritation occurs, a full face style mask should be used. A respiratory protection program that meets 29 CFR 1910.134 must be followed whenever workplace conditions warrant use of a respirator.

#### 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid  
Appearance: Clear to opaque  
Color: Colorless to slightly colored  
Odor: Odorless  
Boiling Point/Range: 230 291 F (110 144 C)  
Freezing Point/Range: -26 to 59 F (-32 to 15 C)  
Vapor Pressure: 13 - 135 mmHg @ 60 C  
Vapor Density (air=1): No data available  
Specific Gravity (water=1): 1.11 1.53 @ 15.6 C  
Water Solubility: 100%  
pH: 14.0 (7.5% solution)  
Volatility: No data available  
Evaporation Rate (ether=1): No data available  
Partition Coefficient (n-octanol/water): No data available

#### 10. STABILITY AND REACTIVITY

Reactivity/ Stability: Stable at normal temperatures and pressures.

Conditions to Avoid: Mixing with water, acid or incompatible materials may cause splattering and release of large amounts of heat. Will react with some metals forming flammable hydrogen gas. Carbon monoxide gas may form upon contact with reducing sugars, food and beverage products in enclosed spaces.

Incompatibilities/Materials to Avoid: Acids, Halogenated compounds, Prolonged contact with aluminum, brass, bronze, copper, lead, tin, zinc or other alkali sensitive metals or alloys

Hazardous Decomposition Products: Toxic fumes of sodium oxide

Hazardous Polymerization: Will not occur

#### 11. TOXICOLOGICAL INFORMATION

##### TOXICITY DATA:

Hazardous Component	LD50 Oral	LC50 Inhalation	LD50 Dermal
Sodium hydroxide	Not listed	Not listed	1350 mg/kg (Rabbit)
Sodium chloride (NaCl)	3 g/kg (Rat)	42 g/m3 (1 hr-Rat)	10 g/kg (Rabbit)

##### TOXICITY:

The severity of the tissue damage is a function of its concentration, the length of tissue contact time, and local tissue conditions. After exposure there may be a time delay before irritation and other effects occur. This material is a strong irritant and is corrosive to the skin, eyes, and mucous



membranes. This material may cause severe burns and permanent damage to any tissue with which it comes into contact. Inhalation will cause severe irritation and possible burns with pulmonary edema, which may lead to pneumonitis. Skin contact with this material may cause severe irritation and corrosion of tissue. Eye contact can cause severe irritation, corrosion with possible corneal damage and blindness. Ingestion may cause irritation, corrosion/ulceration, nausea, and vomiting. In general, chronic effects are due to long-term irritation. This material may cause dermatitis. In rare cases reports have noted long-term inhalation causes bronchial inflammatory reaction or obstructive airway dysfunction.

CARCINOGENICITY: This product is not classified as a carcinogen by NTP, IARC or OSHA.

#### 12. ECOLOGICAL INFORMATION

AQUATIC TOXICITY: This material has exhibited moderate toxicity to aquatic organisms. Data provided are for sodium hydroxide.

##### Freshwater Fish Data:

LC50 brook trout: 25 ppm/24 hr

LC50 king salmon: 48 ppm

##### Invertebrate Toxicity Data:

EC50 daphnia magna: 100 ppm

EC50 shrimp: 33 100 ppm/48 hr

EC50 cockle: 330 1000 ppm/48 hr

BIODEGRADATION: This material is inorganic and not subject to biodegradation.

PERSISTENCE: This material is alkaline and may raise the pH of surface waters with low buffering capacity. This material is believed to exist in the disassociated state in the environment.

BIOCONCENTRATION: This material is not expected to bioconcentrate in organisms.

ADDITIONAL ECOLOGICAL INFORMATION: This material has exhibited slight toxicity to terrestrial organisms.

#### 13. DISPOSAL CONSIDERATIONS

Reuse or reprocess, if possible. Dispose in accordance with all applicable regulations. May be subject to disposal regulations: U.S. EPA 40 CFR 261.  
Hazardous Waste Number(s): D002

#### 14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:

PROPER SHIPPING NAME: Sodium Hydroxide Solution

DOT UN NUMBER: UN1824

HAZARD CLASS/ DIVISION: 8  
PACKING GROUP: II  
LABELING REQUIREMENTS: 8  
DOT RQ (lbs): RQ 1000 lbs. (Sodium Hydroxide)

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

SHIPPING NAME: Sodium hydroxide solution  
UN NUMBER: UN1824  
CLASS: 8  
PACKING/RISK GROUP: II

15. REGULATORY INFORMATION

U.S. REGULATIONS

OSHA REGULATORY STATUS:

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200) (US).

CERCLA SECTIONS 102a1103 HAZARDOUS SUBSTANCES (40 CFR 302.4):

If a release is reportable under CERCLA section 103, notify the state emergency response commission and local emergency planning committee. In addition, notify the National Response Center at (800) 424-8802 or (202) 4262675.

Hazardous Component

CERCLA Reportable Quantities:

Sodium hydroxide

1000 lb (final RQ)

EPCRA EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): No components are listed.

EPCRA SECTIONS 311/312 HAZARD CATEGORIES (40 CFR 370.21):

Acute Health Hazard

EPCRA SECTION 313 (40 CFR 372.65): No components are listed.

OSHA PROCESS SAFETY (29 CFR 1910.119): Not regulated

NATIONAL INVENTORY STATUS

U.S. INVENTORY STATUS (TSCA): All components are listed or exempt

TSCA 12(b): This product is not subject to export notification

CANADIAN DOMESTIC SUBSTANCE LIST (DSL/NDSL): All components are listed.

STATE REGULATIONS

California Proposition 65: This product is not listed

Hazardous Component

Sodium hydroxide

California Proposition 65 Cancer WARNING:	Not Listed
California Proposition 65 CRT List - Male reproductive toxin:	Not Listed
California Proposition 65 CRT List - Female reproductive toxin:	Not Listed
Massachusetts Right to Know Hazardous Substance List	Listed
New Jersey Right to Know Hazardous Substance List	Listed
New Jersey Special Health Hazards Substance List	Listed
Pennsylvania Right to Know Hazardous Substance List	Listed
Pennsylvania Right to Know Environmental Hazard List	Listed
Rhode Island Right to Know Hazardous Substance List	Listed

CANADIAN REGULATIONS:

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

WHMIS Classification:

E

16. OTHER INFORMATION

HMIS: (SCALE 0-4) (Rated using National Paint & Coatings Association HMIS:

Rating Instructions, 2nd Edition)

Health:	3	Flammability:	0	Reactivity:	1
---------	---	---------------	---	-------------	---

NFPA 704 - Hazard Identification Ratings (SCALE 0-4)

Health:	3	Flammability:	0	Reactivity:	1
---------	---	---------------	---	-------------	---



## Univar USA Inc Material Safety Data Sheet

---

For Additional Information contact MSDS Coordinator during business hours, Pacific time: (425) 889-3400

### Notice

Univar USA Inc. ("Univar") expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose, with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a product specification sheet and/or a certificate of analysis. These can be obtained from your local Univar sales office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein.

This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process



# SAFETY DATA SHEET

## CORTROL\* IS101

### 1. Identification

Product identifier	CORTROL IS101
Other means of identification	Not available.
Recommended use	Oxygen scavenger
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

### 2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Serious eye damage/eye irritation	Category 2B
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
	Specific target organ toxicity, repeated exposure (oral)	Category 2 (gastrointestinal tract)
OSHA defined hazards	Not classified.	

#### Label elements



Signal word	Warning
Hazard statement	Causes eye irritation. May cause respiratory irritation. May cause damage to organs (gastrointestinal tract) through prolonged or repeated exposure by ingestion.
Precautionary statement	
Prevention	Do not breathe dust/fume/gas/mist/vapors/spray. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area.
Response	If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a poison center/doctor// if you feel unwell. If eye irritation persists: Get medical advice/attention.
Storage	Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

### 3. Composition/information on ingredients

#### Mixtures

Chemical name	Common name and synonyms	CAS number	%
Sodium sulphite		7757-83-7	90 - 100

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

### 4. First-aid measures

Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
Skin contact	Rinse skin with water/shower.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately.
Most important symptoms/effects, acute and delayed	Exposed individuals may experience eye tearing, redness, and discomfort. May cause respiratory irritation. Prolonged exposure may cause chronic effects.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

### 5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO <sub>2</sub> ).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire-fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

### 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Stop the flow of material, if this is without risk. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

### 7. Handling and storage

Precautions for safe handling	Avoid contact with eyes. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Use care in handling/storage.
Conditions for safe storage, including any incompatibilities	Store locked up. Keep away from strong acids and oxidizers. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Store in accordance with local/regional/national/international regulation.

### 8. Exposure controls/personal protection

Occupational exposure limits	No exposure limits noted for ingredient(s).
Biological limit values	No biological exposure limits noted for the ingredient(s).



<b>Appropriate engineering controls</b>	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Provide eyewash station.
<b>Individual protection measures, such as personal protective equipment</b>	
<b>Eye/face protection</b>	Airtight chemical goggles.
<b>Skin protection</b>	
<b>Hand protection</b>	Chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.
<b>Other</b>	Wear suitable protective clothing. Use of an impervious apron is recommended.
<b>Respiratory protection</b>	Chemical respirator with organic vapor cartridge and full facepiece. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
<b>Thermal hazards</b>	Wear appropriate thermal protective clothing, when necessary.
<b>General hygiene considerations</b>	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

<b>Appearance</b>	
<b>Color</b>	Black White to off-white
<b>Physical state</b>	Solid
<b>Odor</b>	Characteristic
<b>Odor threshold</b>	Not available.
<b>pH in aqueous solution</b>	10 (5% SOL.)
<b>Melting point/freezing point</b>	Not available.
<b>Initial boiling point and boiling range</b>	Not available.
<b>Flash point</b>	> 200 °F (> 93 °C) P-M(CC)
<b>Evaporation rate</b>	< 1 (Ether = 1)
<b>Flammability (solid, gas)</b>	Not available.
<b>Upper/lower flammability or explosive limits</b>	
<b>Flammability limit - lower (%)</b>	Not available.
<b>Flammability limit - upper (%)</b>	Not available.
<b>Explosive limit - lower (%)</b>	Not available.
<b>Explosive limit - upper (%)</b>	Not available.
<b>Vapor pressure</b>	< 1 mm Hg
<b>Vapor pressure temp.</b>	70 °F (21 °C)
<b>Vapor density</b>	< 1 (Air = 1)
<b>Relative density</b>	Not available.
<b>Relative density temperature</b>	70 °F (21 °C)
<b>Solubility(ies)</b>	
<b>Solubility (water)</b>	15 %
<b>Partition coefficient (n-octanol/water)</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Viscosity</b>	Not available.
<b>Viscosity temperature</b>	70 °F (21 °C)
<b>Other information</b>	
<b>Percent volatile</b>	0 (Calculated)

## 10. Stability and reactivity

<b>Reactivity</b>	Not available.
<b>Chemical stability</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions</b>	Hazardous polymerization does not occur. Contact with oxidizers may cause fire.
<b>Conditions to avoid</b>	Avoid contact with incompatible materials.
<b>Incompatible materials</b>	Strong oxidizing agents.
<b>Hazardous decomposition products</b>	Oxides of carbon evolved in fire. Sulfur oxides.

## 11. Toxicological information

### Information on likely routes of exposure

<b>Ingestion</b>	May cause gastrointestinal irritation. Very large doses may cause diarrhea, depression, colic and death. May also cause severe allergic reactions in sensitive individuals.
<b>Inhalation</b>	Dusts or mists are irritating to mucous membranes
<b>Skin contact</b>	May cause irritation.
<b>Eye contact</b>	Causes eye irritation.

**Symptoms related to the physical, chemical and toxicological characteristics** Exposed individuals may experience eye tearing, redness, and discomfort.

### Information on toxicological effects

**Acute toxicity** May cause respiratory irritation.

Product	Species	Test Results
CORTROL IS101 (CAS N/A)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 2000 mg/kg, (Calculated according to GHS additivity formula)
<i>Inhalation</i>		
LC50	Rat	> 5.5 mg/l, 4 Hours, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	Rat	2850 mg/kg, (Calculated according to GHS additivity formula)
Components	Species	Test Results
Sodium sulphite (CAS 7757-83-7)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 2000 mg/kg
<i>Inhalation</i>		
LC50	Rat	> 5.5 mg/l, 4 Hour
<i>Oral</i>		
LD50	Rat	2610 mg/kg

\* Estimates for product may be based on additional component data not shown.

<b>Skin corrosion/irritation</b>	Prolonged skin contact may cause temporary irritation.
<b>Serious eye damage/eye irritation</b>	Causes eye irritation.
<b>Respiratory or skin sensitization</b>	
<b>Respiratory sensitization</b>	Not available.
<b>Skin sensitization</b>	This product is not expected to cause skin sensitization.
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Carcinogenicity</b>	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

## IARC Monographs. Overall Evaluation of Carcinogenicity

Sodium sulphite (CAS 7757-83-7)

3 Not classifiable as to carcinogenicity to humans.

## OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.
<b>Specific target organ toxicity - single exposure</b>	May cause respiratory irritation.
<b>Specific target organ toxicity - repeated exposure</b>	Not classified.
<b>Aspiration hazard</b>	Not available.
<b>Chronic effects</b>	May cause damage to organs through prolonged or repeated exposure.

## 12. Ecological information

### Ecotoxicity

Product		Species	Test Results
CORTROL IS101 (CAS N/A)		LC50	Fathead Minnow
			4710 mg/L, Static Renewal Bioassay, 96 hour, (pH adjusted)
		NOEL	Fathead Minnow
			1785 mg/L, Static Renewal Bioassay, 96 hour, (pH adjusted)
Crustacea		LC50	Daphnia magna
			1025 mg/L, Static Renewal Bioassay, 48 hour
		NOEL	Daphnia magna
			550 mg/L, Static Renewal Bioassay, 48 hour

\* Estimates for product may be based on additional component data not shown.

<b>Bioaccumulative potential</b>	No data available.
<b>Mobility in soil</b>	No data available.
<b>Other adverse effects</b>	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.
<b>Environmental fate</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
<b>Persistence and degradability</b>	No data is available on the degradability of this product.

## 13. Disposal considerations

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
<b>Contaminated packaging</b>	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

## 14. Transport information

### DOT

Not regulated as dangerous goods.

Some containers may be DOT exempt, please check BOL for exact container classification.

### IATA

Not regulated as dangerous goods.

Some containers may not be approved under IATA, please check BOL for exact container classification.

### IMDG

Not regulated as dangerous goods.



## 15. Regulatory information

### US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.  
All components are on the U.S. EPA TSCA Inventory List.

#### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

#### CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

#### SARA 304 Emergency release notification

Not regulated.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

### Superfund Amendments and Reauthorization Act of 1986 (SARA)

#### Hazard categories

Immediate Hazard - Yes  
Delayed Hazard - Yes  
Fire Hazard - No  
Pressure Hazard - No  
Reactivity Hazard - No

#### SARA 302 Extremely hazardous substance

Not listed.

#### SARA 311/312 Hazardous chemical

No

#### SARA 313 (TRI reporting)

Not regulated.

### Other federal regulations

#### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

#### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

#### Safe Drinking Water Act (SDWA)

Not regulated.

### Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s).

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

### Food and drug administration

ALL ingredients in this product are authorized in 21CFR173.310 for use as boiler water additives where the steam may contact food.

### NSF Registered and/or meets USDA (according to 1998 guidelines):

Registration No. - 139780  
Category Code(s):  
G5 Cooling and retort water treatment products  
G6 Boiler treatment products, steam line products - food contact

### US state regulations

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

#### US - Massachusetts RTK - Substance List

Not regulated.

#### US - Pennsylvania RTK - Hazardous Substances

Not regulated.

#### US - Rhode Island RTK

Not regulated.

#### US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

#### US. New Jersey Worker and Community Right-to-Know Act

Not regulated.

**US. California Proposition 65**

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Female reproductive toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Male reproductive toxin**

No ingredient listed.

**16. Other information, including date of preparation or last revision**

**Issue date** Nov-10-2014

**Revision date** Nov-10-2014

**Version #** 1.0

**List of abbreviations** TLV: Threshold Limit Value

**References:** No data available

**Disclaimer** The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. The information in the sheet was written based on the best knowledge and experience currently available.

**Revision Information** Composition / Information on Ingredients: Disclosure Overrides  
Physical & Chemical Properties: Multiple Properties  
Toxicological Information: Toxicological Data  
Transport Information: Material Transportation Information  
GHS: Classification

**Prepared by** This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.



## SAFETY DATA SHEET

### DEPOSITROL\* BL5400

#### 1. Identification

Product identifier	DEPOSITROL BL5400
Other means of identification	None.
Recommended use	Water based deposit control agent.
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Corrosive to metals	Category 1
Health hazards	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 1
OSHA defined hazards	Not classified.	

#### Label elements



Signal word	Danger
Hazard statement	May be corrosive to metals. Causes severe skin burns and eye damage. Causes serious eye damage.
Precautionary statement	
Prevention	Keep only in original container. Do not breathe mist or vapor. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection.
Response	If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor/. Specific treatment (see this label). Wash contaminated clothing before reuse. Absorb spillage to prevent material damage.
Storage	Store locked up. Store in corrosive resistant/ container with a resistant inner liner.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.



### 3. Composition/information on ingredients

#### Mixtures

Components	CAS #	Percent
Phosphonic acid, (1-hydroxyethylidene)bis-	2809-21-4	60 - 80
Phosphorous acid(phosphonic acid)	13598-36-2	1 - 2.5

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

**Composition comments** Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

### 4. First-aid measures

**Inhalation** If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.

**Skin contact** Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.

**Eye contact** Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.

**Ingestion** Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

**Most important symptoms/effects, acute and delayed** Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

**Indication of immediate medical attention and special treatment needed** Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim under observation. Symptoms may be delayed.

**General information** Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

### 5. Fire-fighting measures

**Suitable extinguishing media** Water fog. Foam. Dry chemical powder. Carbon dioxide (CO<sub>2</sub>).

**Unsuitable extinguishing media** Do not use water jet as an extinguisher, as this will spread the fire.

**Specific hazards arising from the chemical** During fire, gases hazardous to health may be formed.

**Special protective equipment and precautions for firefighters** Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

**Fire fighting equipment/instructions** Move containers from fire area if you can do so without risk.

**Specific methods** Use standard firefighting procedures and consider the hazards of other involved materials.

### 6. Accidental release measures

**Personal precautions, protective equipment and emergency procedures** Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

**Methods and materials for containment and cleaning up** Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb spillage to prevent material damage. Absorb in vermiculite, dry sand or earth and place into containers. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

**Environmental precautions** Avoid discharge into drains, water courses or onto the ground.

## 7. Handling and storage

### Precautions for safe handling

Acidic. Do not mix with alkaline material. Do not breathe mist or vapor. Do not get this material in contact with eyes. Do not get this material in contact with skin. Avoid prolonged exposure. Do not get this material on clothing. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Use care in handling/storage.

### Conditions for safe storage, including any incompatibilities

Store locked up. Do not freeze. If frozen, thaw completely and mix thoroughly prior to use. Keep away from strong bases. Store in corrosive resistant container with a resistant inner liner. Store in original tightly closed container. Do not store in steel aluminum containers. Store in a cool, dry place out of direct sunlight. Store away from incompatible materials (see Section 10 of the SDS). Store in accordance with local/regional/national/international regulation.

## 8. Exposure controls/personal protection

### Occupational exposure limits

No exposure limits noted for ingredient(s).

### Biological limit values

No biological exposure limits noted for the ingredient(s).

### Appropriate engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

### Individual protection measures, such as personal protective equipment

#### Eye/face protection

Splash proof chemical goggles. Face shield.

#### Skin protection

##### Hand protection

Chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.

##### Other

Wear appropriate chemical resistant clothing. Chemical resistant gloves.

#### Respiratory protection

In case of insufficient ventilation, wear suitable respiratory equipment. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

#### Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

### General hygiene considerations

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

### Appearance

#### Color

Colorless to yellow

#### Physical state

Liquid

### Odor

Mild

### Odor threshold

Not available.

### pH (concentrated product)

< 1

### pH in aqueous solution

1.4 (5% SOL.)

### Melting point/freezing point

< -30 °F (< -34 °C)

### Initial boiling point and boiling range

220 °F (104 °C)

### Flash point

> 212 °F (> 100 °C) SETA(CC)

### Evaporation rate

< 1 (Ether = 1)

### Flammability (solid, gas)

Not available.

### Upper/lower flammability or explosive limits

#### Flammability limit - lower (%)

Not available.

#### Flammability limit - upper (%)

Not available.

#### Explosive limit - lower (%)

Not available.

#### Explosive limit - upper (%)

Not available.

### Vapor pressure

18 mm Hg

### Vapor pressure temp.

70 °F (21 °C)

Material name: DEPOSITROL\* BL5400

Version number: 3.0

Vapor density	< 1 (Air = 1)
Relative density	1.45
Relative density temperature	70 °F (21 °C)
Solubility(ies)	
Solubility (water)	100 %
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	48 cps
Viscosity temperature	70 °F (21 °C)
Other information	
Percent volatile	0 (Estimated)
Pour point	< -30 °F (< -34 °C)
Specific gravity	1.45

## 10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Protect from freezing.
Incompatible materials	Avoid contact with strong oxidizers. Avoid contact with steel, aluminium, and zinc. Avoid contact with strong bases. Contact with strong bases may cause a violent reaction releasing heat.
Hazardous decomposition products	Oxides of carbon and phosphorus evolved in fire.

## 11. Toxicological information

### Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns.

**Symptoms related to the physical, chemical and toxicological characteristics** Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

### Information on toxicological effects

#### Acute toxicity

Product	Species	Test Results
DEPOSITROL BL5400 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	Rat	3020 mg/kg, (Calculated according to GHS additivity formula (Category 5))
<b>Chronic</b>		
<i>Oral</i>		
NOEL	Rat	0.062 - 1 % diet, 2 Year, (Reversible anemia at 1%)



Components	Species	Test Results
Phosphonic acid, (1-hydroxyethylidene)bis- (CAS 2809-21-4)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 7940 mg/kg
<i>Oral</i>		
LD50	Rat	1878 mg/kg
Phosphorous acid(phosphonic acid) (CAS 13598-36-2)		
<b>Acute</b>		
<i>Oral</i>		
LD50	Rat	1720 mg/kg

\* Estimates for product may be based on additional component data not shown.

<b>Skin corrosion/irritation</b>	Causes severe skin burns and eye damage.
<b>Serious eye damage/eye irritation</b>	Causes serious eye damage.
<b>Respiratory or skin sensitization</b>	
<b>Respiratory sensitization</b>	Not available.
<b>Skin sensitization</b>	This product is not expected to cause skin sensitization.
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Carcinogenicity</b>	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
<b>IARC Monographs. Overall Evaluation of Carcinogenicity</b>	
Not available.	
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	
Not listed.	
<b>US. National Toxicology Program (NTP) Report on Carcinogens</b>	
Not available.	
<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.
<b>Specific target organ toxicity - single exposure</b>	Not classified.
<b>Specific target organ toxicity - repeated exposure</b>	Not classified.
<b>Aspiration hazard</b>	Based on available data, the classification criteria are not met. Aspiration of this product may cause the same corrosiveness/irritation impacts as if it were ingested.
<b>Chronic effects</b>	Prolonged inhalation may be harmful.

## 12. Ecological information

<b>Ecotoxicity</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
--------------------	--

Product	Species	Test Results
DEPOSITROL BL5400 (CAS Mixture)		
EC50	Selenastrum (algae)	39 mg/l, Growth Inhibition, 14 day
		3 mg/l, Growth Inhibition, 96 hour
Growth LOEL	Fathead Minnow	60 mg/l, Chronic Bioassay, 7 day
Growth NOEL	Fathead Minnow	30 mg/l, Chronic Bioassay, 7 day
LC50	Bluegill Sunfish	1440 mg/l, Static Acute Bioassay, 96 hour
	Ceriodaphnia	113 mg/l, Static Renewal Bioassay, 48 hour, (pH adjusted)
	Fathead Minnow	3040 mg/l, Static Renewal Bioassay, 96 hour, (pH adjusted)
	Grass Shrimp (Palaemonetes pugio)	2675 mg/l, Static Acute Bioassay, 96 hour
	Midge larvae (Chironomus tentans)	14850 mg/l, Static Acute Bioassay, 48 hour

Product	Species		Test Results	
	NOEL	Mysid Shrimp	319 mg/l, Static Renewal Bioassay, 48 hour, (pH adjusted)	
		Sheepshead Minnow	3630 mg/l, Static Acute Bioassay, 96 hour	
		Bluegill Sunfish	880 mg/l, Static Acute Bioassay, 96 hour	
		Ceriodaphnia	31.3 mg/l, Static Renewal Bioassay, 48 hour, (pH adjusted)	
		Fathead Minnow	1370 mg/l, Static Renewal Bioassay, 96 hour, (pH adjusted)	
	Reproduction LOEC	Sheepshead Minnow	170 mg/l, Static Acute Bioassay, 96 hour	
		Ceriodaphnia	15 mg/l, Chronic Bioassay, 7 day	
	Reproduction NOEL	Ceriodaphnia	7.5 mg/l, Chronic Bioassay, 7 day	
	Aquatic Crustacea	LC50	Daphnia magna	755 mg/l, Static Renewal Bioassay, 48 hour, (pH adjusted)
		NOEL	Daphnia magna	420 mg/l, Static Renewal Bioassay, 48 hour, (pH adjusted)
Fish		LC50	Rainbow Trout	610 mg/l, Static Acute Bioassay, 96 hour
		NOEL	Rainbow Trout	250 mg/l, Static Acute Bioassay, 96 hour
Bioaccumulative potential		No data available.		
Mobility in soil		No data available.		
Other adverse effects		Nutrients: P : 179,4 mg/g, N : 0 mg/g		
Environmental fate		The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.		
Persistence and degradability		Testing has shown product to be inherently biodegradable.		
- COD (mgO2/g)		300		
- BOD 5 (mgO2/g)		1		
- BOD 28 (mgO2/g)		1		
- Closed Bottle Test (% Degradation in 28 days)		0		
- Zahn-Wellens Test (% Degradation in 28 days)		33		
- TOC (mg C/g)		70		
- Modified SCAS		90		
13. Disposal considerations				
Disposal instructions		Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Dispose of contents/container in accordance with local/regional/national/international regulations.		
Local disposal regulations		Dispose in accordance with all applicable regulations.		
Hazardous waste code		D002: Waste Corrosive material [pH <=2 or >=12.5, or corrosive to steel] The waste code should be assigned in discussion between the user, the producer and the waste disposal company.		
Waste from residues / unused products		Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).		
Contaminated packaging		Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.		

<b>UN proper shipping name</b>	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (ORGANIC PHOSPHONIC ACID)
<b>Transport hazard class(es)</b>	
Class	8
Subsidiary risk	-
<b>Packing group</b>	III
<b>Special precautions for user</b>	Read safety instructions, SDS and emergency procedures before handling.
<b>ERG number</b>	153

Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

#### IATA

<b>UN number</b>	UN3265
<b>UN proper shipping name</b>	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (ORGANIC PHOSPHONIC ACID)
<b>Transport hazard class(es)</b>	
Class	8
Subsidiary risk	-
<b>Packing group</b>	III
<b>Environmental hazards</b>	No.
<b>ERG Code</b>	153
<b>Special precautions for user</b>	Read safety instructions, SDS and emergency procedures before handling.

#### IMDG

<b>UN number</b>	UN3265
<b>UN proper shipping name</b>	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (ORGANIC PHOSPHONIC ACID)
<b>Transport hazard class(es)</b>	
Class	8
Subsidiary risk	-
<b>Packing group</b>	III
<b>Environmental hazards</b>	
Marine pollutant	No.
<b>EmS</b>	Not available.
<b>Special precautions for user</b>	Read safety instructions, SDS and emergency procedures before handling.

#### DOT



#### IATA; IMDG



## 15. Regulatory information

**US federal regulations** This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.  
All components are on the U.S. EPA TSCA Inventory List.

**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**  
Not regulated.



**CERCLA Hazardous Substance List (40 CFR 302.4)**

Not listed.

**SARA 304 Emergency release notification**

Not regulated.

**OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)**

Not listed.

**Superfund Amendments and Reauthorization Act of 1986 (SARA)**

**Hazard categories**  
Immediate Hazard - Yes  
Delayed Hazard - No  
Fire Hazard - No  
Pressure Hazard - No  
Reactivity Hazard - No

**SARA 302 Extremely hazardous substance**

Not listed.

**SARA 311/312 Hazardous chemical** No

**SARA 313 (TRI reporting)**

Not regulated.

**Other federal regulations**

**Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Not regulated.

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)**

Not regulated.

**Clean Water Act (CWA) Section 112(r) (40 CFR 68.130)** Hazardous substance

**Safe Drinking Water Act (SDWA)** Not regulated.

**Inventory status**

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

**US state regulations** California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - Massachusetts RTK - Substance List**

Not regulated.

**US - Pennsylvania RTK - Hazardous Substances**

Not regulated.

**US - Rhode Island RTK**

Not regulated.

**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

**US. New Jersey Worker and Community Right-to-Know Act**

Phosphorous acid(phosphonic acid) (CAS 13598-36-2)

**US. Pennsylvania Worker and Community Right-to-Know Law**

Not listed.

**US. California Proposition 65**

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

No ingredient listed.

## 16. Other information, including date of preparation or last revision

Issue date Nov-12-2014

Revision date Oct-02-2015

Version # 3.0

### List of abbreviations

CAS: Chemical Abstract Service Registration Number

TWA: Time Weighted Average

STEL: Short Term Exposure Limit

LD50: Lethal Dose, 50%

LC50: Lethal Concentration, 50%

NOEL: No Observed Effect Level

COD: Chemical Oxygen Demand

BOD: Biochemical Oxygen Demand

TOC: Total Organic Carbon

IATA: International Air Transport Association

IMDG: International Maritime Dangerous Goods Code

NFPA: National Fire Protection Association

ACGIH: American Conference of Governmental Industrial Hygienists

TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.

References: No data available

**Disclaimer** The information in the sheet was written based on the best knowledge and experience currently available. The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**Revision Information** Composition/information on ingredients: Composition comments  
Physical & Chemical Properties: Multiple Properties  
Toxicological Information: Toxicological Data  
Ecological Information: Ecotoxicity

**Prepared by** This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.



## SAFETY DATA SHEET

### DUSTREAT\* CF9156

#### 1. Identification

Product identifier	DUSTREAT CF9156
Other means of identification	None.
Recommended use	Material handling treatment.
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 1
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
OSHA defined hazards	Not classified.	

#### Label elements



Signal word	Danger
Hazard statement	Causes skin irritation. Causes serious eye damage. May cause respiratory irritation.
Precautionary statement	
Prevention	Avoid breathing mist or vapor. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves. Wear eye/face protection.
Response	If on skin: Wash with plenty of water/. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor/. Specific treatment (see on this label). If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.
Storage	Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.



### 3. Composition/information on ingredients

#### Mixtures

Components	CAS #	Percent
Sodium-bis-(2-ethylhexyl) sulphosuccinate	577-11-7	40 - 60
Butyl diglycol ether	112-34-5	20 - 40
Propylene glycol	57-55-6	10 - 20

**Composition comments** Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

### 4. First-aid measures

<b>Inhalation</b>	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell. If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.
<b>Skin contact</b>	Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.
<b>Eye contact</b>	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.
<b>Ingestion</b>	Do not feed anything by mouth to an unconscious or convulsive victim. Do NOT induce vomiting! Immediately give 1-2 glasses of water, if victim is fully conscious. Call a physician or poison control center immediately.
<b>Most important symptoms/effects, acute and delayed</b>	Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation. Skin irritation. May cause redness and pain.
<b>Indication of immediate medical attention and special treatment needed</b>	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
<b>General information</b>	If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

### 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Alcohol resistant foam. Water fog. Dry chemical powder. Carbon dioxide (CO2).
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards arising from the chemical</b>	During fire, gases hazardous to health may be formed.
<b>Special protective equipment and precautions for firefighters</b>	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
<b>Fire fighting equipment/instructions</b>	Move containers from fire area if you can do so without risk.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.
<b>General fire hazards</b>	No unusual fire or explosion hazards noted.

### 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate protective equipment and clothing during clean-up. Avoid breathing mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
<b>Methods and materials for containment and cleaning up</b>	<p>Large Spills: Stop the flow of material, if this is without risk. Use water spray to reduce vapors or divert vapor cloud drift. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.</p> <p>Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.</p> <p>Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.</p>
<b>Environmental precautions</b>	Avoid discharge into drains, water courses or onto the ground.

## 7. Handling and storage

### Precautions for safe handling

Do not get this material in contact with eyes. Avoid breathing mist or vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Use care in handling/storage.

### Conditions for safe storage, including any incompatibilities

Store locked up. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Shelf life 360 days.

## 8. Exposure controls/personal protection

### Occupational exposure limits

#### US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Butyl diglycol ether (CAS 112-34-5)	TWA	10 ppm	Inhalable fraction and vapor.

#### US. Workplace Environmental Exposure Level (WEEL) Guides

Components	Type	Value	Form
Propylene glycol (CAS 57-55-6)	TWA	10 mg/m <sup>3</sup>	Aerosol.

### Biological limit values

No biological exposure limits noted for the ingredient(s).

### Appropriate engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

### Individual protection measures, such as personal protective equipment

#### Eye/face protection

Splash proof chemical goggles.

#### Skin protection

##### Hand protection

Wear appropriate chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.

##### Other

Wear appropriate chemical resistant clothing. Chemical resistant apron. Viton gloves. Wash off after each use. Replace as necessary.

#### Respiratory protection

Chemical respirator with organic vapor cartridge and full facepiece. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

#### Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

### General hygiene considerations

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

### Appearance

#### Color

Colorless to light yellow

#### Physical state

Liquid

### Odor

Mild

### Odor threshold

Not available.

### pH in aqueous solution

5.2 (5% SOL.)

### Melting point/freezing point

4 °F (-16 °C)

### Initial boiling point and boiling range

350 °F (177 °C)

### Flash point

> 212 °F (> 100 °C) P-M(CC)

### Evaporation rate

< 1 (Ether = 1)

### Flammability (solid, gas)

Not available.

### Upper/lower flammability or explosive limits

#### Flammability limit - lower (%)

Not available.

#### Flammability limit - upper (%)

Not available.

Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	< 1 mm Hg
Vapor pressure temp.	70 °F (21 °C)
Vapor density	> 1 (Air = 1)
Relative density	1.05
Relative density temperature	70 °F (21 °C)
Solubility(ies)	
Solubility (water)	10 %
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	38 cps
Viscosity temperature	70 °F (21 °C)
Other information	
Percent volatile	38 (Estimated)
Pour point	1 °F (-17 °C)
Specific gravity	1.05

## 10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials. None under normal conditions.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	Oxides of carbon and sulphur evolved in fire.

## 11. Toxicological information

### Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
Skin contact	Causes skin irritation.
Eye contact	Causes serious eye damage.
Ingestion	Expected to be a low ingestion hazard.

Symptoms related to the physical, chemical and toxicological characteristics	Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation. Skin irritation. May cause redness and pain.
--	---

### Information on toxicological effects

Acute toxicity	May cause respiratory irritation.
----------------	-----------------------------------

Product	Species	Test Results
DUSTREAT CF9156 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	rabbit	> 5000 mg/kg, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	rat	> 5000 mg/kg, (Calculated according to GHS additivity formula)



Components	Species	Test Results
Butyl diglycol ether (CAS 112-34-5)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	2764 mg/kg
<i>Oral</i>		
LD50	Rat	6560 mg/kg
Propylene glycol (CAS 57-55-6)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 20800 mg/kg
<i>Inhalation</i>		
LC50	Rat	> 30 mg/l, 4 Hour
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg
Sodium-bis-(2-ethylhexyl) sulphosuccinate (CAS 577-11-7)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg
<i>Oral</i>		
LD50		1900 mg/kg

\* Estimates for product may be based on additional component data not shown.

<b>Skin corrosion/irritation</b>	Causes skin irritation.
<b>Serious eye damage/eye irritation</b>	Causes serious eye damage.
<b>Respiratory or skin sensitization</b>	
<b>Respiratory sensitization</b>	Not available.
<b>Skin sensitization</b>	This product is not expected to cause skin sensitization.
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Carcinogenicity</b>	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	
Not listed.	
<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.
<b>Specific target organ toxicity - single exposure</b>	May cause respiratory irritation.
<b>Specific target organ toxicity - repeated exposure</b>	Not classified.
<b>Aspiration hazard</b>	Based on available data, the classification criteria are not met. May be harmful if swallowed and enters airways.
<b>Chronic effects</b>	Prolonged inhalation may be harmful.

## 12. Ecological information

<b>Ecotoxicity</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
--------------------	--

Product	Species	Test Results
DUSTREAT CF9156 (CAS Mixture)		
LC50	Fathead Minnow	59 mg/L, Acute Toxicity, 96 hour, (Estimated)
NOEL	Fathead Minnow	26 mg/L, Acute Toxicity, 96 hour, (Estimated)

Product	Species		Test Results
Aquatic Crustacea	LC50	Daphnia magna	43 mg/L, Acute Toxicity, 48 hour, (Estimated)
	NOEL	Daphnia magna	17 mg/L, Acute Toxicity, 48 hour, (Estimated)
* Estimates for product may be based on additional component data not shown.			
Bioaccumulative potential	No data available.		
Partition coefficient n-octanol / water (log Kow)			
Butyl diglycol ether			0.56
Propylene glycol			-0.92
Mobility in soil	No data available.		
Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.		
Environmental fate	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.		
Persistence and degradability	No data is available on the degradability of this product.		
- COD (mgO2/g)	1943 (calculated data)		
- BOD 5 (mgO2/g)	403 (calculated data)		
- BOD 28 (mgO2/g)	577 (calculated data)		
- TOC (mg C/g)	484 (calculated data)		
13. Disposal considerations			
Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.		
Local disposal regulations	Dispose in accordance with all applicable regulations.		
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.		
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).		
Contaminated packaging	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.		
14. Transport information			
DOT			
Not regulated as dangerous goods.			
Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.			
IATA			
Not regulated as dangerous goods.			
IMDG			
Not regulated as dangerous goods.			
15. Regulatory information			
US federal regulations	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.		
TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)			
Not regulated.			
CERCLA Hazardous Substance List (40 CFR 302.4)			
Butyl diglycol ether (CAS 112-34-5)		Listed.	
SARA 304 Emergency release notification			
Not regulated.			

**OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)**

Not listed.

**Superfund Amendments and Reauthorization Act of 1986 (SARA)**

**Hazard categories**  
Immediate Hazard - Yes  
Delayed Hazard - No  
Fire Hazard - No  
Pressure Hazard - No  
Reactivity Hazard - No

**SARA 302 Extremely hazardous substance**

Not listed.

**SARA 311/312 Hazardous chemical** No

**SARA 313 (TRI reporting)**

Chemical name	CAS number	% by wt.
Butyl diglycol ether	112-34-5	20 - 40

**Other federal regulations****Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Butyl diglycol ether (CAS 112-34-5)

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)**

Not regulated.

**Safe Drinking Water Act (SDWA)** Not regulated.

**Inventory status**

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

**US state regulations** California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - Massachusetts RTK - Substance List**

Not regulated.

**US - Pennsylvania RTK - Hazardous Substances**

Butyl diglycol ether (CAS 112-34-5)

Propylene glycol (CAS 57-55-6)

**US - Rhode Island RTK**

Butyl diglycol ether (CAS 112-34-5)

**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

**US. New Jersey Worker and Community Right-to-Know Act**

Butyl diglycol ether (CAS 112-34-5)

Propylene glycol (CAS 57-55-6)

**US. Pennsylvania Worker and Community Right-to-Know Law**

Butyl diglycol ether (CAS 112-34-5)

Propylene glycol (CAS 57-55-6)

**US. California Proposition 65**

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Female reproductive toxin**

No ingredient listed.



No ingredient listed.

## 16. Other information, including date of preparation or last revision

**Issue date** Dec-17-2014

**Revision date** Jun-12-2015

**Version #** 2.0

### List of abbreviations

CAS: Chemical Abstract Service Registration Number  
TWA: Time Weighted Average  
STEL: Short Term Exposure Limit  
LD50: Lethal Dose, 50%  
LC50: Lethal Concentration, 50%  
NOEL: No Observed Effect Level  
COD: Chemical Oxygen Demand  
BOD: Biochemical Oxygen Demand  
TOC: Total Organic Carbon  
TLV: Threshold Limit Value  
IATA: International Air Transport Association  
IMDG: International Maritime Dangerous Goods Code  
NFPA: National Fire Protection Association  
ACGIH: American Conference of Governmental Industrial Hygienists  
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.

**References:** No data available

**Disclaimer** The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. The information in the sheet was written based on the best knowledge and experience currently available.

**Revision Information** Composition/information on ingredients: Composition comments  
Composition/information on ingredients: Component information  
Physical & Chemical Properties: Multiple Properties  
Toxicological information: Aspiration hazard  
Other information, including date of preparation or last revision: Prepared by

**Prepared by** This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.



## SAFETY DATA SHEET

### DUSTREAT\* DC6109

#### 1. Identification

Product identifier	DUSTREAT DC6109
Other means of identification	None.
Recommended use	Dust control agent.
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 1
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
OSHA defined hazards	Not classified.	

#### Label elements



Signal word	Danger
Hazard statement	Causes skin irritation. Causes serious eye damage. May cause respiratory irritation.
Precautionary statement	
Prevention	Avoid breathing mist or vapor. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves. Wear eye/face protection.
Response	If on skin: Wash with plenty of water/. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor/. Specific treatment (see on this label). If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.
Storage	Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

### 3. Composition/information on ingredients

#### Mixtures

Components	CAS #	Percent
SOLVENT	TSRN 125438 - 5500P	
Sodium (C14-16) olefin sulfonate	68439-57-6	20 - 40
Sodium chloride	7647-14-5	1 - 2.5

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

### 4. First-aid measures

<b>Inhalation</b>	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
<b>Skin contact</b>	Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.
<b>Eye contact</b>	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.
<b>Ingestion</b>	Rinse mouth. Get medical attention if symptoms occur.
<b>Most important symptoms/effects, acute and delayed</b>	Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation. May cause redness and pain.
<b>Indication of immediate medical attention and special treatment needed</b>	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
<b>General information</b>	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

### 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
<b>Unsuitable extinguishing media</b>	Not available.
<b>Specific hazards arising from the chemical</b>	Oxides of carbon and sulphur evolved in fire.
<b>Special protective equipment and precautions for firefighters</b>	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
<b>Fire fighting equipment/instructions</b>	Move containers from fire area if you can do so without risk. Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.
<b>General fire hazards</b>	No unusual fire or explosion hazards noted.

### 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate protective equipment and clothing during clean-up. Avoid inhalation of vapors or mists. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
<b>Methods and materials for containment and cleaning up</b>	<p>Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.</p> <p>Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.</p> <p>Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.</p>
<b>Environmental precautions</b>	Prevent raw product from entering sewers or the immediate environment. Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit.



## 7. Handling and storage

### Precautions for safe handling

Alkaline. Do not mix with acidic material. Do not get this material in contact with eyes. Avoid breathing mist or vapor. Avoid contact with skin. Avoid contact with clothing. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

### Conditions for safe storage, including any incompatibilities

Protect from freezing. Warming and mixing required if stored below 50F. If frozen, thaw and mix completely prior to use. Store in cool, well ventilated area. Store containers closed when not in use. Store away from oxidizers.

## 8. Exposure controls/personal protection

### Occupational exposure limits

No exposure limits noted for ingredient(s).

### Biological limit values

No biological exposure limits noted for the ingredient(s).

### Appropriate engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

### Individual protection measures, such as personal protective equipment

#### Eye/face protection

Splash proof chemical goggles.

#### Skin protection

##### Hand protection

Chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.

##### Other

Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

#### Respiratory protection

If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

#### Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

### General hygiene considerations

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

### Appearance

#### Color

Light yellow to amber

#### Physical state

Liquid

#### Odor

Sweet

#### Odor threshold

Not available.

#### pH in aqueous solution

8.1 (5% SOL.)

#### Melting point/freezing point

19 °F (-7 °C)

#### Initial boiling point and boiling range

210 °F (99 °C)

#### Flash point

> 200 °F (> 93 °C) P-M(CC)

#### Evaporation rate

< 1 (Ether = 1)

#### Flammability (solid, gas)

Not available.

### Upper/lower flammability or explosive limits

#### Flammability limit - lower (%)

Not available.

#### Flammability limit - upper (%)

Not available.

#### Explosive limit - lower (%)

Not available.

#### Explosive limit - upper (%)

Not available.

#### Vapor pressure

18 mm Hg

#### Vapor pressure temp.

70 °F (21 °C)

#### Vapor density

< 1 (Air = 1)

Relative density	1.06
Relative density temperature	70 °F (21 °C)
Solubility(ies)	
Solubility (water)	100 %
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	72 cps
Viscosity temperature	70 °F (21 °C)
Other information	
Percent volatile	0 (ASTM 3960-93)
Pour point	25 °F (-4 °C)
Specific gravity	1.06

## 10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Protect from freezing.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	Oxides of carbon and sulphur evolved in fire.

## 11. Toxicological information

### Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system.
Skin contact	Causes skin irritation.
Eye contact	Causes serious eye damage.
Ingestion	Expected to be a low ingestion hazard.

**Symptoms related to the physical, chemical and toxicological characteristics** May cause redness and pain. May cause respiratory irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

### Information on toxicological effects

**Acute toxicity** May cause respiratory irritation.

Product	Species	Test Results
DUSTREAT DC6109 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	2150 mg/kg
<i>Oral</i>		
LD50	Rat	2500 mg/kg
Components	Species	Test Results
Sodium (C14-16) olefin sulfonate (CAS 68439-57-6)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 6000 mg/kg
<i>Inhalation</i>		
LC50	Rat	> 52 mg/l/4h

Components	Species	Test Results
Oral LD50	Rat	2079 mg/kg
* Estimates for product may be based on additional component data not shown.		
Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.	
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.	
Respiratory or skin sensitization		
Respiratory sensitization	Not available.	
Skin sensitization	This product is not expected to cause skin sensitization.	
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.	
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.	
IARC Monographs. Overall Evaluation of Carcinogenicity		
Not available.		
OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)		
Not listed.		
US. National Toxicology Program (NTP) Report on Carcinogens		
Not available.		
Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.	
Specific target organ toxicity - single exposure.	May cause respiratory irritation.	
Specific target organ toxicity - repeated exposure	Not classified.	
Aspiration hazard	Based on available data, the classification criteria are not met. May be harmful if swallowed and enters airways.	

## 12. Ecological information

### Ecotoxicity

Product		Species	Test Results	
DUSTREAT DC6109 (CAS Mixture)				
Aquatic		10% Mortality	Fathead Minnow	0.78 mg/L, Static Renewal Bioassay, 96 hour
		LC50	Fathead Minnow	4 mg/L, Static Renewal Bioassay, 96 hour
	Crustacea	LC50	Daphnia magna	16 mg/L, Static Renewal Bioassay, 48 hour
		NOEL	Daphnia magna	6.3 mg/L, Static Renewal Bioassay, 48 hour
	Fish	LC50	Rainbow Trout	7.1 mg/L, Static Renewal Bioassay, 96 hour
		NOEL	Rainbow Trout	5 mg/L, Static Renewal Bioassay, 96 hour

\* Estimates for product may be based on additional component data not shown.

<b>Bioaccumulative potential</b>	No data available.		
<b>Mobility in soil</b>	No data available.		
<b>Other adverse effects</b>	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.		
<b>Persistence and degradability</b>	Testing has shown product to be readily biodegradable.		
- COD (mgO2/g)	860		
- BOD 5 (mgO2/g)	7		
- BOD 28 (mgO2/g)	303		
- Closed Bottle Test (% Degradation in 28 days)	37		
- Zahn-Wellens Test (% Degradation in 28 days)	45		



- TOC (mg C/g) 200

### 13. Disposal considerations

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
<b>Contaminated packaging</b>	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

### 14. Transport information

<b>DOT</b>	Not regulated as dangerous goods. Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.
<b>IATA</b>	Not regulated as dangerous goods.
<b>IMDG</b>	Not regulated as dangerous goods.

### 15. Regulatory information

<b>US federal regulations</b>	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.
<b>TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)</b>	Not regulated.
<b>CERCLA Hazardous Substance List (40 CFR 302.4)</b>	Not listed.
<b>SARA 304 Emergency release notification</b>	Not regulated.
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	Not listed.
<b>Superfund Amendments and Reauthorization Act of 1986 (SARA)</b>	
<b>Hazard categories</b>	Immediate Hazard - Yes Delayed Hazard - No Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No
<b>SARA 302 Extremely hazardous substance</b>	Not listed.
<b>SARA 311/312 Hazardous chemical</b>	No
<b>SARA 313 (TRI reporting)</b>	Not regulated.
<b>Other federal regulations</b>	
<b>Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List</b>	Not regulated.
<b>Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)</b>	Not regulated.
<b>Safe Drinking Water Act (SDWA)</b>	Not regulated.

**Inventory status**

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

**US state regulations** California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - Massachusetts RTK - Substance List**

Not regulated.

**US - Pennsylvania RTK - Hazardous Substances**

Not regulated.

**US - Rhode Island RTK**

Not regulated.

**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

**US. New Jersey Worker and Community Right-to-Know Act**

Not listed.

**US. Pennsylvania Worker and Community Right-to-Know Law**

Not listed.

**US. California Proposition 65**

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Female reproductive toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Male reproductive toxin**

No ingredient listed.

**16. Other information, including date of preparation or last revision**

**Issue date** Oct-10-2014

**Revision date** Aug-05-2015

**Version #** 3.0

**List of abbreviations**

CAS: Chemical Abstract Service Registration Number  
TWA: Time Weighted Average  
STEL: Short Term Exposure Limit  
LD50: Lethal Dose, 50%  
LC50: Lethal Concentration, 50%  
NOEL: No Observed Effect Level  
COD: Chemical Oxygen Demand  
BOD: Biochemical Oxygen Demand  
TOC: Total Organic Carbon  
IATA: International Air Transport Association  
IMDG: International Maritime Dangerous Goods Code  
NFPA: National Fire Protection Association  
ACGIH: American Conference of Governmental Industrial Hygienists  
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.

**References:** No data available

**Disclaimer**

The information in the sheet was written based on the best knowledge and experience currently available. The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**Revision Information**

Composition/information on ingredients: Composition comments  
Handling and storage: Conditions for safe storage, including any incompatibilities  
Exposure controls/personal protection: Respiratory protection  
Physical & Chemical Properties: Multiple Properties  
Toxicological information: Aspiration hazard  
Transport Information: Material Transportation Information  
Other information, including date of preparation or last revision: Prepared by  
GHS: Classification

**Prepared by**

This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.



**SAFETY DATA SHEET****EG-2600****Section: 1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : EG-2600

Other means of identification : Not applicable.

Restrictions on use : Refer to available product literature or ask your local Sales Representative for restrictions on use and dose limits.

Company : Nalco Company  
1601 W. Diehl Road  
Naperville, Illinois 60563-1198  
USA  
TEL: (630)305-1000

Emergency telephone number : (800) 424-9300 (24 Hours) CHEMTREC

Issuing date : 08/26/2015

**Section: 2. HAZARDS IDENTIFICATION****GHS Classification**

Not a hazardous substance or mixture.

**GHS Label element**

Precautionary Statements : **Prevention:**  
Wash hands thoroughly after handling.  
**Response:**  
Specific measures: consult SDS Section 4.  
**Storage:**  
Store in accordance with local regulations.

**Other hazards** : None known.

**Section: 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Pure substance/mixture : Mixture

Chemical Name	CAS-No.	Concentration: (%)
Glycerol	56-81-5	60 - 100
Methanol	67-56-1	0.1 - 1

**Section: 4. FIRST AID MEASURES**

In case of eye contact : Rinse with plenty of water. Get medical attention if symptoms occur.

In case of skin contact : Wash off with soap and plenty of water. Get medical attention if symptoms occur.

If swallowed : Rinse mouth. Get medical attention if symptoms occur.

If inhaled : Get medical attention if symptoms occur.

## SAFETY DATA SHEET

**EG-2600**

- Protection of first-aiders : In event of emergency assess the danger before taking action. Do not put yourself at risk of injury. If in doubt, contact emergency responders. Use personal protective equipment as required.
- Notes to physician : Treat symptomatically.
- Most important symptoms and effects, both acute and delayed : See Section 11 for more detailed information on health effects and symptoms.

### Section: 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Unsuitable extinguishing media : None known.
- Specific hazards during firefighting : Not flammable or combustible.
- Hazardous combustion products : Carbon oxides
- Special protective equipment for firefighters : Use personal protective equipment.
- Specific extinguishing methods : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

### Section: 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions, protective equipment and emergency procedures : Refer to protective measures listed in sections 7 and 8.
- Environmental precautions : No special environmental precautions required.
- Methods and materials for containment and cleaning up : Stop leak if safe to do so. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Flush away traces with water. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway.

### Section: 7. HANDLING AND STORAGE

- Advice on safe handling : For personal protection see section 8. Wash hands after handling.
- Conditions for safe storage : Keep out of reach of children. Keep container tightly closed. Store in suitable labeled containers.

## SAFETY DATA SHEET

**EG-2600**

Suitable material : Keep in properly labelled containers.

Unsuitable material : not determined

### Section: 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### Components with workplace control parameters

Components	CAS-No.	Form of exposure	Permissible concentration	Basis
Glycerol	56-81-5	TWA	10 mg/m <sup>3</sup>	ACGIH
		TWA (mist, respirable fraction)	5 mg/m <sup>3</sup>	OSHA Z1
		TWA (mist, total dust)	15 mg/m <sup>3</sup>	OSHA Z1

Engineering measures : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

#### Personal protective equipment

Eye protection : Safety glasses

Hand protection : Wear protective gloves.  
Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Skin protection : Wear suitable protective clothing.

Respiratory protection : No personal respiratory protective equipment normally required.

Hygiene measures : Wash hands before breaks and immediately after handling the product.

### Section: 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Colour : Clear to hazy amber to dark brown

Odour : slight

Flash point : > 93.3 °C

pH : no data available

Odour Threshold : no data available

Melting point/freezing point : no data available

Initial boiling point and boiling range : no data available

Evaporation rate : no data available



## SAFETY DATA SHEET

**EG-2600**

Flammability (solid, gas)	: no data available
Upper explosion limit	: no data available
Lower explosion limit	: no data available
Vapour pressure	: no data available
Relative vapour density	: no data available
Relative density	: 1.199
Density	: 10.0 lb/gal
Water solubility	: no data available
Solubility in other solvents	: no data available
Partition coefficient: n-octanol/water	: no data available
Auto-ignition temperature	: no data available
Thermal decomposition temperature	: no data available
Viscosity, dynamic	: no data available
Viscosity, kinematic	: no data available
Molecular weight	: no data available
VOC	: no data available

### Section: 10. STABILITY AND REACTIVITY

Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: No dangerous reaction known under conditions of normal use.
Conditions to avoid	: None known.
Incompatible materials	: None known.
Hazardous decomposition products	: Carbon oxides

### Section: 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure	: Inhalation, Eye contact, Skin contact
--	---

#### Potential Health Effects

Eyes	: Health injuries are not known or expected under normal use.
Skin	: Health injuries are not known or expected under normal use.
Ingestion	: Health injuries are not known or expected under normal use.
Inhalation	: Health injuries are not known or expected under normal use.

## SAFETY DATA SHEET

EG-2600

Chronic Exposure : Health injuries are not known or expected under normal use.

### Experience with human exposure

Eye contact : No symptoms known or expected.

Skin contact : No symptoms known or expected.

Ingestion : No symptoms known or expected.

Inhalation : No symptoms known or expected.

### Toxicity

#### Product

Acute oral toxicity : Acute toxicity estimate > 5,000 mg/kg

Acute inhalation toxicity : Acute toxicity estimate : > 40 mg/l  
Exposure time: 4 h

Acute dermal toxicity : Acute toxicity estimate : > 5,000 mg/kg

Skin corrosion/irritation : no data available

Serious eye damage/eye irritation : no data available

Respiratory or skin sensitization : no data available

Carcinogenicity : no data available

Reproductive effects : no data available

Germ cell mutagenicity : no data available

Teratogenicity : no data available

STOT - single exposure : no data available

STOT - repeated exposure : no data available

Aspiration toxicity : no data available

## Section: 12. ECOLOGICAL INFORMATION

### Ecotoxicity

Environmental Effects : This product has no known ecotoxicological effects.

### Components

## SAFETY DATA SHEET

**EG-2600**

Toxicity to fish : Glycerol  
LC50 Fish: 855 mg/l  
Exposure time: 96 h

Methanol  
LC50 : 15,400 mg/l  
Exposure time: 96 h

### Components

Toxicity to daphnia and other aquatic invertebrates : Methanol  
EC50 : > 10,000 mg/l  
Exposure time: 48 h

### Components

Toxicity to algae : Methanol  
EC50 : 22,000 mg/l  
Exposure time: 72 h

### Components

Toxicity to bacteria : Methanol  
> 1,000 mg/l

### Components

Toxicity to fish (Chronic toxicity) : Methanol  
NOEC: 7,900 mg/l  
Exposure time: 8.3 d

### Persistence and degradability

no data available

### Mobility

no data available

### Bioaccumulative potential

no data available

### Other information

no data available

## Section: 13. DISPOSAL CONSIDERATIONS

Disposal methods : Where possible recycling is preferred to disposal or incineration. If recycling is not practicable, dispose of in compliance with local regulations. Dispose of wastes in an approved waste disposal facility.

Disposal considerations : Dispose of as unused product. Empty containers should be taken to an approved waste handling site for recycling or disposal. Do not re-use empty containers.



## SAFETY DATA SHEET

EG-2600

### Section: 14. TRANSPORT INFORMATION

The shipper/consignor/sender is responsible to ensure that the packaging, labeling, and markings are in compliance with the selected mode of transport.

#### Land transport (DOT)

Proper shipping name : PRODUCT IS NOT REGULATED DURING  
TRANSPORTATION

#### Air transport (IATA)

Proper shipping name : PRODUCT IS NOT REGULATED DURING  
TRANSPORTATION

#### Sea transport (IMDG/IMO)

Proper shipping name : PRODUCT IS NOT REGULATED DURING  
TRANSPORTATION

### Section: 15. REGULATORY INFORMATION

#### EPCRA - Emergency Planning and Community Right-to-Know Act

##### CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

##### SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

**SARA 311/312 Hazards** : No SARA Hazards

**SARA 302** : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**SARA 313** : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

#### California Prop 65

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Methanol

67-56-1

#### INTERNATIONAL CHEMICAL CONTROL LAWS :

##### TOXIC SUBSTANCES CONTROL ACT (TSCA)

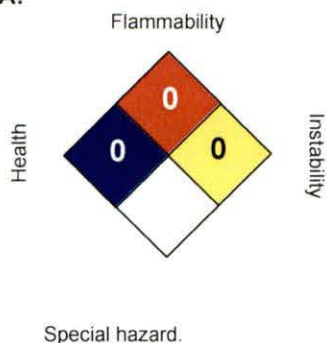
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

### Section: 16. OTHER INFORMATION

# SAFETY DATA SHEET

EG-2600

## NFPA:



## HMIS III:

HEALTH	0
FLAMMABILITY	0
PHYSICAL HAZARD	0

0 = not significant, 1 = Slight,  
2 = Moderate, 3 = High  
4 = Extreme, \* = Chronic

Revision Date : 08/26/2015  
Version Number : 1.3  
Prepared By : Regulatory Affairs

REVISED INFORMATION: Significant changes to regulatory or health information for this revision is indicated by a bar in the left-hand margin of the SDS.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. For additional copies of an SDS visit [www.nalco.com](http://www.nalco.com) and request access.



## SAFETY DATA SHEET

### FERROQUEST\* FQ7101

#### 1. Identification

Product identifier	FERROQUEST FQ7101
Other means of identification	None.
Recommended use	Chemical cleaning compound
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Serious eye damage/eye irritation	Category 2B
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
OSHA defined hazards	Not classified.	
Label elements		



Signal word	Warning
Hazard statement	Causes eye irritation. May cause respiratory irritation.
Precautionary statement	
Prevention	Avoid breathing mist or vapor. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area.
Response	IF ON SKIN: Gently wash with plenty of soap and water. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. Call a POISON CENTER or doctor/physician if you feel unwell.
Storage	Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

#### 3. Composition/information on ingredients

##### Mixtures



Components	CAS #	Percent
Phosphonic acid, (1-hydroxyethylidene)bis-, disodium salt	7414-83-7	2.5 - 10

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

**Composition comments** Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

#### 4. First-aid measures

<b>Inhalation</b>	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
<b>Skin contact</b>	Rinse skin with water/shower. Get medical attention if irritation develops and persists.
<b>Eye contact</b>	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.
<b>Ingestion</b>	Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately.
<b>Most important symptoms/effects, acute and delayed</b>	Irritation of eyes. Exposed individuals may experience eye tearing, redness, and discomfort. May cause respiratory irritation.
<b>Indication of immediate medical attention and special treatment needed</b>	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
<b>General information</b>	If you feel unwell, seek medical advice (show the label where possible).

#### 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards arising from the chemical</b>	During fire, gases hazardous to health may be formed.
<b>Special protective equipment and precautions for firefighters</b>	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.
<b>Fire fighting equipment/instructions</b>	In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials. Move containers from fire area if you can do so without risk. Cool containers / tanks with water spray.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.
<b>General fire hazards</b>	No unusual fire or explosion hazards noted.

#### 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Avoid breathing mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
<b>Methods and materials for containment and cleaning up</b>	Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.  Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.  Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
<b>Environmental precautions</b>	Avoid discharge into drains, water courses or onto the ground.

#### 7. Handling and storage

<b>Precautions for safe handling</b>	Avoid breathing mist or vapor. Avoid contact with eyes. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Use care in handling/storage.
<b>Conditions for safe storage, including any incompatibilities</b>	Store locked up. Store in original tightly closed container. Store below 100°F (38°C). Protect from freezing. If frozen, thaw completely and mix thoroughly prior to use. Store away from incompatible materials (see Section 10 of the SDS). Store in accordance with local/regional/national/international regulation.

#### 8. Exposure controls/personal protection

<b>Occupational exposure limits</b>	No exposure limits noted for ingredient(s).
-------------------------------------	---

<b>Biological limit values</b>	No biological exposure limits noted for the ingredient(s).
<b>Appropriate engineering controls</b>	Provide eyewash station.
<b>Individual protection measures, such as personal protective equipment</b>	
<b>Eye/face protection</b>	Wear safety glasses with side shields (or goggles).
<b>Skin protection</b>	
<b>Hand protection</b>	Wear appropriate chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Suitable gloves can be recommended by the glove supplier. Glove selection must take into account any solvents and other hazards present.
<b>Other</b>	Wear suitable protective clothing.
<b>Respiratory protection</b>	A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE. If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.
<b>Thermal hazards</b>	Wear appropriate thermal protective clothing, when necessary.
<b>General hygiene considerations</b>	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

<b>Appearance</b>	
<b>Color</b>	Colorless to amber
<b>Physical state</b>	Liquid
<b>Odor</b>	Mild
<b>Odor threshold</b>	Not available.
<b>pH (concentrated product)</b>	6
<b>pH in aqueous solution</b>	6.6 (5% SOL.)
<b>Melting point/freezing point</b>	18 °F (-8 °C)
<b>Initial boiling point and boiling range</b>	215 °F (102 °C)
<b>Flash point</b>	Not applicable.
<b>Evaporation rate</b>	< 1 (Ether = 1)
<b>Flammability (solid, gas)</b>	Not applicable.
<b>Upper/lower flammability or explosive limits</b>	
<b>Flammability limit - lower (%)</b>	Not available.
<b>Flammability limit - upper (%)</b>	Not available.
<b>Explosive limit - lower (%)</b>	Not available.
<b>Explosive limit - upper (%)</b>	Not available.
<b>Vapor pressure</b>	18 mm Hg
<b>Vapor pressure temp.</b>	70 °F (21 °C)
<b>Vapor density</b>	< 1 (Air = 1)
<b>Relative density</b>	1.1
<b>Relative density temperature</b>	70 °F (21 °C)
<b>Solubility(ies)</b>	
<b>Solubility (water)</b>	100 %
<b>Partition coefficient (n-octanol/water)</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Viscosity</b>	13 cps
<b>Viscosity temperature</b>	70 °F (21 °C)

## Other information

Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Percent volatile	0 (Calculated)
Pour point	23 °F (-5 °C)
Specific gravity	1.105

## 10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Water reactive substance.
Hazardous decomposition products	Hydrogen chloride, oxides of carbon, nitrogen, and phosphorus evolved in fire.

## 11. Toxicological information

### Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system.
Skin contact	May be irritating to the skin.
Eye contact	Causes eye irritation.
Ingestion	Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics	Irritation of eyes. Exposed individuals may experience eye tearing, redness, and discomfort. May cause respiratory irritation.

### Information on toxicological effects

Acute toxicity	May cause respiratory irritation.
----------------	-----------------------------------

Product	Species	Test Results
FERROQUEST FQ7101 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	Rat	2920 mg/kg, (Calculated according to GHS additivity formula)
Components	Species	Test Results
Phosphonic acid, (1-hydroxyethylidene)bis-, disodium salt (CAS 7414-83-7)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 2000 mg/kg
<i>Oral</i>		
LD50	Rat	> 2000 mg/kg

\* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation	Not classified.
Serious eye damage/eye irritation	Causes eye irritation.
Respiratory or skin sensitization	
Respiratory sensitization	This product is not expected to cause respiratory sensitization.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.



#### IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

#### US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.
<b>Specific target organ toxicity - single exposure</b>	May cause respiratory irritation.
<b>Specific target organ toxicity - repeated exposure</b>	Not classified.
<b>Aspiration hazard</b>	Not available.
<b>Chronic effects</b>	Prolonged inhalation may be harmful.

## 12. Ecological information

### Ecotoxicity

Product		Species	Test Results
FERROQUEST FQ7101 (CAS Mixture)	0% Mortality	Fathead Minnow	2000 mg/L, Static Bioassay with 48-Hour Renewal, 96 hour
	LC50	Fathead Minnow	> 2000 mg/L, Static Bioassay with 48-Hour Renewal, 96 hour
	<b>Aquatic</b>		
	Crustacea		
	0% Mortality	Daphnia magna	2000 mg/L, Static Acute Bioassay, 48 hour
	LC50	Daphnia magna	> 2000 mg/L, Static Acute Bioassay, 48 hour

### Bioaccumulative potential

**Mobility in soil** No data available.

**Other adverse effects** Not available.

**Persistence and degradability**  
No data available

## 13. Disposal considerations

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
<b>Contaminated packaging</b>	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

## 14. Transport information

### DOT

Not regulated as dangerous goods.

Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

### IATA

Not regulated as dangerous goods.

### IMDG

Not regulated as dangerous goods.

## 15. Regulatory information

### US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

#### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

#### CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

#### SARA 304 Emergency release notification

Not regulated.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

### Superfund Amendments and Reauthorization Act of 1986 (SARA)

#### Hazard categories

Immediate Hazard - Yes  
Delayed Hazard - No  
Fire Hazard - No  
Pressure Hazard - No  
Reactivity Hazard - No

#### SARA 302 Extremely hazardous substance

Not listed.

#### SARA 311/312 Hazardous chemical

Yes

#### SARA 313 (TRI reporting)

Not regulated.

### Other federal regulations

#### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

#### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

#### Safe Drinking Water Act (SDWA)

Not regulated.

### Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

### NSF Registered and/or meets USDA (according to 1998 guidelines):

Registration No. - 140930  
Category Code(s):  
G5 Cooling and retort water treatment products  
G7 Boiler, steam line treatment products - nonfood contact

### US state regulations

#### US - Massachusetts RTK - Substance List

Not regulated.

#### US - Pennsylvania RTK - Hazardous Substances

Not regulated.

#### US - Rhode Island RTK

Not regulated.

#### US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

#### US. New Jersey Worker and Community Right-to-Know Act

Not listed.

#### US. Pennsylvania Worker and Community Right-to-Know Law

Not listed.

**US. California Proposition 65**

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

ARSENIC (CAS 7440-38-2)	Listed: February 27, 1987
LEAD (CAS 7439-92-1)	Listed: October 1, 1992

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**

LEAD (CAS 7439-92-1)	Listed: February 27, 1987
Methanol (CAS 67-56-1)	Listed: March 16, 2012

**US - California Proposition 65 - CRT: Listed date/Female reproductive toxin**

LEAD (CAS 7439-92-1)	Listed: February 27, 1987
----------------------	---------------------------

**US - California Proposition 65 - CRT: Listed date/Male reproductive toxin**

LEAD (CAS 7439-92-1)	Listed: February 27, 1987
----------------------	---------------------------

**16. Other information, including date of preparation or last revision**

**Issue date** Oct-15-2014

**Revision date** Feb-07-2017

**Version #** 2.1

**List of abbreviations**

CAS: Chemical Abstract Service Registration Number  
TWA: Time Weighted Average  
STEL: Short Term Exposure Limit  
LD50: Lethal Dose, 50%  
LC50: Lethal Concentration, 50%  
NOEL: No Observed Effect Level  
COD: Chemical Oxygen Demand  
BOD: Biochemical Oxygen Demand  
TOC: Total Organic Carbon  
IATA: International Air Transport Association  
IMDG: International Maritime Dangerous Goods Code  
ACGIH: American Conference of Governmental Industrial Hygienists  
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.

**References:** No data available

**Disclaimer**

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**Revision information**

Hazard(s) identification: Response  
Composition / Information on Ingredients: Ingredients  
Composition/information on ingredients: Composition comments  
Physical & Chemical Properties: Multiple Properties  
Toxicological information: Respiratory sensitization  
Other information, including date of preparation or last revision: Further information  
HazReg Data: Pacific Rim  
GHS: Classification

**Prepared by** This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.



GE Power & Water  
Water & Process Technologies

## SAFETY DATA SHEET

### FOAMTROL\* AF2290

---

#### 1. Identification

Product identifier	FOAMTROL AF2290
Other means of identification	Not available.
Recommended use	Defoamer Antifoam
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Not classified.
Health hazards	Not classified.
OSHA defined hazards	Not classified.

#### Label elements

Hazard symbol	None.
Signal word	Not available.
Hazard statement	The mixture does not meet the criteria for classification.
Precautionary statement	
Prevention	Observe good industrial hygiene practices.
Response	Wash hands after handling.
Storage	Store away from incompatible materials.
Disposal	Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

#### 3. Composition/information on ingredients

##### Mixtures

This material is not considered to be hazardous according to regulatory guidelines (see Section 15 of the SDS).

**Composition comments** Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.



## 4. First-aid measures

Inhalation	If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.
Skin contact	Rinse skin with water/shower.
Eye contact	Rinse with water.
Ingestion	Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately.
Most important symptoms/effects, acute and delayed	Direct contact with eyes may cause temporary irritation.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

## 5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO <sub>2</sub> ).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Not available.
Fire-fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

## 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	<p>Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.</p> <p>Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.</p> <p>Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.</p>

## 7. Handling and storage

Precautions for safe handling	Normal chemical handling.
Conditions for safe storage, including any incompatibilities	Shelf life 270 days. Avoid freezing. If frozen, thaw completely and mix thoroughly prior to use. Keep containers tightly closed in a dry, cool and well-ventilated place. Store in accordance with local/regional/national/international regulation.

## 8. Exposure controls/personal protection

Occupational exposure limits	No exposure limits noted for ingredient(s).
Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.
Individual protection measures, such as personal protective equipment	
Eye/face protection	Splash proof chemical goggles.
Skin protection	
Hand protection	Chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.

<b>Other</b>	Wear suitable protective clothing.
<b>Respiratory protection</b>	If ventilation is insufficient, suitable respiratory protection must be provided. Respiratory protection not required. No personal respiratory protective equipment normally required. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
<b>Thermal hazards</b>	Wear appropriate thermal protective clothing, when necessary.
<b>General hygiene considerations</b>	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

<b>Appearance</b>	
Color	White
Physical state	Emulsion
<b>Odor</b>	Slight
<b>Odor threshold</b>	Not available.
<b>pH (concentrated product)</b>	7.5
<b>pH in aqueous solution</b>	8 (5% SOL.)
<b>Melting point/freezing point</b>	27 °F (-3 °C)
<b>Initial boiling point and boiling range</b>	Not available.
<b>Flash point</b>	Not applicable.
<b>Evaporation rate</b>	< 1 (Ether = 1)
<b>Flammability (solid, gas)</b>	Not available.
<b>Upper/lower flammability or explosive limits</b>	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
<b>Vapor pressure</b>	18 mm Hg
<b>Vapor pressure temp.</b>	70 °F (21 °C)
<b>Vapor density</b>	< 1 (Air = 1)
<b>Relative density</b>	1
<b>Relative density temperature</b>	70 °F (21 °C)
<b>Solubility(ies)</b>	
Solubility (water)	0 %
<b>Partition coefficient (n-octanol/water)</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Viscosity</b>	1588 cps
<b>Viscosity temperature</b>	70 °F (21 °C)
<b>Other information</b>	
Percent volatile	0 (ASTM 3960-93)
Pour point	32 °F (0 °C)
Specific gravity	1

## 10. Stability and reactivity

<b>Reactivity</b>	The product is stable and non-reactive under normal conditions of use, storage and transport.
<b>Chemical stability</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions</b>	Hazardous polymerization does not occur.
<b>Conditions to avoid</b>	Contact with incompatible materials. None under normal conditions.

Material name: FOAMTROL\* AF2290

Version number: 1.0

<b>Incompatible materials</b>	Avoid contact with strong oxidizers. Contact with water reactive compounds may cause fire or explosion.
<b>Hazardous decomposition products</b>	Oxides of silicon evolved in fire.

## 11. Toxicological information

### Information on likely routes of exposure

<b>Ingestion</b>	May cause slight gastrointestinal irritation.
<b>Inhalation</b>	Prolonged or repeated exposure may cause transient irritation.
<b>Skin contact</b>	Prolonged or repeated contact may cause irritation.
<b>Eye contact</b>	Direct contact with eyes may cause temporary irritation.

**Symptoms related to the physical, chemical and toxicological characteristics** Prolonged and repetitive exposure, depending on the route(s), may develop transient irritation on skin, eyes, ingestion tract, and/or respiratory tract.

### Information on toxicological effects

#### Acute toxicity

Product	Species	Test Results
FOAMTROL AF2290 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg, (Calculated according to GHS additivity formula)

\* Estimates for product may be based on additional component data not shown.

<b>Skin corrosion/irritation</b>	Prolonged skin contact may cause temporary irritation.
<b>Serious eye damage/eye irritation</b>	Prolonged or repeated contact may cause transient irritation.
<b>Respiratory or skin sensitization</b>	
<b>Respiratory sensitization</b>	Not available.
<b>Skin sensitization</b>	This product is not expected to cause skin sensitization.
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Carcinogenicity</b>	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	
Not listed.	
<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.
<b>Specific target organ toxicity - single exposure</b>	Not available.
<b>Specific target organ toxicity - repeated exposure</b>	Not available.
<b>Aspiration hazard</b>	Not classified.
<b>Further information</b>	This product has no known adverse effect on human health.

## 12. Ecological information

**Ecotoxicity** The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Product	Species		Test Results
FOAMTROL AF2290 (CAS Mixture)			
	0% Mortality	Fathead Minnow	5000 mg/L, Static Bioassay with 48-Hour Renewal, 96 hour
Crustacea	0% Mortality	Daphnia magna	1000 mg/L, Static Screen, 48 hour

Product		Species	Test Results
	10% Mortality	Daphnia magna	5000 mg/L, Static Screen, 48 hour
Other	0% Mortality	Rainbow Trout	1000 mg/L, Static Screen, 48 hour
	100% Mortality	Rainbow Trout	5000 mg/L, Static Screen, 48 hour

\* Estimates for product may be based on additional component data not shown.

<b>Bioaccumulative potential</b>	No data available.
<b>Mobility in soil</b>	No data available.
<b>Other adverse effects</b>	Si : 0,924 mg/g
<b>Environmental fate</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
<b>Persistence and degradability</b>	Testing has shown product not to be readily biodegradable.
- COD (mgO2/g)	219
- BOD 5 (mgO2/g)	0
- BOD 28 (mgO2/g)	0
- Closed Bottle Test (% Degradation in 28 days)	0
- Zahn-Wellens Test (% Degradation in 28 days)	0
- TOC (mg C/g)	41

### 13. Disposal considerations

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
<b>Contaminated packaging</b>	Not available.

### 14. Transport information

<b>DOT</b>	Not regulated as dangerous goods. Some containers may be DOT exempt, please check BOL for exact container classification.
<b>IATA</b>	Not regulated as dangerous goods.
<b>IMDG</b>	Not regulated as dangerous goods.

### 15. Regulatory information

<b>US federal regulations</b>	This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.
<b>TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)</b>	Not regulated.
<b>CERCLA Hazardous Substance List (40 CFR 302.4)</b>	Not listed.
<b>SARA 304 Emergency release notification</b>	Not regulated.
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	Not listed.



**Superfund Amendments and Reauthorization Act of 1986 (SARA)**

**Hazard categories** Immediate Hazard - No  
Delayed Hazard - No  
Fire Hazard - No  
Pressure Hazard - No  
Reactivity Hazard - No

**SARA 302 Extremely hazardous substance**

Not listed.

**SARA 311/312 Hazardous chemical** No

**SARA 313 (TRI reporting)**

Not regulated.

**Other federal regulations****Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Not regulated.

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)**

Not regulated.

**Safe Drinking Water Act (SDWA)** Not regulated.

**Inventory status**

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

**Food and drug administration** 21 CFR 176.210 & 176.200 (antifoams approved for use in wet end applications and in coating formulations) and 21 CFR 175.105 (adhesives)

**NSF Registered and/or meets USDA (according to 1998 guidelines):** Registration No. – 147598  
Category Code(s):  
G5 Cooling and retort water treatment products  
G7 Boiler, steam line treatment products – nonfood contact

**US state regulations** California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - Massachusetts RTK - Substance List**

Not regulated.

**US - Pennsylvania RTK - Hazardous Substances**

Not regulated.

**US - Rhode Island RTK**

Not regulated.

**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

**US. New Jersey Worker and Community Right-to-Know Act**

Not regulated.

**US. California Proposition 65**

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Female reproductive toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Male reproductive toxin**

No ingredient listed.

## 16. Other information, including date of preparation or last revision

**Issue date** Oct-29-2014

**Revision date** Oct-29-2014

**Version #** 1.0

**List of abbreviations** CAS: Chemical Abstract Service Registration Number  
TWA: Time Weighted Average  
STEL: Short Term Exposure Limit  
LD50: Lethal Dose, 50%  
LC50: Lethal Concentration, 50%  
NOEL: No Observed Effect Level  
COD: Chemical Oxygen Demand  
BOD: Biochemical Oxygen Demand  
TOC: Total Organic Carbon  
TLV: Threshold Limit Value  
IATA: International Air Transport Association  
IMDG: International Maritime Dangerous Goods Code  
NFPA: National Fire Protection Association  
ACGIH: American Conference of Governmental Industrial Hygienists  
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.

**References:** No data available

**Disclaimer** The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**Revision Information** Product and Company Identification: Product and Company Identification  
Composition / Information on Ingredients: Disclosure Overrides  
Physical & Chemical Properties: Multiple Properties  
Toxicological Information: Toxicological Data  
Transport Information: Material Transportation Information  
Regulatory Information: Hazard Symbol - Labeling  
HazReg Data: Europe - EU  
GHS: Classification

**Prepared by** This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.



## SAFETY DATA SHEET

### FUELSOLV\* FMG2960

#### 1. Identification

Product identifier	FUELSOLV FMG2960
Other means of identification	None.
Recommended use	Fouling, corrosion prevention and better carbon burn out in coal firing boilers
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Flammable liquids	Category 4
Health hazards	Acute toxicity, inhalation	Category 4
	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2A
	Carcinogenicity	Category 2
	Specific target organ toxicity, single exposure (inhalation)	Category 1 (lung)
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
	Specific target organ toxicity, repeated exposure (dermal)	Category 2 (bone marrow, kidney, liver, lung)
	Aspiration hazard	Category 1
OSHA defined hazards	Not classified.	

#### Label elements



#### Signal word

Danger

#### Hazard statement

Combustible liquid. May be fatal if swallowed and enters airways. Causes skin irritation. Causes serious eye irritation. Harmful if inhaled. May cause respiratory irritation. Suspected of causing cancer. Causes damage to organs (lung) by inhalation. May cause damage to organs (bone marrow, kidney, liver, lung) through prolonged or repeated exposure by skin contact.

#### Precautionary statement

##### Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from flames and hot surfaces-No smoking. Do not breathe mist or vapor. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection.

<b>Response</b>	If swallowed: Immediately call a poison center/doctor/. If on skin: Wash with plenty of water/. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If exposed: Call a poison center/doctor/. If exposed or concerned: Get medical advice/attention. Specific treatment (see this label). Do NOT induce vomiting. If skin irritation occurs: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. Take off contaminated clothing and wash before reuse. In case of fire: Use to extinguish.
<b>Storage</b>	Store in a well-ventilated place. Keep container tightly closed. Store in a well-ventilated place. Keep cool. Store locked up.
<b>Disposal</b>	Dispose of contents/container in accordance with local/regional/national/international regulations. Dispose of contents/container to approved local facility..

**Hazard(s) not otherwise classified (HNOC)** None known.

**Supplemental information** None.

### 3. Composition/information on ingredients

#### Mixtures

Components	CAS #	Percent
Magnesium oxide	1309-48-4	40 - 60
Copper oxychloride	1332-65-6	20 - 40
Gas oil	68334-30-5	20 - 40
Calcium oxide	1305-78-8	1 - 2.5
Silicon dioxide	7631-86-9	1 - 2.5

### 4. First-aid measures

<b>Inhalation</b>	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Call a POISON CENTER or doctor/physician if you feel unwell.
<b>Skin contact</b>	Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.
<b>Eye contact</b>	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.
<b>Ingestion</b>	Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Aspiration may cause pulmonary edema and pneumonitis.
<b>Most important symptoms/effects, acute and delayed</b>	Coughing. Discomfort in the chest. Edema. Irritation of eyes and mucous membranes. Irritation of nose and throat. Jaundice. Shortness of breath. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause respiratory irritation. May cause redness and pain. Prolonged exposure may cause chronic effects.
<b>Indication of immediate medical attention and special treatment needed</b>	Provide general supportive measures and treat symptomatically. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
<b>General information</b>	IF exposed or concerned: Get medical advice/attention. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

### 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards arising from the chemical</b>	The product is combustible, and heating may generate vapors which may form explosive vapor/air mixtures. During fire, gases hazardous to health may be formed.
<b>Special protective equipment and precautions for firefighters</b>	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.
<b>Fire fighting equipment/instructions</b>	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.
<b>General fire hazards</b>	Combustible liquid.



## 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

### Methods and materials for containment and cleaning up

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

### Environmental precautions

Avoid discharge into drains, water courses or onto the ground. Water contaminated with this product may be sent to a sanitary sewer treatment facility, or a permitted waste treatment facility, in accordance with any local agreements.

## 7. Handling and storage

### Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from open flames, hot surfaces and sources of ignition. When using do not smoke. Do not breathe mist or vapor. Avoid contact with skin. Avoid contact with eyes. Avoid prolonged exposure. Avoid contact with clothing. Use only outdoors or in a well-ventilated area. Should be handled in closed systems, if possible. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Wash hands thoroughly after handling.

### Conditions for safe storage, including any incompatibilities

Store locked up. Keep away from heat, sparks and open flame. Store in original tightly closed container. Store in a cool, dry place out of direct sunlight. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS). Keep in an area equipped with sprinklers. Store in accordance with local/regional/national/international regulation.

## 8. Exposure controls/personal protection

### Occupational exposure limits

#### US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Calcium oxide (CAS 1305-78-8)	PEL	5 mg/m <sup>3</sup>	
Magnesium oxide (CAS 1309-48-4)	PEL	15 mg/m <sup>3</sup>	Total particulate.

#### US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value
Silicon dioxide (CAS 7631-86-9)	TWA	0.8 mg/m <sup>3</sup>
		20 mppcf

#### US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Calcium oxide (CAS 1305-78-8)	TWA	2 mg/m <sup>3</sup>	
Copper oxychloride (CAS 1332-65-6)	TWA	1 mg/m <sup>3</sup>	Dust and mist.
		0.2 mg/m <sup>3</sup>	Fume.
Gas oil (CAS 68334-30-5)	TWA	100 mg/m <sup>3</sup>	Inhalable fraction and vapor.
Magnesium oxide (CAS 1309-48-4)	TWA	10 mg/m <sup>3</sup>	Inhalable fraction.

#### US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Calcium oxide (CAS 1305-78-8)	TWA	2 mg/m <sup>3</sup>	

# US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Copper oxychloride (CAS 1332-65-6)	TWA	1 mg/m3	Dust and mist.
Silicon dioxide (CAS 7631-86-9)	TWA	6 mg/m3	

**Biological limit values** No biological exposure limits noted for the ingredient(s).

## Exposure guidelines

### US. ACGIH Threshold Limit Values

Gas oil (CAS 68334-30-5)

Can be absorbed through the skin.

**Appropriate engineering controls** Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

## Individual protection measures, such as personal protective equipment

**Eye/face protection** Splash proof chemical goggles.

### Skin protection

**Hand protection** Chemical resistant gloves.

**Other** Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

**Respiratory protection** Chemical respirator with organic vapor cartridge and full facepiece.

**Thermal hazards** Wear appropriate thermal protective clothing, when necessary.

**General hygiene considerations** When using, do not eat, drink or smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

### Appearance

**Color** Green

**Physical state** Dispersion

**Odor** Slight hydrocarbon

**Odor threshold** Not available.

**pH in aqueous solution** 10.4 (5% EXTRACT)

**Melting point/freezing point** < 15 °F (< -9 °C)

**Initial boiling point and boiling range** 330 °F (166 °C)

**Flash point** 160 °F (71 °C) P-M(CC)

**Evaporation rate** < 1 (Ether = 1)

**Flammability (solid, gas)** Not available.

### Upper/lower flammability or explosive limits

**Flammability limit - lower (%)** Not available.

**Flammability limit - upper (%)** Not available.

**Explosive limit - lower (%)** Not available.

**Explosive limit - upper (%)** Not available.

**Vapor pressure** < 1 mm Hg

**Vapor pressure temp.** 70 °F (21 °C)

**Vapor density** > 1 (Air = 1)

**Relative density** 1.77

**Relative density temperature** 70 °F (21 °C)

### Solubility(ies)

**Solubility (water)** < 0.01 %

<b>Partition coefficient (n-octanol/water)</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Viscosity</b>	3000 cps
<b>Viscosity temperature</b>	70 °F (21 °C)
<b>Other information</b>	
<b>Percent volatile</b>	30 (Calculated)
<b>Pour point</b>	25 °F (-4 °C)
<b>Specific gravity</b>	1.77

## 10. Stability and reactivity

<b>Reactivity</b>	The product is stable and non-reactive under normal conditions of use, storage and transport.
<b>Chemical stability</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions</b>	Hazardous polymerization does not occur.
<b>Conditions to avoid</b>	Avoid heat, sparks, open flames and other ignition sources. Avoid temperatures exceeding the flash point.
<b>Incompatible materials</b>	Avoid contact with strong oxidizers.
<b>Hazardous decomposition products</b>	Oxides of carbon and chloride evolved in fire. Hydrogen chloride gas (HCl).

## 11. Toxicological information

### Information on likely routes of exposure

<b>Inhalation</b>	May be fatal if swallowed and enters airways. Harmful if inhaled. May cause damage to organs by inhalation.
<b>Skin contact</b>	Causes skin irritation.
<b>Eye contact</b>	Causes serious eye irritation.
<b>Ingestion</b>	May be fatal if swallowed and enters airways.

**Symptoms related to the physical, chemical and toxicological characteristics** Coughing. Discomfort in the chest. Edema. Irritation of nose and throat. Jaundice. Shortness of breath. Irritation of eyes and mucous membranes. May cause redness and pain. May cause respiratory irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision.

### Information on toxicological effects

**Acute toxicity** May be fatal if swallowed and enters airways. May cause respiratory irritation.

<b>Product</b>	<b>Species</b>	<b>Test Results</b>
FUELSOLV FMG2960 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg, (Calculated according to GHS additivity formula)
<i>Inhalation</i>		
LC50	Rat	> 5 mg/l, 4 Hour, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	Rat	> 2000 mg/kg, (Calculated according to GHS additivity formula)
<b>Components</b>	<b>Species</b>	<b>Test Results</b>
Calcium oxide (CAS 1305-78-8)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 2500 mg/kg
<i>Oral</i>		
LD50	Rat	> 2000 mg/kg

Components	Species	Test Results
Copper oxychloride (CAS 1332-65-6)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rat	> 2000 mg/kg
<i>Inhalation</i>		
LC50	Rat	2.85 mg/l, 4 Hour
<i>Oral</i>		
LD50	Rat	700 mg/kg
Gas oil (CAS 68334-30-5)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 4300 mg/kg
<i>Inhalation</i>		
LC50	Rat	4.6 mg/l, 4 Hour
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg
Silicon dioxide (CAS 7631-86-9)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg

\* Estimates for product may be based on additional component data not shown.

<b>Skin corrosion/irritation</b>	Prolonged skin contact may cause temporary irritation.
<b>Serious eye damage/eye irritation</b>	Direct contact with eyes may cause temporary irritation.
<b>Respiratory or skin sensitization</b>	
<b>Respiratory sensitization</b>	Not available.
<b>Skin sensitization</b>	This product is not expected to cause skin sensitization.
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Carcinogenicity</b>	Risk of cancer cannot be excluded with prolonged exposure.
<b>IARC Monographs. Overall Evaluation of Carcinogenicity</b>	
Silicon dioxide (CAS 7631-86-9)	3 Not classifiable as to carcinogenicity to humans.
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	
Not listed.	
<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.
<b>Specific target organ toxicity - single exposure</b>	Causes damage to organs (lung) by inhalation.
<b>Specific target organ toxicity - repeated exposure</b>	May cause damage to organs (bone marrow, kidney, liver, lung) through prolonged or repeated exposure by skin contact.
<b>Aspiration hazard</b>	Based on available data, the classification criteria are not met.
<b>Chronic effects</b>	Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects. May cause damage to organs through prolonged or repeated exposure.

## 12. Ecological information

<b>Ecotoxicity</b>	No data available		
Product	Species	Test Results	
FUELSOLV FMG2960 (CAS Mixture)			
LC50	Fathead Minnow	> 10000 mg/L, Static Acute Bioassay, 96 hour	



Product	Species		Test Results
Aquatic	Crustacea	LC50	Daphnia magna
		NOEL	Daphnia magna
Fish	LC50	Rainbow Trout	
			6155 mg/L, Static Acute Bioassay, 48 hour
			2500 mg/L, Static Acute Bioassay, 48 hour
			> 10000 mg/L, Static Acute Bioassay, 96 hour

\* Estimates for product may be based on additional component data not shown.

<b>Bioaccumulative potential</b>	No data available.
<b>Mobility in soil</b>	No data available.
<b>Other adverse effects</b>	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.
<b>Environmental fate</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
<b>Persistence and degradability</b>	No data available

### 13. Disposal considerations

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
<b>Contaminated packaging</b>	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

### 14. Transport information

<b>DOT</b>	
UN number	NA1993
UN proper shipping name	COMBUSTIBLE LIQUID N.O.S. (CONTAINS DIESEL FUEL)
Transport hazard class(es)	
Class	Not available.
Subsidiary risk	-
Packing group	III
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
ERG number	128
<b>IATA</b>	
UN number	UN3082
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (COPPER OXYCHLORIDE MIXTURE)
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Packing group	III
Environmental hazards	No.
ERG Code	171
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
<b>IMDG</b>	
UN number	UN3082
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (COPPER OXYCHLORIDE MIXTURE), MARINE POLLUTANT
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Packing group	III

**Environmental hazards**

**Marine pollutant**

Yes

**EmS**

Not available.

**Special precautions for user**

Read safety instructions, SDS and emergency procedures before handling.

IATA; IMDG



**Marine pollutant**



**General information**

IMDG Regulated Marine Pollutant.

## 15. Regulatory information

### US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

All components are on the U.S. EPA TSCA Inventory List.

#### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

#### CERCLA Hazardous Substance List (40 CFR 302.4)

Copper oxychloride (CAS 1332-65-6)

Listed.

#### SARA 304 Emergency release notification

Not regulated.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

### Superfund Amendments and Reauthorization Act of 1986 (SARA)

#### Hazard categories

Immediate Hazard - Yes

Delayed Hazard - Yes

Fire Hazard - Yes

Pressure Hazard - No

Reactivity Hazard - No

#### SARA 302 Extremely hazardous substance

Not listed.

#### SARA 311/312 Hazardous chemical

No

#### SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Copper oxychloride	1332-65-6	20 - 40

### Other federal regulations

#### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)**

Not regulated.

**Safe Drinking Water Act (SDWA)**

Not regulated.

**Inventory status**

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

**US state regulations**

WARNING: This product contains a chemical known to the State of California to cause cancer.

**US - Massachusetts RTK - Substance List**

Calcium oxide (CAS 1305-78-8)  
Magnesium oxide (CAS 1309-48-4)  
Silicon dioxide (CAS 7631-86-9)

**US - Pennsylvania RTK - Hazardous Substances**

Calcium oxide (CAS 1305-78-8)  
Gas oil (CAS 68334-30-5)  
Magnesium oxide (CAS 1309-48-4)  
Silicon dioxide (CAS 7631-86-9)

**US - Rhode Island RTK**

Copper oxychloride (CAS 1332-65-6)

**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

**US. New Jersey Worker and Community Right-to-Know Act**

Calcium oxide (CAS 1305-78-8)  
Copper oxychloride (CAS 1332-65-6)  
Magnesium oxide (CAS 1309-48-4)  
Silicon dioxide (CAS 7631-86-9)

**US. Pennsylvania Worker and Community Right-to-Know Law**

Calcium oxide (CAS 1305-78-8)  
Gas oil (CAS 68334-30-5)  
Magnesium oxide (CAS 1309-48-4)  
Silicon dioxide (CAS 7631-86-9)

**US. California Proposition 65**

WARNING: This product contains a chemical known to the State of California to cause cancer.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

Sulphur trioxide (CAS 7446-11-9) Listed: March 14, 2003

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Female reproductive toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Male reproductive toxin**

No ingredient listed.

**16. Other information, including date of preparation or last revision****Issue date** Dec-05-2014**Revision date** Jun-02-2015**Version #** 2.0**References:** No data available

**Disclaimer** The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**Revision Information**

Composition/information on ingredients: Composition comments  
Composition/information on ingredients: Component information  
Physical & Chemical Properties: Multiple Properties  
Disposal considerations: Hazardous waste code  
Other information, including date of preparation or last revision: Prepared by  
Other information, including date of preparation or last revision: Disclaimer

**Prepared by**

This SDS has been prepared by GE Water & Process Technologies Regulatory Department  
(1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.





## SAFETY DATA SHEET

### GENGARD\* GN7004

---

#### 1. Identification

Product identifier	GENGARD GN7004
Other means of identification	None.
Recommended use	Dispersant
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Not classified.
Health hazards	Not classified.
OSHA defined hazards	Not classified.

#### Label elements

Hazard symbol	None.
Signal word	None.
Hazard statement	The mixture does not meet the criteria for classification.
Precautionary statement	
Prevention	Observe good industrial hygiene practices.
Response	Wash hands after handling.
Storage	Store away from incompatible materials.
Disposal	Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

#### 3. Composition/information on ingredients

##### Mixtures

The manufacturer lists no ingredients as hazardous according to OSHA 29 CFR 1910.1200.

Composition comments This product does not contain hazardous ingredients in reportable concentrations.

#### 4. First-aid measures

Inhalation	If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.
Skin contact	Rinse skin with water/shower. Get medical attention if irritation develops and persists.

<b>Eye contact</b>	Rinse with water. Get medical attention if irritation develops and persists.
<b>Ingestion</b>	Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately.
<b>Most important symptoms/effects, acute and delayed</b>	Direct contact with eyes may cause temporary irritation.
<b>Indication of immediate medical attention and special treatment needed</b>	Treat symptomatically.
<b>General information</b>	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

## 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO <sub>2</sub> ).
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards arising from the chemical</b>	During fire, gases hazardous to health may be formed.
<b>Special protective equipment and precautions for firefighters</b>	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
<b>Fire fighting equipment/instructions</b>	Use standard firefighting procedures and consider the hazards of other involved materials.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.
<b>General fire hazards</b>	No unusual fire or explosion hazards noted.

## 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	Keep unnecessary personnel away. For personal protection, see section 8 of the SDS.
<b>Methods and materials for containment and cleaning up</b>	<p>Large Spills: Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.</p> <p>Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.</p> <p>Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.</p>
<b>Environmental precautions</b>	Avoid discharge into drains, water courses or onto the ground.

## 7. Handling and storage

<b>Precautions for safe handling</b>	Handle in accordance with good industrial hygiene and safety procedures. Avoid prolonged exposure.
<b>Conditions for safe storage, including any incompatibilities</b>	Shelf life 360 days. Keep container tightly closed. Store in cool, well ventilated area. Store away from oxidizers. Protect from freezing. If frozen, thaw completely and mix thoroughly prior to use. Store in original tightly closed container.

## 8. Exposure controls/personal protection

<b>Occupational exposure limits</b>	No exposure limits noted for ingredient(s).
<b>Biological limit values</b>	No biological exposure limits noted for the ingredient(s).
<b>Appropriate engineering controls</b>	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.
<b>Individual protection measures, such as personal protective equipment</b>	
<b>Eye/face protection</b>	Splash proof chemical goggles.
<b>Skin protection</b>	
<b>Hand protection</b>	Wear appropriate chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.
<b>Other</b>	Wear suitable protective clothing.

<b>Respiratory protection</b>	In case of insufficient ventilation, wear suitable respiratory equipment. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
<b>Thermal hazards</b>	Wear appropriate thermal protective clothing, when necessary.
<b>General hygiene considerations</b>	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

### Appearance

Color	Amber
Physical state	Liquid
Odor	Mild
Odor threshold	Not available.
pH (concentrated product)	5
pH in aqueous solution	5.9 (5% SOL.)
Melting point/freezing point	25 °F (-4 °C)
Initial boiling point and boiling range	220 °F (104 °C)
Flash point	Not applicable.
Evaporation rate	< 1 (Ether = 1)
Flammability (solid, gas)	Not applicable.

### Upper/lower flammability or explosive limits

Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.

Vapor pressure	18 mm Hg
Vapor pressure temp.	70 °F (21 °C)
Vapor density	< 1 (Air = 1)
Relative density	1.13
Relative density temperature	70 °F (21 °C)
Solubility(ies)	
Solubility (water)	100 %
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	44 cps
Viscosity temperature	70 °F (21 °C)
Other information	
Percent volatile	0 (Calculated)
Pour point	30 °F (-1 °C)
Specific gravity	1.13

## 10. Stability and reactivity

<b>Reactivity</b>	The product is stable and non-reactive under normal conditions of use, storage and transport.
<b>Chemical stability</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions</b>	Contact with water reactive compounds may cause fire or explosion. Hazardous polymerization does not occur.
<b>Conditions to avoid</b>	Avoid contact with strong oxidizers. Protect from freezing. Contact with incompatible materials.
<b>Incompatible materials</b>	Strong oxidizing agents.

**Hazardous decomposition products**

Oxides of carbon evolved in fire.

## 11. Toxicological information

### Information on likely routes of exposure

Inhalation	May cause irritation to respiratory organs.
Skin contact	Prolonged or repeated contact may cause transient irritation.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	May cause gastrointestinal irritation.

**Symptoms related to the physical, chemical and toxicological characteristics** Direct contact with eyes may cause temporary irritation.

### Information on toxicological effects

#### Acute toxicity

Product	Species	Test Results
GENGARD GN7004 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg, (Calculated according to GHS additivity formula)

\* Estimates for product may be based on additional component data not shown.

**Skin corrosion/irritation** Prolonged skin contact may cause temporary irritation.

**Serious eye damage/eye irritation** Direct contact with eyes may cause temporary irritation.

#### Respiratory or skin sensitization

**Respiratory sensitization** Not a respiratory sensitizer.

**Skin sensitization** This product is not expected to cause skin sensitization.

**Germ cell mutagenicity** No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

**Carcinogenicity** This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

#### IARC Monographs. Overall Evaluation of Carcinogenicity

Not available.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

#### US. National Toxicology Program (NTP) Report on Carcinogens

Not available.

**Reproductive toxicity** This product is not expected to cause reproductive or developmental effects.

**Specific target organ toxicity - single exposure** Not classified.

**Specific target organ toxicity - repeated exposure** Not classified.

**Aspiration hazard** Based on available data, the classification criteria are not met. May be harmful if swallowed and enters airways.

**Chronic effects** Prolonged inhalation may be harmful.

## 12. Ecological information

**Ecotoxicity** The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.



Product		Species	Test Results
GENGARD GN7004 (CAS Mixture)			
	LC50	Ceriodaphnia	1707.6 mg/L, Static Acute Bioassay, 48 hour
		Fathead Minnow	2367 mg/L, Static Acute Bioassay, 96 hour
	LOEL	Ceriodaphnia	1000 mg/L, Chronic Bioassay, 7 day
		Fathead Minnow	2000 mg/L, Chronic Bioassay, 7 day
	NOEL	Ceriodaphnia	1250 mg/L, Static Acute Bioassay, 48 hour
			500 mg/L, Chronic Bioassay, 7 day
		Fathead Minnow	1250 mg/L, Static Acute Bioassay, 96 hour
			1000 mg/L, Chronic Bioassay, 7 day
<b>Aquatic</b>			
Crustacea	LC50	Daphnia magna	3677 mg/L, Static Acute Bioassay, 48 hour
	NOEL	Daphnia magna	2500 mg/L, Static Acute Bioassay, 48 hour
Fish	LC50	Rainbow Trout	1894 mg/L, Static Acute Bioassay, 96 hour
	NOEL	Rainbow Trout	1250 mg/L, Static Acute Bioassay, 96 hour

\* Estimates for product may be based on additional component data not shown.

#### Bioaccumulative potential

**Mobility in soil** No data available.

**Other adverse effects** Nutrients: P : 1.449 mg/g, N : 2.62 mg/g

**Environmental fate** The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

#### Persistence and degradability

No data is available on the degradability of this product.

- COD (mgO<sub>2</sub>/g) 385 (calculated data)

- BOD 5 (mgO<sub>2</sub>/g) 0 (calculated data)

- BOD 28 (mgO<sub>2</sub>/g) 24 (calculated data)

- Closed Bottle Test (%) 6 (calculated data)

**Degradation in 28 days)**

- TOC (mg C/g) 109 (calculated data)

### 13. Disposal considerations

**Disposal instructions** Collect and reclaim or dispose in sealed containers at licensed waste disposal site.

**Local disposal regulations** Dispose in accordance with all applicable regulations.

**Hazardous waste code** The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

**Waste from residues / unused products** Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

**Contaminated packaging** Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

### 14. Transport information

#### DOT

Not regulated as dangerous goods.

Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

#### IATA

Not regulated as dangerous goods.

#### IMDG

Not regulated as dangerous goods.

## 15. Regulatory information

### US federal regulations

All components are on the U.S. EPA TSCA Inventory List.  
This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

#### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

#### CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

#### SARA 304 Emergency release notification

Not regulated.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

### Superfund Amendments and Reauthorization Act of 1986 (SARA)

#### Hazard categories

Immediate Hazard - No  
Delayed Hazard - No  
Fire Hazard - No  
Pressure Hazard - No  
Reactivity Hazard - No

#### SARA 302 Extremely hazardous substance

Not listed.

#### SARA 311/312 Hazardous chemical

No

#### SARA 313 (TRI reporting)

Not regulated.

### Other federal regulations

#### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

#### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

#### Safe Drinking Water Act (SDWA)

Not regulated.

### Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

### NSF Registered and/or meets USDA (according to 1998 guidelines):

Registration No. - 141931  
Category Code(s):  
G5 Cooling and retort water treatment products  
G7 Boiler, steam line treatment products - nonfood contact

### US state regulations

#### US - Massachusetts RTK - Substance List

Not regulated.

#### US - Pennsylvania RTK - Hazardous Substances

Not regulated.

#### US - Rhode Island RTK

Not regulated.

#### US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

#### US. New Jersey Worker and Community Right-to-Know Act

Not listed.

#### US. Pennsylvania Worker and Community Right-to-Know Law

Not listed.

## US. California Proposition 65

### US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

No ingredient listed.

### US - California Proposition 65 - CRT: Listed date/Developmental toxin

No ingredient listed.

### US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

No ingredient listed.

### US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

No ingredient listed.

## 16. Other information, including date of preparation or last revision

**Issue date** Jan-07-2015

**Revision date** Jan-14-2016

**Version #** 4.0

**List of abbreviations** CAS: Chemical Abstract Service Registration Number  
TWA: Time Weighted Average  
STEL: Short Term Exposure Limit  
LD50: Lethal Dose, 50%  
LC50: Lethal Concentration, 50%  
NOEL: No Observed Effect Level  
COD: Chemical Oxygen Demand  
BOD: Biochemical Oxygen Demand  
TOC: Total Organic Carbon  
IATA: International Air Transport Association  
IMDG: International Maritime Dangerous Goods Code  
ACGIH: American Conference of Governmental Industrial Hygienists  
NFPA: National Fire Protection Association  
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.

**References:** No data available

**Disclaimer** The information in the sheet was written based on the best knowledge and experience currently available.

**Revision information** Hazard(s) identification: Prevention  
Hazard(s) identification: Supplemental information  
Composition / Information on Ingredients: Disclosure Overrides  
Composition/information on ingredients: Composition comments  
Handling and storage: Precautions for safe handling  
Exposure controls/personal protection: Eye/face protection  
Physical & Chemical Properties: Multiple Properties  
Physical and chemical properties: Explosive properties  
Physical and chemical properties: Oxidizing properties  
Toxicological information: Further information  
Other information, including date of preparation or last revision: Prepared by  
GHS: Classification

**Prepared by** This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.

# MATERIAL SAFETY DATA SHEET

## Section 1 - Chemical Product and Company Identification

**MSDS Name:** Glycerin

**Catalog Numbers:** BP229-1, BP229-4, BPG33-1LC, G153-1, G153-4, G30-20, G30-200, G30-4, G31-1, G31-20, G31-200, G31-20LC, G31-4, G31-500, G34-20, G34-200, G34-4, G36-20, G37-20, G37-200, G37-4, NC9117583, NC9484773, NC9573811, NC9707289

**Synonyms:** Glycerol; 1,2,3-Propanetriol; Glycyl alcohol; 1,2,3-Trihydroxypropane; Glycerine.

**Company Identification:**

Fisher Scientific  
One Reagent Lane  
Fair Lawn, NJ 07410

**For information in the US, call:**

201-796-7100

**Emergency Number US:**

201-796-7100

**CHEMTREC Phone Number, US:**

800-424-9300

## Section 2 - Composition, Information on Ingredients

CAS#: 56-81-5  
Chemical Name: Glycerin  
%: 100  
EINECS#: 200-289-5

**Hazard Symbols:** None listed

**Risk Phrases:** None listed

## Section 3 - Hazards Identification

### EMERGENCY OVERVIEW

Caution! This is expected to be a low hazard for usual industrial handling. May cause eye, skin, and respiratory tract irritation. Target Organs: No data found.

#### Potential Health Effects

**Eye:** May cause eye irritation.

**Skin:** May cause skin irritation. Low hazard for usual industrial handling.

**Ingestion:** Ingestion of large amounts may cause gastrointestinal irritation. Low hazard for usual industrial handling. May cause headache.

**Inhalation:** Low hazard for usual industrial handling. Inhalation of a mist of this material may cause respiratory tract irritation.

**Chronic:** No information found.

## Section 4 - First Aid Measures

**Eyes:** Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation develops, get medical aid.

**Skin:** Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.

**Ingestion:** Never give anything by mouth to an unconscious person. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water. Get medical aid if irritation or symptoms occur.

**Inhalation:** Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.

**Notes to Physician:**

## Section 5 - Fire Fighting Measures

**General Information:** As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Containers may explode when heated.

**Extinguishing Media:** Use water spray to cool fire-exposed containers. Use agent most appropriate to extinguish fire. Use water spray, dry chemical, carbon dioxide, or appropriate foam.

**Autoignition Temperature:** 400 deg C ( 752.00 deg F)

**Flash Point:** 193 deg C ( 379.40 deg F)

**Explosion:** 1.1



**Limits: Lower:**

**Explosion** Not available

**Limits: Upper:**

**NFPA Rating:** health: 1; flammability: 1; instability: 0;

#### Section 6 - Accidental Release Measures

**General Information:** Use proper personal protective equipment as indicated in Section 8.

**Spills/Leaks:** Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Provide ventilation.

#### Section 7 - Handling and Storage

**Handling:** Wash thoroughly after handling. Use with adequate ventilation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation. Wash clothing before reuse.

**Storage:** Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. No special precautions indicated.

#### Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Glycerin	10 mg/m3	none listed	15 mg/m3 TWA (total); 5 mg/m3 TWA (respirable fraction)

OSHA Vacated PELs: Glycerin: 10 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)

#### Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

#### Exposure Limits

#### Personal Protective Equipment

**Eyes:** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin:** Wear appropriate protective gloves to prevent skin exposure.

**Clothing:** Wear appropriate protective clothing to minimize contact with skin.

**Respirators:** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

#### Section 9 - Physical and Chemical Properties

**Physical State:** Liquid

**Color:** Clear

**Odor:** faint odor

**pH:** Not available

**Vapor Pressure:** .0025 mm Hg @ 50 deg C

**Vapor Density:** 3.17 (H2O=1)

**Evaporation Rate:** Not available

**Viscosity:** Not available

**Boiling Point:** 290 deg C ( 554.00°F)

**Freezing/Melting Point:** 20 deg C ( 68.00°F)

**Decomposition Temperature:**

**Solubility in water:** Miscible in water. Insol. in chloroform,

**Specific Gravity/Density:** 1.2610g/cm3 @ 20°C

**Molecular Formula:** C3H8O3

**Molecular Weight:** 92.05

#### Section 10 - Stability and Reactivity

**Chemical Stability:** Stable.

**Conditions to Avoid:** Incompatible materials, ignition sources, excess heat.

**Incompatibilities with:** Oxidizing agents, strong acids, acetic anhydride, isocyanates, aliphatic amines, potassium permanganate,

**Other Materials** caustics (e.g. ammonia, ammonium hydroxide, calcium hydroxide, potassium hydroxide, sodium hydroxide).  
**Hazardous Decomposition** Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.  
**Products**  
**Hazardous Polymerization** Will not occur.

#### Section 11 - Toxicological Information

**RTECS#:** CAS# 56-81-5: MA8050000  
**LD50/LC50:** RTECS:  
**CAS# 56-81-5:** Draize test, rabbit, eye: 126 mg Mild;  
Draize test, rabbit, eye: 500 mg/24H Mild;  
Draize test, rabbit, skin: 500 mg/24H Mild;  
Inhalation, rat: LC50 = >570 mg/m3/1H;  
Oral, mouse: LD50 = 4090 mg/kg;  
Oral, rabbit: LD50 = 27 gm/kg;  
Oral, rat: LD50 = 12600 mg/kg;  
Skin, rabbit: LD50 = >10 gm/kg;  
**Carcinogenicity:** Glycerin - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.  
**Other:** See actual entry in RTECS for complete information.

#### Section 12 - Ecological Information

**Ecotoxicity:** Not available

#### Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

#### Section 14 - Transport Information

US DOT  
Shipping Name: Not Regulated  
Hazard Class:  
UN Number:  
Packing Group:  
Canada TDG  
Shipping Name: Not regulated as a hazardous material  
Hazard Class:  
UN Number:  
Packing Group:

#### Section 15 - Regulatory Information

##### European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: Not available

Risk Phrases:

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 56-81-5: 0

Canada

CAS# 56-81-5 is listed on Canada's DSL List

Canadian WHMIS Classifications: Not controlled.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 56-81-5 is not listed on Canada's Ingredient Disclosure List.

##### US Federal

TSCA

CAS# 56-81-5 is listed on the TSCA  
Inventory.

#### Section 16 - Other Information

MSDS Creation Date: 7/20/1999

**Revisions were made in Sections: 9**

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.

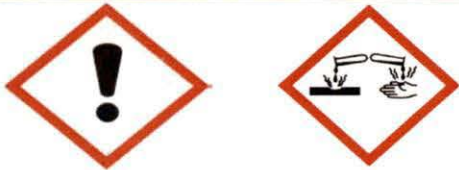
# MISSISSIPPI LIME COMPANY - SAFETY DATA SHEET

## Section 1: Identification

Calcium Hydroxide $\text{Ca(OH)}_2$	
Product Line	MicroCal – HF, HFT20, HM, HS; PetroCal – HF, HM, HS; Standard Hydrated - Lime, CG, FGT, HRH, HRH-64, SP; Liquid Calcium Hydroxide (LCH); MP Liquid Calcium Hydroxide (MPLCH); VitaCal – H, LCH; Architectural Lime Putty; Enhanced
Product Uses	Building material industry, Chemical industry, Agriculture, Biocide applications, Environmental protection (e.g. flue gas treatment, waste water treatment, sludge treatment), Drinking water treatment, Feed, food and pharmaceutical industry, Civil engineering, Paper and paint industry, Glass industry, Leather.
Manufacturer	Mississippi Lime Company 16147 US Highway 61, Ste Genevieve, MO 63670

**24 Hour Emergency Contact Number: (800) 437-5463**

## Section 2: Hazard(s) Identification

Signal Word	<b>WARNING !</b>
	
HAZARD	<b>H 315: Causes skin irritation</b> <b>H 319: Causes serious eye irritation</b> <b>H 335: May cause respiratory irritation</b>
PRECAUTIONARY STATEMENTS	<b>PREVENTION</b> <b>P 102:</b> Keep out of reach of children. <b>P 261:</b> Avoid breathing dust. <b>P 280:</b> Wear protective gloves/ protective clothing/ eye protection/ face protection. <b>P 402:</b> Store (dry product) in dry place <b>P 501:</b> Dispose of contents / container in accordance with... regulations.
	<b>RESPONSE</b> <b>P 302 + P 352:</b> IF ON SKIN: Wash with plenty of soap and water. <b>P 304 + P 340:</b> IF INHALED: Remove victim to fresh air and keep at rest and comfortable. <b>P 305 + P 351:</b> IF IN EYES: Rinse cautiously with water for several minutes. <b>P 305 + P 337 + P 313:</b> IF IN EYES: If eye irritation persists, Get medical advice/attention <b>P 301 + P 330 + P 331:</b> IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
WHMIS	Class "D2A" Chronic Toxicity/Carcinogenicity (if qrtz >0.1%) and Class "E" (Corrosive) Skin
Other Hazards	In contrast to the dry powder, calcium hydroxide, when diluted with water, can produce severe skin damage in humans (alkaline burns), especially with prolonged skin contact.

## Section 3: Composition/Information on Ingredients

Ingredient	CAS ID	EC ID	Concentration
Calcium Hydroxide $\text{Ca(OH)}_2$	01305-62-0	215-137-3	96.0 to 97.2 %
Calcium Carbonate	0471-34-1	207-439-9	0.65 to 1.75 %
Magnesium Oxide	01309-48-4	215-171-9	0.40 to 0.55 %
Calcium Sulfate	07778-18-9	231-900-3	0.05 to 0.10 %
Crystalline Silica $\text{SiO}_2$	14808-60-7	238-878-4	< 0.10 to 0.50 %



# MISSISSIPPI LIME COMPANY - SAFETY DATA SHEET

## Section 4: First-Aid Measures

<b>Eye Contact</b>	Irritation - Irrigate eyes with water immediately for at least 15 minutes. Consult a doctor.
<b>Skin Contact</b>	Irritation - Wash affected area with water. Change out of contaminated clothing when practical.
<b>Ingestion</b>	Wash mouth and drink copious quantities of water. Do not induce vomiting. Consult a doctor.
<b>Inhalation</b>	Irritation - Move victim to fresh air and treat for discomfort. Consult a doctor if difficult breathing.
<b>Medical</b>	No delayed effects. Treat symptomatically.

## Section 5: Fire-Fighting Measures

<b>Flammability</b>	Nonflammable and noncombustible.
<b>Extinguishing Media</b>	Use dry powder, foam or CO2 extinguishers to fight surrounding fire.
<b>Special hazards</b>	None.
<b>Advice for fire-fighters</b>	Wear appropriate personal protective equipment.

## Section 6: Accidental Release Measures

<b>Precautions</b>	Avoid contact with skin and eyes and keep dust levels to a minimum. Ensure adequate ventilation and/or suitable respiratory protective equipment (Section 8).
<b>Environmental</b>	Control and minimize releases to watercourses and storm drains. Notify Environmental agencies of significant spillage into water.
<b>Containment</b>	Contain spillage and keep material dry and covered if possible to minimize dust hazard.
<b>Clean-up</b>	Keep material dry if possible. Use vacuum systems, if available, and/or broom and shovel. Use salvage drums for dry and wet collection.
<b>Disposal</b>	Check Federal State and Local restrictions or recycle and reuse for beneficial applications.

## Section 7: Handling and Storage

<b>Precautions for Safe Handling</b>	Avoid excessive dust in work area and ensure adequate ventilation. Use dust mask when appropriate. Avoid contact with skin and eyes. Use appropriate eye protection. Avoid extended contact with skin and clothing. Avoid ingestion and contact with food.
<b>Precautions for Safe Storage</b>	Keep product dry and bags and containers stored in dry and well-ventilated location place. Store bulk in dry properly designed bins and silos. Keep out of reach of children. Calcium hydroxide will react with air, strong acids and moisture.

## Section 8: Exposure Control / Personal Protection

Ingredient	CAS	Concentration	Exposure Limit (mg/m3)			
<b>Calcium Hydroxide Ca(OH)2</b>	1305-62-0	Solids 95-100% (Dry Basis)	OSHA PEL (TWA) 8/40h	ACGIH TLV (TWA) 8/40h	MSHA/PEL (TWA) 8/40h	NIOSH REL (TWA) 10/40H
			15 T / 5 R	5	5	10 T / 5 R
<b>Crystalline Silica SiO2</b>	14808-60-7	< 0.1% or 0.1 - 0.5%	T= 30(%SiO2)+2 R=10/(%SiO2)+2	R= 0.025	T= 30 (%SiO2)+2 R=10 / (%SiO2)+2	R=0.05

Calcium Hydroxide is not listed as a carcinogen by ACGIH, MSHA, OSHA, NTP, DFG, RSST or IARC. However, Crystalline Silica may be present below or above detection levels <0.1%. Occupational exposure is dependent upon the handling method and specific application. Two ranges are disclosed for (T) Total Dust and (R) Respirable Dust

<b>Derived No Effect Lvl (DNEL):</b>	<b>Predict No Effect Con (PNEC):</b>	<b>Biological Limit</b>
No information available	No information available	Not established by ACGIH or manufacturer



# MISSISSIPPI LIME COMPANY - SAFETY DATA SHEET

## Section 8: Exposure Control / Personal Protection (continued)

<b>Engineering Control Measures</b>	<b>Ventilation</b> - Ensure adequate ventilation in workplace - especially in confined areas. Evaluate degree of exposure and apply appropriate PPE as necessary.
	<b>Dust Control</b> - Use exhaust ventilation (dust collector) or other engineering controls at handling points to keep airborne levels below recommended exposure limits and/or wear personal protective equipment.
	<b>Eye Wash</b> - Keep emergency eye wash supplies at the workplace.
<b>Personal Protective Equipment</b>	<b>Eye Protection</b> - ANSI, CSA or ATM approved glasses with side-shields. Tight fitting dust goggles should be worn when excessive (visible) emissions are present. Do not wear contact lenses without tight fitting goggles when handling this product.
	<b>Hand Protection</b> - Wear dry protective gloves and apply barrier cream as required.
	<b>Skin Protection</b> - Cover skin to minimize direct contact.
	<b>Footwear</b> - Boots resistant to alkaline material. Prevent dust penetration into socks and boots.
	<b>Respiratory Protection</b> - Follow OSHA respirator guidelines found in 29 CFR 1910.134 or European Standard EN 149. Use NIOSH/MSHA or European Standard EN 149 approved respirators if exposure threshold limits are exceeded or irritation is experienced.
<b>Hygiene</b>	Handle product in accordance with good industrial hygiene and safety practice. Wear clean, dry personal protective equipment. Barrier cream will reduce dryness and irritation. Heavily exposed workers should shower immediately and apply barrier cream to neck, face and wrists.
<b>Environmental</b>	Ventilation systems should be filtered before discharge to atmosphere.

## Section 9: Physical and Chemical Properties

<u>Physical State</u>	<u>Formula</u>	<u>Color</u>	<u>Stability</u>	<u>Flammability</u>	<u>Explosivity</u>	<u>Flash Pt</u>
Solid / Powder	Ca(OH) <sub>2</sub>	Off white	Reactive	Non-flammable	Not flammable	Non-Combustible
<u>Solu. (H<sub>2</sub>O)</u>	<u>Volatiles</u>	<u>Density</u>	<u>Bulk Density</u>	<u>Sp. Gravity</u>	<u>Vapor Press</u>	<u>Boiling Pt</u>
1650 mg/L 20C	0%	200-500 kg/m <sup>3</sup>	220-690 kg/m <sup>3</sup>	2.2- 2.7 g/cm <sup>3</sup>	NA	NA
<u>Freezing Point</u>	<u>pH @ (25C)</u>	<u>Melting Pt</u>	<u>Self Ignition T</u>	<u>Dust Defrag Kst</u>	<u>Vapor Density</u>	<u>Viscosity</u>
NA	12.45	580 °C	NA	NA	NA	NA
<u>Partition CoeF</u>	<u>Odor</u>	<u>Evaporation</u>	<u>Decomp.</u>	<u>Additives</u>		
NA	Odorless	NA	540 °C 1076 °F	NA		

## Section 10: Stability and Reactivity

<b>Reactivity</b>	Ca(OH) <sub>2</sub> dissociates in aqueous media forming calcium cations and hydroxyl anions
<b>Stability</b>	Under normal conditions of use and storage, calcium hydroxide is stable
<b>Hazardous</b>	Reacts exothermically with acids
<b>Incompatibility</b>	Strong acids, phosphorus, maleic anhydride, nitro methane, nitro ethane, nitroparaffins, nitro propane, boron tri-fluoride, chlorine tri-fluoride, ethanol, fluorine, hydrogen fluoride, phosphorous pentoxide some metals
<b>Decomposition</b>	None - Calcium hydroxide reacts with carbon dioxide to form calcium carbonate



# MISSISSIPPI LIME COMPANY - SAFETY DATA SHEET

## Section 11: Toxicological Information

<b>Acute</b>	Routes of Entry - Skin Contact, Eye Contact, Acute Inhalation, Ingestion
<b>Skin</b>	Irritating and drying to skin -depending on exposure , moisture and duration of contact. Long sleeve clothing and gloves recommended.
<b>Eyes</b>	Hazardous with eye contact (as irritant and high alkalinity). Possible lesions and blindness if left untreated for prolonged period.. Wear appropriate eye protection (goggles) and avoid wearing contact lenses. Standard Draize (Rabbit) - 10 mg/24 hr - Severe
<b>Inhalation</b>	Potentially hazardous. Respiratory irritation /inflammation of mucous membranes, , coughing and sneezing The extent of damage depends on amount inhaled. Wear appropriate dust mask
<b>Ingestion</b>	May cause gastro-intestinal irritation and pain, vomiting, diarrhea, drop in blood pressure. Extent of damage depends on amount ingested. Rat- LD50: 7340 mg/kg
<b>Sensitization</b>	No sensitizing effects known.
<b>Chronic</b>	Contact dermatitis.
<b>Carcinogenicity</b>	No carcinogenicity data is available for this product. Calcium hydroxide is not listed as a carcinogen by ACGIH, MSHA, OSHA, NTP, DFG, RSST or IAARC.

## Section 12: Ecological Information

Toxicity - Aquatic toxicity severe in high concentrations from high alkalinity ( pH -12.454) in concentrations > 1 gram/Liter.
Persistence and degradability - Not relevant for inorganic substances
Ecological information - Not relevant information available.
Other information - The product is not biodegradable.
Bioaccumulative potential - Not relevant for inorganic substances
Mobility in soil - Low solubility and mobility in most ground conditions
Additional information - Product generally nonhazardous at low concentrations. Frequently used in water treatment
PBT and vPvB assessment - Not relevant for inorganic substances
Other adverse effects - No further relevant information available.

## Section 13: Disposal Considerations

Recover uncontaminated product where possible and reutilize or recycle for other beneficial purposes.
Dispose of containers and unused products as a solid waste in accordance with Federal, State and local requirements.
Processing, use or contamination of this product may change the waste profile characteristics and waste management options. Although not a listed RCRA hazardous waste, calcium hydroxide may exhibit high alkalinity and require refined analysis to

## Section 14: Transport/Shipping Information

<b>Calcium hydroxide is not regulated as a hazardous material by the Canadian Transportation of Dangerous Goods (TDG) Regulations or by the US Department of Transportation. (US DOT)</b>	
UN Number - Non dangerous product - <b>Not Listed</b>	UN Proper Shipping Name - <b>Not Classified</b>
DOT Hazard Class - <b>Not Classified</b>	Packing Group Number - <b>Not Classified</b>
International Marine Dangerous Goods (IMDG) - <b>Not Subject</b>	IATA - <b>Not Subject</b>
Regulations governing the carriage of chemicals by ship are contained in the International Convention for the Safety of Life at Sea (SOLAS) and the International Convention for the Prevention of Marine Pollution from Ships, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78). - Not regulated	

# MISSISSIPPI LIME COMPANY - SAFETY DATA SHEET

## Section 15: Regulatory Information

<b>SARA 302/304</b>	Emergency Planning and Release Notification - <b>Not Listed.</b>
<b>SARA 311</b>	Hazard Categories (40 CFR 370) - Regulated under OSHA HazCom - <b>Acute &amp; Chronic.</b>
<b>SARA 312</b>	Emergency Planning and Release Notification - <b>Not Listed.</b>
<b>SARA 313</b>	Toxic Release Inventory (TRI) Chemical List - <b>Not Listed.</b>
<b>CERCLA</b>	Hazardous Substances (Table 302.4) - <b>Not Listed.</b>
<b>TSCA/DSL</b>	Toxic Substance Control Act, Canada DSL and most International Chemical Inventories - <b>Listed.</b>
<b>RCRA</b>	Hazardous Waste Number and Classification - <b>Not Listed or Classified.</b>
<b>WASTE</b>	Not subject to RCRA and generally acceptable at landfills as a "special waste". Product can often be beneficially reused or recycled for other purposes.
<b>CONEG</b>	Council of NE Governors -Materials and inks used to manufacture packaging - <b>Compliant</b>
<b>CWA 311</b>	CWA list of hazardous substances- <b>Not Listed.</b> Calcium hydroxide contains alkaline material potentially toxic to aquatic life at high concentrations.
<b>US DOT</b>	U.S. Dept. of Transportation - <b>Not Regulated.</b>
<b>SPILLS</b>	Sweep up dry spillage where possible and minimize flushing with water.
<b>FDA</b>	Calcium hydroxide is generally recognized as safe (GRAS) by FDA 21 CFR 184.1205.
<b>PROP 65</b>	Subject to California's Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) warning and labeling requirements based on presence of listed trace metals & silica (at or below detection levels) <b>"known to the State of California to cause cancer."</b> Non-detectable concentrations are reported at 1/2 the detection level.
<b>NAFTA</b>	Product classified as HS Tariff No 2822.50 OR 2825.90; Preference Criteria A; 100% US Origin.
<b>EU REACH</b>	Product pre-registered # 5-2116374587-30-0000. Contact Customer Service for restrictions.

## Section 16: Other Information /Disclaimer

Mississippi Lime Company provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person. Individuals receiving this information must exercise their independent judgment in determining its appropriateness for a particular application or purpose.

Prepared by: *J.S. Castleberry*

6/8/2015





Univar USA Inc.  
6100 Carillon Point  
Kirkland, WA 98033  
(425) 889-3400

For Emergency Assistance involving chemicals call - CHEMTREC (800) 424-9300

=====

The Version Date for this MSDS is : 06/14/2005

PRODUCT NAME: HYDROGEN PEROXIDE 20-34%  
MSDS NUMBER: MZH4065  
DATE ISSUED: 1/4/2005  
SUPERSEDES: 5/1/2002  
ISSUED BY: 008614

=====

HYDROGEN PEROXIDE SOLUTION, 30%

=====

#### 1. PRODUCT IDENTIFICATION

SYNONYMS: PEROXIDE; 100 VOLUME PEROXIDE; HYDROGEN DIOXIDE SOLUTION;  
HYDROGEN PEROXIDE, 30%, UNSTABILIZED; HYDROGEN PEROXIDE,  
30%, ULTREX(R)  
CAS NO: 7722-84-1  
MOLECULAR WEIGHT: 34.01  
CHEMICAL FORMULA: H2O2

Distributed by:  
Univar USA Inc.  
6100 Carillon Point  
Kirkland, WA 98033  
425-889-3400

=====

#### 2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT	CAS NO	PERCENT	HAZARDOUS
HYDROGEN PEROXIDE	7722-84-1	20 - 34%	YES
WATER	7732-18-5	BALANCE	NO

=====

### 3. HAZARDS IDENTIFICATION

#### EMERGENCY OVERVIEW

-----  
DANGER! STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE.  
CORROSIVE. CAUSES BURNS TO SKIN, EYES, AND RESPIRATORY TRACT. HARMFUL IF  
SWALLOWED OR INHALED.

#### POTENTIAL HEALTH EFFECTS

##### ----- INHALATION:

VAPORS ARE CORROSIVE AND IRRITATING TO THE RESPIRATORY TRACT. INHALATION OF  
MIST MAY BURN THE MUCOUS MEMBRANE OF THE NOSE AND THROAT. IN SEVERE CASES,  
EXPOSURES MAY RESULT IN PULMONARY EDEMA AND DEATH.

##### INGESTION:

CORROSIVE AND IRRITATING TO THE MOUTH, THROAT, AND ABDOMEN. LARGE DOSES MAY  
CAUSE SYMPTOMS OF ABDOMINAL PAIN, VOMITING, AND DIARRHEA AS WELL AS  
BLISTERING OR TISSUE DESTRUCTION. STOMACH DISTENTION (DUE TO RAPID  
LIBERATION OF OXYGEN), AND RISK OF STOMACH PERFORATION, CONVULSIONS,  
PULMONARY EDEMA, COMA, POSSIBLE CEREBRAL EDEMA (FLUID ON THE BRAIN), AND  
DEATH ARE POSSIBLE.

##### SKIN CONTACT:

CORROSIVE. SYMPTOMS OF REDNESS, PAIN, AND SEVERE BURN CAN OCCUR.

##### EYE CONTACT:

VAPORS ARE VERY CORROSIVE AND IRRITATING TO THE EYES. SYMPTOMS INCLUDE  
PAIN, REDNESS AND BLURRED VISION. SPLASHES CAN CAUSE PERMANENT TISSUE  
DESTRUCTION.

##### CHRONIC EXPOSURE:

NO INFORMATION FOUND.

##### AGGRAVATION OF PRE-EXISTING CONDITIONS:

PERSONS WITH PRE-EXISTING SKIN DISORDERS OR EYE PROBLEMS OR IMPAIRED  
RESPIRATORY FUNCTION MAY BE MORE SUSCEPTIBLE TO THE EFFECTS OF THE  
SUBSTANCE.

### =====

### 4. FIRST AID MEASURES

#### INHALATION:

REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF  
BREATHING IS DIFFICULT, GIVE OXYGEN. GET MEDICAL ATTENTION IMMEDIATELY.

#### INGESTION:

IF SWALLOWED, DO NOT INDUCE VOMITING. GIVE LARGE QUANTITIES OF WATER. NEVER  
GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. GET MEDICAL ATTENTION  
IMMEDIATELY.

#### SKIN CONTACT:

IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE  
REMOVING CONTAMINATED CLOTHING AND SHOES. GET MEDICAL ATTENTION  
IMMEDIATELY. WASH CLOTHING BEFORE REUSE. THOROUGHLY CLEAN SHOES BEFORE  
REUSE. IF ALLOWED TO DRY ON CLOTHING, EVAPORATION LEADS TO CONCENTRATION  
AND INCREASED POSSIBILITY OF IGNITION.

#### EYE CONTACT:

IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES, LIFTING LOWER AND UPPER EYELIDS OCCASIONALLY. GET MEDICAL ATTENTION IMMEDIATELY.

NOTE TO PHYSICIAN:

PULMONARY EDEMA MAY BE DELAYED FOR 24 TO 72 HOURS; KEEP UNDER OBSERVATION. GASTRIC LAVAGE MAY BE NECESSARY IF SWALLOWED. ANALYSIS OF BODY FLUIDS (PARTICULARLY GASTRIC ASPIRATES) USING THE TITANIUM CHLORIDE REACTION, IF DONE IMMEDIATELY, WILL REVEAL PEROXIDES.

=====

## 5. FIRE FIGHTING MEASURES

FIRE:

NOT COMBUSTIBLE, BUT SUBSTANCE IS A STRONG OXIDIZER AND ITS HEAT OF REACTION WITH REDUCING AGENTS OR COMBUSTIBLES MAY CAUSE IGNITION. INCREASES THE FLAMMABILITY OF COMBUSTIBLE, ORGANIC AND READILY OXIDIZABLE MATERIALS.

EXPLOSION:

CONTACT WITH OXIDIZABLE SUBSTANCES MAY CAUSE EXTREMELY VIOLENT COMBUSTION. DRYING OF CONCENTRATED HYDROGEN PEROXIDE ON CLOTHING OR OTHER COMBUSTIBLE MATERIALS MAY CAUSE FIRE OR EXPLOSION. SEALED CONTAINERS MAY RUPTURE WHEN HEATED.

FIRE EXTINGUISHING MEDIA:

WATER SPRAY MAY BE USED TO EXTINGUISH SURROUNDING FIRE AND COOL EXPOSED CONTAINERS. WATER SPRAY WILL ALSO REDUCE FUME AND IRRITANT GASES.

SPECIAL INFORMATION:

IN THE EVENT OF A FIRE, WEAR FULL PROTECTIVE CLOTHING AND NIOSH-APPROVED SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN THE PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

=====

## 6. ACCIDENTAL RELEASE MEASURES

CAUTION! CAUSTIC MATERIAL. CAUSES FIRES WITH ORGANIC MATERIAL. VENTILATE AREA OF LEAK OR SPILL. WEAR APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT AS SPECIFIED IN SECTION 8. CONTAIN AND RECOVER LIQUID WHEN POSSIBLE. DO NOT RETURN SPILLED MATERIAL TO ORIGINAL CONTAINER.

LARGER SPILLS: DILUTE WITH A LARGE AMOUNT OF WATER AND HOLD IN A POND OR DYKED AREA UNTIL THE PEROXIDE DECOMPOSES FOLLOWED BY DISCHARGE INTO A SUITABLE TREATMENT SYSTEM. MAY BE NEUTRALIZED WITH SODIUM METABISULFITE OR SODIUM SULFITE AFTER DILUTING TO 5-10% PEROXIDE.

DO NOT FLUSH UNDILUTED MATERIAL TO SEWER. THIS OXIDIZING MATERIAL CAN INCREASE THE FLAMMABILITY OF ADJACENT COMBUSTIBLE MATERIALS. EMPTY CONTAINERS SHOULD BE RINSED WITH WATER BEFORE DISCARDING.

=====

## 7. HANDLING AND STORAGE

STORE IN A COOL (< 35C), WELL-VENTILATED DARK AREA SEPARATED FROM COMBUSTIBLE SUBSTANCES, REDUCING AGENTS, STRONG BASES, ORGANICS. DO NOT STORE ON WOODEN SHELVES OR FLOORS. SUGGEST ROTATION OF STOCK. CONTAINERS MUST BE VENTED, BUT CHECK PERIODICALLY FOR BULGING CONTAINERS WHICH CAN BURST FROM PRESSURE. PROTECT CONTAINERS FROM PHYSICAL DAMAGE, CONTAMINATION, HEAT AND INCOMPATIBLES.. CONTAMINATION FROM ANY SOURCE

(DUST, METALS) MAY CAUSE RAPID DECOMPOSITION WITH GENERATION OF LARGE QUANTITIES OF OXYGEN GAS AND HIGH PRESSURES. RINSE EMPTY CONTAINERS THOROUGHLY WITH CLEAN WATER. GLASS, POLYETHYLENE, STAINLESS STEEL AND ALUMINUM ARE RECOMMENDED MATERIALS FOR STORAGE CONTAINERS. CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTY SINCE THEY RETAIN PRODUCT RESIDUES (VAPORS, LIQUID); OBSERVE ALL WARNINGS AND PRECAUTIONS LISTED FOR THE PRODUCT.

=====

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### AIRBORNE EXPOSURE LIMITS:

-OSHA PERMISSIBLE EXPOSURE LIMIT (PEL):

1 PPM (TWA).

-ACGIH THRESHOLD LIMIT VALUE (TLV):

1 PPM (TWA), A3: ANIMAL CARCINOGEN.

### VENTILATION SYSTEM:

A SYSTEM OF LOCAL AND/OR GENERAL EXHAUST IS RECOMMENDED TO KEEP EMPLOYEE EXPOSURES BELOW THE AIRBORNE EXPOSURE LIMITS. LOCAL EXHAUST VENTILATION IS GENERALLY PREFERRED BECAUSE IT CAN CONTROL THE EMISSIONS OF THE CONTAMINANT AT ITS SOURCE, PREVENTING DISPERSION OF IT INTO THE GENERAL WORK AREA. PLEASE REFER TO THE ACGIH DOCUMENT, "INDUSTRIAL VENTILATION, A MANUAL OF RECOMMENDED PRACTICES", MOST RECENT EDITION, FOR DETAILS.

### PERSONAL RESPIRATORS (NIOSH APPROVED):

IF THE EXPOSURE LIMIT IS EXCEEDED, WEAR A SUPPLIED AIR, FULL-FACEPIECE RESPIRATOR, AIRLINED HOOD, OR FULL-FACEPIECE SELF-CONTAINED BREATHING APPARATUS. THIS SUBSTANCE HAS UNKNOWN WARNING PROPERTIES.

### SKIN PROTECTION:

WEAR IMPERVIOUS PROTECTIVE CLOTHING, INCLUDING BOOTS, GLOVES, LAB COAT, APRON OR COVERALLS, AS APPROPRIATE, TO PREVENT SKIN CONTACT.

### EYE PROTECTION:

USE CHEMICAL SAFETY GOGGLES AND/OR A FULL FACE SHIELD WHERE SPLASHING IS POSSIBLE. MAINTAIN EYE WASH FOUNTAIN AND QUICK-DRENCH FACILITIES IN WORK AREA.

=====

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### APPEARANCE:

CLEAR, COLORLESS LIQUID.

### BOILING POINT:

108C (226F)

### ODOR:

SLIGHT ACRID ODOR.

### MELTING POINT:

-25C (-13F)

### SOLUBILITY:

INFINITELY SOLUBLE.

### VAPOR DENSITY (AIR=1):

1.17

### DENSITY:

1.11

### VAPOR PRESSURE (MM HG):

25 @ 30C (86F)

### PH:

3.3

### EVAPORATION RATE (BUAC=1):

< 1

% VOLATILES BY VOLUME @ 21C (70F):



## =====

## 10. STABILITY AND REACTIVITY

## STABILITY:

NORMALLY STABLE IF UNCONTAMINATED, BUT SLOWLY DECOMPOSES TO RELEASE OXYGEN. UNSTABLE WITH HEAT, MAY RESULT IN DANGEROUS PRESSURES. A STRONG OXIDIZER, REACTS VIOLENTLY UPON CONTACT WITH MANY ORGANIC SUBSTANCES, PARTICULARLY TEXTILE AND PAPER. AVOID LIGHT AND KEEP IN A CLOSED BUT VENTED CONTAINER TO PREVENT EVAPORATION (CONCENTRATION) AND CONTAMINATION.

## HAZARDOUS DECOMPOSITION PRODUCTS:

DECOMPOSES TO WATER AND OXYGEN WITH RAPID HEAT RELEASE. USE VENTED CONTAINERS. THE SOLUTION CAN DECOMPOSE VIOLENTLY UPON HEATING.

## HAZARDOUS POLYMERIZATION:

WILL NOT OCCUR.

## INCOMPATIBILITIES:

HEAT, REDUCING AGENTS, ORGANIC MATERIALS, DIRT, ALKALIS, RUST, AND MANY METALS. SPONTANEOUS COMBUSTION MAY OCCUR ON STANDING IN CONTACT WITH READILY FLAMMABLE MATERIALS.

## CONDITIONS TO AVOID:

AVOID EXCESS HEAT AND CONTACT WITH COMBUSTIBLE OR ORGANIC MATERIALS. LIGHT AND INCOMPATIBLES.

## =====

## 11. TOXICOLOGICAL INFORMATION

FOR HYDROGEN PEROXIDE: NO LD50/LC50 INFORMATION FOUND RELATING TO NORMAL ROUTES OF OCCUPATIONAL EXPOSURE. INVESTIGATED AS A TUMORIGEN AND MUTAGEN.

-----/CANCER LISTS/-----

INGREDIENT	KNOWN	---NTP CARCINOGEN---	
		ANTICIPATED	IARC CATEGORY
HYDROGEN PEROXIDE (7722-84-1)	NO	NO	3
WATER (7732-18-5)	NO	NO	NONE

## =====

## 12. ECOLOGICAL INFORMATION

## ENVIRONMENTAL FATE:

NO INFORMATION FOUND.

## ENVIRONMENTAL TOXICITY:

NO INFORMATION FOUND.

## =====

## 13. DISPOSAL CONSIDERATIONS

WHATEVER CANNOT BE SAVED FOR RECOVERY OR RECYCLING SHOULD BE HANDLED AS HAZARDOUS WASTE AND SENT TO A RCRA APPROVED WASTE FACILITY. PROCESSING, USE OR CONTAMINATION OF THIS PRODUCT MAY CHANGE THE WASTE MANAGEMENT OPTIONS. STATE AND LOCAL DISPOSAL REGULATIONS MAY DIFFER FROM FEDERAL DISPOSAL

REGULATIONS. DILUTE WITH WATER AND FLUSH TO SEWER IF LOCAL ORDINANCES ALLOW, OTHERWISE, WHATEVER CANNOT BE SAVED FOR RECOVERY OR RECYCLING SHOULD BE MANAGED IN AN APPROPRIATE AND APPROVED WASTE DISPOSAL FACILITY. PROCESSING, USE OR CONTAMINATION OF THIS PRODUCT MAY CHANGE THE WASTE MANAGEMENT OPTIONS. STATE AND LOCAL DISPOSAL REGULATIONS MAY DIFFER FROM FEDERAL DISPOSAL REGULATIONS.

DISPOSE OF CONTAINER AND UNUSED CONTENTS IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REQUIREMENTS.

#### 14. TRANSPORT INFORMATION

##### DOMESTIC (LAND, D.O.T.)

PROPER SHIPPING NAME: HYDROGEN PEROXIDE, AQUEOUS SOLUTION  
HAZARD CLASS: 5.1, 8  
UN/NA: UN2014 PACKING GROUP: II

##### INTERNATIONAL (WATER, I.M.O.)

PROPER SHIPPING NAME: HYDROGEN PEROXIDE, AQUEOUS SOLUTION  
HAZARD CLASS: 5.1, 8  
UN/NA: UN2014 PACKING GROUP: II

#### 15. REGULATORY INFORMATION

INGREDIENT	TSCA	EC	JAPAN	AUSTRALIA
HYDROGEN PEROXIDE (7722-84-1)	YES	YES	YES	YES
WATER (7732-18-5)	YES	YES	YES	YES

INGREDIENT	KOREA	DSL	NDSL	PHIL.
HYDROGEN PEROXIDE (7722-84-1)	YES	YES	NO	YES
WATER (7732-18-5)	YES	YES	NO	YES

INGREDIENT	-SARA 302-	-SARA 313-
	RQ TPQ	LIST CHEMICAL CATG
HYDROGEN PEROXIDE (7722-84-1)	NO NO	NO NO
WATER (7732-18-5)	NO NO	NO NO

INGREDIENT	CERCLA	-RCRA-	-TSCA-
		261.33	8(D)
HYDROGEN PEROXIDE (7722-84-1)	NO	NO	NO
WATER (7732-18-5)	NO	NO	NO

CHEMICAL WEAPONS CONVENTION: NO TSCA 12(B): NO CDTA: NO  
SARA 311/312: ACUTE: YES CHRONIC: NO FIRE: YES PRESSURE: NO  
REACTIVITY: YES (MIXTURE / LIQUID)

AUSTRALIAN HAZCHEM CODE: 2P  
POISON SCHEDULE: S6

WHMIS: THIS MSDS HAS BEEN PREPARED ACCORDING TO THE HAZARD CRITERIA OF  
THE CONTROLLED PRODUCTS REGULATIONS (CPR) AND THE MSDS CONTAINS  
ALL OF THE INFORMATION REQUIRED BY THE CPR.

=====

16. OTHER INFORMATION

NFPA RATINGS:

HEALTH: 3 FLAMMABILITY: 0 REACTIVITY: 1 OTHER: OXIDIZER

For Additional Information:

Contact: MSDS Coordinator - Univar USA

During business hours, Pacific Time - (425) 889-3400

NOTICE

Univar USA expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a Product Specification Sheet and/or a Certificate of Analysis. These can be obtained from your local Univar USA Sales Office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar USA makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar USA's control. Therefore, users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes, and they assume all risks of their use, handling, and disposal of the product or from the publication or use of, or reliance upon, information contained herein. This information relates only to the product designated herein and does not relate to its use in combination with any other material or in any other process.

END OF MSDS



## SAFETY DATA SHEET

### HYPERSPERSE\* MDC700

#### 1. Identification

Product identifier	HYPERSPERSE MDC700
Other means of identification	Not available.
Recommended use	Membrane Deposit Control Agent
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Not classified.
Health hazards	Not classified.
OSHA defined hazards	Not classified.
Label elements	
Hazard symbol	None.
Signal word	Not available.
Hazard statement	The mixture does not meet the criteria for classification.
Precautionary statement	
Prevention	Observe good industrial hygiene practices.
Response	Wash hands after handling.
Storage	Store away from incompatible materials.
Disposal	Dispose of waste and residues in accordance with local authority requirements.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

#### 3. Composition/information on ingredients

##### Mixtures

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

#### 4. First-aid measures

Inhalation	If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.
Skin contact	Rinse skin with water/shower.
Eye contact	Rinse with water. Get medical attention if irritation develops and persists.



<b>Ingestion</b>	Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately.
<b>Most important symptoms/effects, acute and delayed</b>	Direct contact with eyes may cause temporary irritation.
<b>Indication of immediate medical attention and special treatment needed</b>	Treat symptomatically.
<b>General information</b>	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

## 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO <sub>2</sub> ).
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards arising from the chemical</b>	During fire, gases hazardous to health may be formed.
<b>Special protective equipment and precautions for firefighters</b>	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
<b>Fire-fighting equipment/instructions</b>	Move containers from fire area if you can do so without risk.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.
<b>General fire hazards</b>	No unusual fire or explosion hazards noted.

## 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. For personal protection, see section 8 of the SDS.
<b>Methods and materials for containment and cleaning up</b>	<p>Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.</p> <p>Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.</p> <p>Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.</p>
<b>Environmental precautions</b>	Avoid discharge into drains, water courses or onto the ground.

## 7. Handling and storage

<b>Precautions for safe handling</b>	Normal chemical handling. Avoid prolonged exposure. Use care in handling/storage.
<b>Conditions for safe storage, including any incompatibilities</b>	Store in original tightly closed container. Do not freeze. If frozen, thaw completely and mix thoroughly prior to use. Store away from incompatible materials (see Section 10 of the SDS). Store in accordance with local/regional/national/international regulation.

## 8. Exposure controls/personal protection

<b>Occupational exposure limits</b>	No exposure limits noted for ingredient(s).
<b>Biological limit values</b>	No biological exposure limits noted for the ingredient(s).
<b>Appropriate engineering controls</b>	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.
<b>Individual protection measures, such as personal protective equipment</b>	
<b>Eye/face protection</b>	Splash proof chemical goggles.
<b>Skin protection</b>	
<b>Hand protection</b>	Chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.
<b>Other</b>	Wear suitable protective clothing. Chemical resistant gloves.

<b>Respiratory protection</b>	If ventilation is insufficient, suitable respiratory protection must be provided. When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Respiratory protection not required.
<b>Thermal hazards</b>	Wear appropriate thermal protective clothing, when necessary.
<b>General hygiene considerations</b>	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

### Appearance

Color	Light yellow to amber
Physical state	Liquid
Odor	Slight
Odor threshold	Not available.
pH (concentrated product)	4.7
pH in aqueous solution	5.4 (5% SOL.)
Melting point/freezing point	23 °F (-5 °C)
Initial boiling point and boiling range	212 °F (100 °C)
Flash point	Not applicable.
Evaporation rate	< 1 (Ether = 1)
Flammability (solid, gas)	Not available.

### Upper/lower flammability or explosive limits

Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	18 mm Hg
Vapor pressure temp.	70 °F (21 °C)
Vapor density	< 1 (Air = 1)
Relative density	1.13
Relative density temperature	70 °F (21 °C)
Solubility(ies)	
Solubility (water)	100 %
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	12 cps
Viscosity temperature	70 °F (21 °C)
Other information	
Percent volatile	0 (Calculated)
Pour point	28 °F (-2 °C)
Specific gravity	1.13

## 10. Stability and reactivity

<b>Reactivity</b>	The product is stable and non-reactive under normal conditions of use, storage and transport.
<b>Chemical stability</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions</b>	Contact with water reactive compounds may cause fire or explosion.
<b>Conditions to avoid</b>	Protect from freezing.
<b>Incompatible materials</b>	Avoid contact with strong oxidizers.

**Hazardous decomposition products**

Oxides of carbon, nitrogen, phosphorus, and sulphur evolved in fire.

## 11. Toxicological information

### Information on likely routes of exposure

Ingestion	May cause gastrointestinal irritation.
Inhalation	Mists/aerosols may cause irritation to upper respiratory tract.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Direct contact with eyes may cause temporary irritation.

**Symptoms related to the physical, chemical and toxicological characteristics** Prolonged and repetitive exposure, depending on the route(s), may develop transient irritation on skin, eyes, ingestion tract, and/or respiratory tract.

### Information on toxicological effects

#### Acute toxicity

Product	Species	Test Results
HYPERSPERSE MDC700 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg, (Calculated according to GHS additivity formula)
<i>Inhalation</i>		
LC50	Rat	> 20 mg/l, 4 Hour, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg, (Calculated according to GHS additivity formula)

\* Estimates for product may be based on additional component data not shown.

<b>Skin corrosion/irritation</b>	Prolonged skin contact may cause temporary irritation.
<b>Serious eye damage/eye irritation</b>	Direct contact with eyes may cause temporary irritation.
<b>Respiratory or skin sensitization</b>	
Respiratory sensitization	Not available.
Skin sensitization	This product is not expected to cause skin sensitization.
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Carcinogenicity</b>	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	
Not listed.	
<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.
<b>Specific target organ toxicity - single exposure</b>	Not classified.
<b>Specific target organ toxicity - repeated exposure</b>	Not classified.
<b>Aspiration hazard</b>	Not classified.
<b>Chronic effects</b>	Prolonged inhalation may be harmful.

## 12. Ecological information

**Ecotoxicity** The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Product	Species	Test Results
HYPERSPERSE MDC700 (CAS Mixture)		
0% Mortality	Fathead Minnow	5000 mg/L, Static Bioassay with 48-Hour Renewal, 96 hour

Product		Species	Test Results
	LC50	Menidia beryllina (Silversides)	23100 mg/L, Static Acute Bioassay, 96 hour, (pH adjusted)
		Mysid Shrimp	13800 mg/L, Static Acute Bioassay, 48 hour, (pH adjusted)
	NOEL	Menidia beryllina (Silversides)	6250 mg/L, Static Acute Bioassay, 96 hour, (pH adjusted)
		Mysid Shrimp	6250 mg/L, Static Acute Bioassay, 48 hour, (pH adjusted)
Crustacea	0% Mortality	Daphnia magna	2500 mg/L, Static Screen, 48 hour
	50% Mortality	Daphnia magna	5000 mg/L, Static Screen, 48 hour

\* Estimates for product may be based on additional component data not shown.

<b>Bioaccumulative potential</b>	No data available.
<b>Mobility in soil</b>	No data available.
<b>Other adverse effects</b>	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.
<b>Environmental fate</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
<b>Persistence and degradability</b>	No data is available on the degradability of this product.
- COD (mgO2/g)	190 (calculated data)
- BOD 5 (mgO2/g)	9 (calculated data)
- BOD 28 (mgO2/g)	12 (calculated data)
- Closed Bottle Test (%)	5 (calculated data)
<b>Degradation in 28 days</b>	
- TOC (mg C/g)	70 (calculated data)

### 13. Disposal considerations

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
<b>Contaminated packaging</b>	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

### 14. Transport information

<b>DOT</b>	Not regulated as dangerous goods. Some containers may be DOT exempt, please check BOL for exact container classification.
<b>IATA</b>	Not regulated as dangerous goods.
<b>IMDG</b>	Not regulated as dangerous goods.

### 15. Regulatory information

<b>US federal regulations</b>	This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.
<b>TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)</b>	Not regulated.
<b>CERCLA Hazardous Substance List (40 CFR 302.4)</b>	Not listed.



**SARA 304 Emergency release notification**

Not regulated.

**OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)**

Not listed.

**Superfund Amendments and Reauthorization Act of 1986 (SARA)**

**Hazard categories**  
Immediate Hazard - No  
Delayed Hazard - No  
Fire Hazard - No  
Pressure Hazard - No  
Reactivity Hazard - No

**SARA 302 Extremely hazardous substance**

Chemical name	CAS number	Reportable quantity	Threshold planning quantity	Threshold planning quantity, lower value	Threshold planning quantity, upper value
Allyl alcohol	107-18-6	100	1000 lbs		
Formaldehyde	50-00-0	100	500 lbs		

**SARA 311/312 Hazardous chemical**  
No

**SARA 313 (TRI reporting)**

Chemical name	CAS number	% by wt.
Formaldehyde	50-00-0	0 - 0.1

**Other federal regulations****Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Not regulated.

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)**

Not regulated.

**Clean Water Act (CWA) Section 112(r) (40 CFR 68.130)**  
Hazardous substance

**Safe Drinking Water Act (SDWA)**  
Not regulated.

**Inventory status**

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

**US state regulations**

WARNING: This product contains a chemical known to the State of California to cause cancer.

**US - Massachusetts RTK - Substance List**

Not regulated.

**US - Pennsylvania RTK - Hazardous Substances**

Not regulated.

**US - Rhode Island RTK**

Not regulated.

**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

**US. New Jersey Worker and Community Right-to-Know Act**

Not regulated.

**US. California Proposition 65**

WARNING: This product contains a chemical known to the State of California to cause cancer.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

Formaldehyde (CAS 50-00-0) Listed: January 1, 1988

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Female reproductive toxin**

No ingredient listed.

No ingredient listed.

## 16. Other information, including date of preparation or last revision

**Issue date** Oct-25-2014

**Revision date** Oct-25-2014

**Version #** 1.0

**List of abbreviations**

CAS: Chemical Abstract Service Registration Number  
 TWA: Time Weighted Average  
 STEL: Short Term Exposure Limit  
 LD50: Lethal Dose, 50%  
 LC50: Lethal Concentration, 50%  
 NOEL: No Observed Effect Level  
 COD: Chemical Oxygen Demand  
 BOD: Biochemical Oxygen Demand  
 TOC: Total Organic Carbon  
 TLV: Threshold Limit Value  
 IATA: International Air Transport Association  
 IMDG: International Maritime Dangerous Goods Code  
 NFPA: National Fire Protection Association  
 ACGIH: American Conference of Governmental Industrial Hygienists  
 TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.

**References:** No data available

**Disclaimer**

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**Revision Information**

Composition / Information on Ingredients: Disclosure Overrides  
 Physical & Chemical Properties: Multiple Properties  
 GHS: Classification

**Prepared by** This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.

## SAFETY DATA SHEET

Ice-Trol 941

## Section: 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Ice-Trol 941

Other means of identification : Not applicable.

Restrictions on use : Refer to available product literature or ask your local Sales Representative for restrictions on use and dose limits.

Company : Nalco Company  
1601 W. Diehl Road  
Naperville, Illinois 60563-1198  
USA  
TEL: (630)305-1000

Emergency telephone number : (800) 424-9300 (24 Hours) CHEMTREC

Issuing date : 08/26/2015

## Section: 2. HAZARDS IDENTIFICATION

## GHS Classification

Eye irritation : Category 2A

## GHS Label element

Hazard pictograms :



Signal Word : Warning

Hazard Statements : Causes serious eye irritation.

Precautionary Statements : **Prevention:**  
Wash skin thoroughly after handling. Wear eye protection/face protection.  
**Response:**  
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/ attention.

Other hazards : None known.

## Section: 3. COMPOSITION/INFORMATION ON INGREDIENTS

Pure substance/mixture : Mixture  
Mixture

Chemical Name	CAS-No.	Concentration: (%)
Inorganic salt	Proprietary	10 - 30
Glycerol	56-81-5	1 - 5

## SAFETY DATA SHEET

**Ice-Trol 941**

### Section: 4. FIRST AID MEASURES

- In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention.
- In case of skin contact : Wash off with soap and plenty of water. Get medical attention if symptoms occur.
- If swallowed : Rinse mouth. Get medical attention if symptoms occur.
- If inhaled : Get medical attention if symptoms occur.
- Protection of first-aiders : In event of emergency assess the danger before taking action. Do not put yourself at risk of injury. If in doubt, contact emergency responders. Use personal protective equipment as required.
- Notes to physician : Treat symptomatically.
- Most important symptoms and effects, both acute and delayed : See Section 11 for more detailed information on health effects and symptoms.

### Section: 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Unsuitable extinguishing media : None known.
- Specific hazards during firefighting : Not flammable or combustible.
- Hazardous combustion products : Carbon oxides
- Special protective equipment for firefighters : Use personal protective equipment.
- Specific extinguishing methods : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. In the event of fire and/or explosion do not breathe fumes.

### Section: 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions, protective equipment and emergency procedures : Ensure clean-up is conducted by trained personnel only. Refer to protective measures listed in sections 7 and 8.
- Environmental precautions : Do not allow contact with soil, surface or ground water.
- Methods and materials for : Stop leak if safe to do so. Contain spillage, and then collect with non-



## SAFETY DATA SHEET

### Ice-Trol 941

containment and cleaning up : combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Flush away traces with water. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway.

### Section: 7. HANDLING AND STORAGE

Advice on safe handling : Avoid contact with skin and eyes. Wash hands thoroughly after handling. Use only with adequate ventilation.

Conditions for safe storage : Keep out of reach of children. Keep container tightly closed. Store in suitable labeled containers.

Suitable material : Keep in properly labelled containers.

Unsuitable material : not determined

### Section: 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

#### Components with workplace control parameters

Components	CAS-No.	Form of exposure	Permissible concentration	Basis
Glycerol	56-81-5	TWA	10 mg/m <sup>3</sup>	ACGIH
		TWA (mist, respirable fraction)	5 mg/m <sup>3</sup>	OSHA Z1
		TWA (mist, total dust)	15 mg/m <sup>3</sup>	OSHA Z1

Engineering measures : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

#### Personal protective equipment

Eye protection : Safety glasses with side-shields

Hand protection : Wear protective gloves.  
Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Skin protection : Wear suitable protective clothing.

Respiratory protection : No personal respiratory protective equipment normally required.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Remove and wash contaminated clothing before re-use.  
Wash face, hands and any exposed skin thoroughly after handling.

### Section: 9. PHYSICAL AND CHEMICAL PROPERTIES

## SAFETY DATA SHEET

### Ice-Trol 941

Appearance	: liquid
Colour	: Light Amber
Odour	: None
Flash point	: Not applicable.
pH	: no data available
Odour Threshold	: no data available
Melting point/freezing point	: no data available
Initial boiling point and boiling range	: no data available
Evaporation rate	: no data available
Flammability (solid, gas)	: no data available
Upper explosion limit	: no data available
Lower explosion limit	: no data available
Vapour pressure	: no data available
Relative vapour density	: no data available
Relative density	: no data available
Density	: 10.68 lb/gal
Water solubility	: no data available
Solubility in other solvents	: no data available
Partition coefficient: n-octanol/water	: no data available
Auto-ignition temperature	: no data available
Thermal decomposition temperature	: no data available
Viscosity, dynamic	: no data available
Viscosity, kinematic	: no data available
Molecular weight	: no data available
VOC	: no data available

### Section: 10. STABILITY AND REACTIVITY

Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: No dangerous reaction known under conditions of normal use.
Conditions to avoid	: None known.
Incompatible materials	: None known.
Hazardous decomposition products	: Carbon oxides

## SAFETY DATA SHEET

Ice-Trol 941

### Section: 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : Inhalation, Eye contact, Skin contact

#### Potential Health Effects

Eyes : Causes serious eye irritation.

Skin : Health injuries are not known or expected under normal use.

Ingestion : Health injuries are not known or expected under normal use.

Inhalation : Health injuries are not known or expected under normal use.

Chronic Exposure : Health injuries are not known or expected under normal use.

#### Experience with human exposure

Eye contact : Redness, Pain, Irritation

Skin contact : No symptoms known or expected.

Ingestion : No symptoms known or expected.

Inhalation : No symptoms known or expected.

#### Toxicity

##### Product

Acute oral toxicity : Acute toxicity estimate : > 5,000 mg/kg

Acute inhalation toxicity : no data available

Acute dermal toxicity : no data available

Skin corrosion/irritation : no data available

Serious eye damage/eye irritation : no data available

Respiratory or skin sensitization : no data available

Carcinogenicity : no data available

Reproductive effects : no data available

Germ cell mutagenicity : no data available

Teratogenicity : no data available

## SAFETY DATA SHEET

### Ice-Trol 941

STOT - single exposure : no data available

STOT - repeated exposure : no data available

Aspiration toxicity : no data available

#### Components

Acute dermal toxicity : Inorganic salt  
LD50 rabbit: > 5,000 mg/kg

Glycerol  
LD50 rabbit: 23,000 mg/kg

### Section: 12. ECOLOGICAL INFORMATION

#### Ecotoxicity

Environmental Effects : This product has no known ecotoxicological effects.

#### Components

Toxicity to fish : Inorganic salt  
LC50 Fish: 4,630 mg/l  
Exposure time: 96 h

Glycerol  
LC50 Fish: 855 mg/l  
Exposure time: 96 h

#### Persistence and degradability

no data available

#### Mobility

no data available

#### Bioaccumulative potential

no data available

#### Other information

no data available

### Section: 13. DISPOSAL CONSIDERATIONS

Disposal methods : Where possible recycling is preferred to disposal or incineration. If recycling is not practicable, dispose of in compliance with local regulations. Dispose of wastes in an approved waste disposal facility.

Disposal considerations : Dispose of as unused product. Empty containers should be



## SAFETY DATA SHEET

Ice-Trol 941

taken to an approved waste handling site for recycling or disposal. Do not re-use empty containers.

### Section: 14. TRANSPORT INFORMATION

The shipper/consignor/sender is responsible to ensure that the packaging, labeling, and markings are in compliance with the selected mode of transport.

#### Land transport (DOT)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

#### Air transport (IATA)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

#### Sea transport (IMDG/IMO)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

### Section: 15. REGULATORY INFORMATION

#### EPCRA - Emergency Planning and Community Right-to-Know Act

##### CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

##### SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards : Acute Health Hazard

SARA 302 : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

#### California Prop 65

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

#### INTERNATIONAL CHEMICAL CONTROL LAWS :

##### TOXIC SUBSTANCES CONTROL ACT (TSCA)

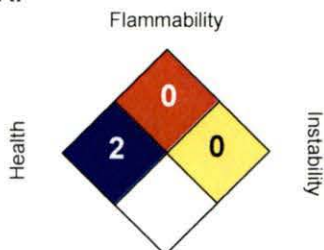
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

### Section: 16. OTHER INFORMATION

## SAFETY DATA SHEET

Ice-Trol 941

### NFPA:



### HMIS III:

HEALTH	2
FLAMMABILITY	0
PHYSICAL HAZARD	0

0 = not significant, 1 = Slight,  
2 = Moderate, 3 = High  
4 = Extreme, \* = Chronic

Revision Date : 08/26/2015  
Version Number : 1.4  
Prepared By : Regulatory Affairs

REVISED INFORMATION: Significant changes to regulatory or health information for this revision is indicated by a bar in the left-hand margin of the SDS.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. For additional copies of an SDS visit [www.nalco.com](http://www.nalco.com) and request access.



# SAFETY DATA SHEET

## INHIBITOR AZ8100

### 1. Identification

Product identifier	INHIBITOR AZ8100
Other means of identification	Not available.
Recommended use	Water-based corrosion inhibitor
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

### 2. Hazard(s) identification

Physical hazards	Corrosive to metals	Category 1
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 1B
	Serious eye damage/eye irritation	Category 1
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
OSHA defined hazards	Not classified.	

#### Label elements



Signal word Danger

Hazard statement May be corrosive to metals. Harmful if swallowed. Causes severe skin burns and eye damage. Causes serious eye damage. May cause respiratory irritation.

#### Precautionary statement

Prevention	Keep only in original container. Do not breathe mist or vapor. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection.
Response	If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor/. Specific treatment (see on this label). Wash contaminated clothing before reuse. Absorb spillage to prevent material damage.
Storage	Store in a well-ventilated place. Keep container tightly closed. Store locked up. Store in corrosive resistant/ container with a resistant inner liner.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

### 3. Composition/information on ingredients

#### Mixtures

Chemical name	Common name and synonyms	CAS number	%
Sodium 4(or 5)-methyl-1H-benzotriazole		64665-57-2	40 - 60

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

**Composition comments** Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

### 4. First-aid measures

<b>Inhalation</b>	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
<b>Skin contact</b>	Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.
<b>Eye contact</b>	Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Continue rinsing. Call a physician or poison control center immediately.
<b>Ingestion</b>	Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact a physician. Rinse mouth. If the victim is fully conscious dilute contents of stomach using 3-4 glasses of water.
<b>Most important symptoms/effects, acute and delayed</b>	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation.
<b>Indication of immediate medical attention and special treatment needed</b>	Corrosive material It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage. Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
<b>General information</b>	In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

### 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards arising from the chemical</b>	During fire, gases hazardous to health may be formed.
<b>Special protective equipment and precautions for firefighters</b>	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
<b>Fire-fighting equipment/instructions</b>	Move containers from fire area if you can do so without risk.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.

### 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
--	---



<b>Methods and materials for containment and cleaning up</b>	<p>Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb spillage to prevent material damage. Absorb in vermiculite, dry sand or earth and place into containers. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.</p> <p>Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.</p> <p>Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.</p>
<b>Environmental precautions</b>	Avoid discharge into drains, water courses or onto the ground.

## 7. Handling and storage

<b>Precautions for safe handling</b>	Alkaline. Do not mix with acidic material. Do not breathe mist or vapor. Do not get this material in contact with eyes. Do not get this material in contact with skin. Do not taste or swallow. Avoid prolonged exposure. Do not get this material on clothing. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. When using, do not eat, drink or smoke. Wash hands thoroughly after handling. Use care in handling/storage.
<b>Conditions for safe storage, including any incompatibilities</b>	Store locked up. Store in corrosive resistant container with a resistant inner liner. Store away from oxidizers. Store in original tightly closed container. Store in a cool, dry place out of direct sunlight. Store away from incompatible materials (see Section 10 of the SDS). Store in accordance with local/regional/national/international regulation.

## 8. Exposure controls/personal protection

<b>Occupational exposure limits</b>	No exposure limits noted for ingredient(s).
<b>Biological limit values</b>	No biological exposure limits noted for the ingredient(s).
<b>Appropriate engineering controls</b>	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.
<b>Individual protection measures, such as personal protective equipment</b>	
<b>Eye/face protection</b>	Splash proof chemical goggles. Face shield.
<b>Skin protection</b>	
<b>Hand protection</b>	Chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.
<b>Other</b>	Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended. Gauntlet-type rubber, butyl or neoprene gloves. Wash off after each use. Replace as necessary.
<b>Respiratory protection</b>	Chemical respirator with organic vapor cartridge and full facepiece. If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
<b>Thermal hazards</b>	Wear appropriate thermal protective clothing, when necessary.
<b>General hygiene considerations</b>	When using, do not eat, drink or smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

<b>Appearance</b>	
<b>Color</b>	Yellow to brown
<b>Physical state</b>	Liquid
<b>Odor</b>	Mild
<b>Odor threshold</b>	Not available.
<b>pH in aqueous solution</b>	11.7 (10% SOL.)
<b>Melting point/freezing point</b>	-25 °F (-32 °C)
<b>Initial boiling point and boiling range</b>	Not available.
<b>Flash point</b>	> 200 °F (> 93 °C) SETA(CC)

Evaporation rate	< 1 (Ether = 1)
Flammability (solid, gas)	Not available.
<b>Upper/lower flammability or explosive limits</b>	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	18 mm Hg
Vapor pressure temp.	70 °F (21 °C)
Vapor density	< 1 (Air = 1)
Relative density	1.22
Relative density temperature	70 °F (21 °C)
<b>Solubility(ies)</b>	
Solubility (water)	100 %
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	190 cps
Viscosity temperature	78 °F (26 °C)
<b>Other information</b>	
Percent volatile	0 (ASTM 3960-93)
Pour point	-20 °F (-29 °C)
Specific gravity	1.22

## 10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Contact with strong acids may cause a violent reaction releasing heat. Strong oxidizing agents.
Hazardous decomposition products	Oxides of carbon and nitrogen evolved in fire.

## 11. Toxicological information

### Information on likely routes of exposure

Ingestion	Causes digestive tract burns. Harmful if swallowed.
Inhalation	May cause irritation to the respiratory system.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Causes serious eye damage.

Symptoms related to the physical, chemical and toxicological characteristics	Causes serious eye damage. May cause respiratory irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision.
--	---

### Information on toxicological effects

Acute toxicity	Harmful if swallowed. May cause respiratory irritation.
----------------	---

Product	Species	Test Results
INHIBITOR AZ8100 (CAS N/A)		
Acute		
Dermal		
LD50	Rabbit	> 4000 mg/kg, (Calculated according to GHS additivity formula)

Product	Species	Test Results
Oral LD50	Rat	1470 mg/kg, (Calculated according to GHS additivity formula)
Components	Species	Test Results
Sodium 4(or 5)-methyl-1H-benzotriazole (CAS 64665-57-2)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 2000 mg/kg
<i>Oral</i>		
LD50	Rat	735 mg/kg

\* Estimates for product may be based on additional component data not shown.

<b>Skin corrosion/irritation</b>	Causes severe skin burns and eye damage.
<b>Serious eye damage/eye irritation</b>	Causes serious eye damage.
<b>Respiratory or skin sensitization</b>	
<b>Respiratory sensitization</b>	Not available.
<b>Skin sensitization</b>	This product is not expected to cause skin sensitization.
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Carcinogenicity</b>	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	
Not listed.	
<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.
<b>Specific target organ toxicity - single exposure</b>	May cause respiratory irritation.
<b>Specific target organ toxicity - repeated exposure</b>	Not available.
<b>Aspiration hazard</b>	Not classified. Aspiration of this product may cause the same corrosiveness/irritation impacts as if it were ingested.
<b>Chronic effects</b>	Prolonged inhalation may be harmful.

## 12. Ecological information

<b>Ecotoxicity</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
--------------------	--

Product	Species	Test Results
INHIBITOR AZ8100 (CAS N/A)	IC25	Ceriodaphnia
		20 mg/L, Static Renewal Bioassay, 7 day
	LC50	Fathead Minnow
		56 mg/L, Static Renewal Bioassay, 7 day
	LC50	Bluegill Sunfish
		109.3 mg/L, Static Acute Bioassay, 96 hour
		Ceriodaphnia
		147 mg/L, Static Renewal Bioassay, 48 hour
	NOEL	Fathead Minnow
		105 mg/L, Static Renewal Bioassay, 96 hour, (pH adjusted)
		Mysid Shrimp
		166 mg/L, Static Acute Bioassay, 48 hour
		Sheepshead Minnow
		475 mg/L, Static Acute Bioassay, 48 hour
	NOEL	Bluegill Sunfish
		42 mg/L, Static Acute Bioassay, 96 hour
		Ceriodaphnia
		37 mg/L, Static Renewal Bioassay, 48 hour
		Fathead Minnow
		75 mg/L, Static Renewal Bioassay, 96 hour, (pH adjusted)
		Mysid Shrimp
		10 mg/L, Static Acute Bioassay, 48 hour
		Sheepshead Minnow
		370 mg/L, Static Acute Bioassay, 48 hour

Product		Species	Test Results
Crustacea	LC50	Daphnia magna	243 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)
	NOEL	Daphnia magna	75 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)
Other	LC50	Rainbow Trout	34 mg/L, Static Renewal Bioassay, 96 hour
	NOEL	Rainbow Trout	15 mg/L, Static Renewal Bioassay, 96 hour

\* Estimates for product may be based on additional component data not shown.

<b>Bioaccumulative potential</b>	No data available.
<b>Mobility in soil</b>	No data available.
<b>Other adverse effects</b>	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.
<b>Environmental fate</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
<b>Persistence and degradability</b>	No data is available on the degradability of this product.
- COD (mgO2/g)	810
- BOD 5 (mgO2/g)	4
- BOD 28 (mgO2/g)	22
- Closed Bottle Test (% Degradation in 28 days)	3
- Zahn-Wellens Test (% Degradation in 28 days)	9
- TOC (mg C/g)	280

### 13. Disposal considerations

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	D002: Waste Corrosive material [pH ≤2 or ≥12.5, or corrosive to steel] The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
<b>Contaminated packaging</b>	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

### 14. Transport information

<b>DOT</b>	
UN number	UN1719
UN proper shipping name	CAUSTIC ALKALI LIQUIDS, N.O.S. (SODIUM TOLYLTRIAZOLE)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	II
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
ERG number	154
Some containers may be DOT exempt, please check BOL for exact container classification.	

<b>IATA</b>	
UN number	UN1719
UN proper shipping name	CAUSTIC ALKALI LIQUIDS, N.O.S. (Sodium hydroxide)
Transport hazard class(es)	
Class	Not available.
Subsidiary risk	-
Packing group	Not applicable.



Environmental hazards	No.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
<b>IMDG</b>	
UN number	UN1719
UN proper shipping name	CAUSTIC ALKALI LIQUIDS, N.O.S. (SODIUM TOLYLTRIAZOLE)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	II
Environmental hazards	
Marine pollutant	No.
EmS	Not available.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

#### DOT



#### IMDG



## 15. Regulatory information

US federal regulations	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.
------------------------	---

#### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

#### CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

#### SARA 304 Emergency release notification

Not regulated.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

#### Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes Delayed Hazard - No Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No
-------------------	---

#### SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical	No
---------------------------------	----

**SARA 313 (TRI reporting)**

Not regulated.

**Other federal regulations****Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Not regulated.

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)**

Not regulated.

**Safe Drinking Water Act (SDWA)**

Not regulated.

**Inventory status**

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

**US state regulations**

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - Massachusetts RTK - Substance List**

Not regulated.

**US - Pennsylvania RTK - Hazardous Substances**

Not regulated.

**US - Rhode Island RTK**

Not regulated.

**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

**US. New Jersey Worker and Community Right-to-Know Act**

Not regulated.

**US. California Proposition 65**

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Female reproductive toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Male reproductive toxin**

No ingredient listed.

**16. Other information, including date of preparation or last revision**

Issue date	Nov-05-2014
Revision date	Nov-05-2014
Version #	1.0

**List of abbreviations**

CAS: Chemical Abstract Service Registration Number  
NFPA: National Fire Protection Association  
ACGIH: American Conference of Governmental Industrial Hygienists  
TWA: Time Weighted Average  
STEL: Short Term Exposure Limit  
LD50: Lethal Dose, 50%  
LC50: Lethal Concentration, 50%  
NOEL: No Observed Effect Level  
COD: Chemical Oxygen Demand  
BOD: Biochemical Oxygen Demand  
TOC: Total Organic Carbon  
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.  
IATA: International Air Transport Association  
IMDG: International Maritime Dangerous Goods Code  
TLV: Threshold Limit Value

**References:**

No data available

**Disclaimer**

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. The information in the sheet was written based on the best knowledge and experience currently available.

**Revision Information**

Product and Company Identification: Product and Company Identification  
Composition / Information on Ingredients: Disclosure Overrides  
Physical & Chemical Properties: Multiple Properties  
Toxicological Information: Toxicological Data  
Transport Information: Material Transportation Information  
HazReg Data: International Inventories  
GHS: Classification

**Prepared by**

This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).



## SAFETY DATA SHEET

### KLARAID\* CDP1304

#### 1. Identification

Product identifier	KLARAID CDP1304
Other means of identification	Not available.
Recommended use	Coagulant
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Corrosive to metals	Category 1
Health hazards	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
OSHA defined hazards	Not classified.	

#### Label elements



Signal word Warning

Hazard statement May be corrosive to metals. Causes skin irritation. Causes serious eye irritation. May cause respiratory irritation.

#### Precautionary statement

##### Prevention

Keep only in original container. Avoid breathing mist or vapor. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves. Wear eye/face protection.

##### Response

If on skin: Wash with plenty of water/. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a poison center/doctor// if you feel unwell. Specific treatment (see on this label). If skin irritation occurs: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. Take off contaminated clothing and wash before reuse. Absorb spillage to prevent material damage.

##### Storage

Store in a well-ventilated place. Keep container tightly closed. Store locked up. Store in corrosive resistant/ container with a resistant inner liner.

##### Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.



### 3. Composition/information on ingredients

#### Mixtures

Chemical name	Common name and synonyms	CAS number	%
Aluminium sulphate		10043-01-3	20 - 40

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

**Composition comments** Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

### 4. First-aid measures

<b>Inhalation</b>	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
<b>Skin contact</b>	Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.
<b>Eye contact</b>	Continue rinsing. Get medical attention if irritation develops and persists.
<b>Ingestion</b>	Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately.
<b>Most important symptoms/effects, acute and delayed</b>	Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause respiratory irritation. May cause redness and pain.
<b>Indication of immediate medical attention and special treatment needed</b>	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
<b>General information</b>	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

### 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO <sub>2</sub> ).
<b>Unsuitable extinguishing media</b>	Water. Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards arising from the chemical</b>	During fire, gases hazardous to health may be formed.
<b>Special protective equipment and precautions for firefighters</b>	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
<b>Fire-fighting equipment/instructions</b>	Move containers from fire area if you can do so without risk.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.

### 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate protective equipment and clothing during clean-up. Avoid inhalation of vapors or mists. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
<b>Methods and materials for containment and cleaning up</b>	<p>Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb spillage to prevent material damage. Absorb in vermiculite, dry sand or earth and place into containers. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.</p> <p>Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.</p> <p>Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.</p>
<b>Environmental precautions</b>	Avoid discharge into drains, water courses or onto the ground.

### 7. Handling and storage

<b>Precautions for safe handling</b>	Acidic. Do not mix with alkaline material. Avoid breathing mist or vapor. Avoid contact with skin. Avoid contact with eyes. Avoid prolonged exposure. Avoid contact with clothing. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Use care in handling/storage.
--------------------------------------	---

**Conditions for safe storage,  
including any incompatibilities**

Store locked up. Store in corrosive resistant container with a resistant inner liner. Store in original tightly closed container. Keep only in the original container. Store in a cool, dry place out of direct sunlight. Store away from incompatible materials (see Section 10 of the SDS). Store in accordance with local/regional/national/international regulation.

## 8. Exposure controls/personal protection

### Occupational exposure limits

#### US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Aluminium sulphate (CAS 10043-01-3)	TWA	1 mg/m <sup>3</sup>	Respirable fraction.

#### US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Aluminium sulphate (CAS 10043-01-3)	TWA	2 mg/m <sup>3</sup>

### Biological limit values

No biological exposure limits noted for the ingredient(s).

### Appropriate engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

### Individual protection measures, such as personal protective equipment

#### Eye/face protection

Splash proof chemical goggles.

#### Skin protection

##### Hand protection

Chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.

##### Other

Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

#### Respiratory protection

Chemical respirator with organic vapor cartridge and full facepiece. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

#### Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

### General hygiene considerations

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

### Appearance

#### Color

Light yellow to green

#### Physical state

Liquid

### Odor

Slight

### Odor threshold

Not available.

### pH (concentrated product)

2.4

### pH in aqueous solution

3.7 (5% SOL.)

### Melting point/freezing point

6 °F (-14 °C)

### Initial boiling point and boiling range

220 °F (104 °C)

### Flash point

> 200 °F (> 93 °C) P-M(CC)

### Evaporation rate

< 1 (Ether = 1)

### Flammability (solid, gas)

Not available.

### Upper/lower flammability or explosive limits

#### Flammability limit - lower (%)

Not available.

#### Flammability limit - upper (%)

Not available.

#### Explosive limit - lower (%)

Not available.

#### Explosive limit - upper (%)

Not available.

Vapor pressure	18 mm Hg
Vapor pressure temp.	70 °F (21 °C)
Vapor density	< 1 (Air = 1)
Relative density	1.29
Relative density temperature	70 °F (21 °C)
Solubility(ies)	
Solubility (water)	100 %
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	373 cps
Viscosity temperature	70 °F (21 °C)
Other information	
Percent volatile	0 (Calculated)
Pour point	11 °F (-12 °C)
Specific gravity	1.29

## 10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Not available.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Avoid temperatures exceeding the flash point. Contact with incompatible materials. None under normal conditions.
Incompatible materials	May react with bases or strong oxidisers. Do not contaminate.
Hazardous decomposition products	Oxides of carbon, nitrogen, and sulphur evolved in fire.

## 11. Toxicological information

### Information on likely routes of exposure

Ingestion	Expected to be a low ingestion hazard.
Inhalation	Prolonged inhalation may be harmful. May cause irritation to the respiratory system.
Skin contact	Causes skin irritation.
Eye contact	Causes serious eye irritation.

Symptoms related to the physical, chemical and toxicological characteristics	May cause redness and pain. May cause respiratory irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision.
--	--

### Information on toxicological effects

Acute toxicity	May cause respiratory irritation.
----------------	-----------------------------------

Product	Species	Test Results
KLARAID CDP1304 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 2000 mg/kg, (Estimated value)
<i>Oral</i>		
LD50	Rat	> 2000 mg/kg, (Estimated value)
Components	Species	Test Results
Aluminium sulphate (CAS 10043-01-3)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg

Components	Species	Test Results
<i>Inhalation</i>		
LC50	Rat	5 mg/l/4h
<i>Oral</i>		
LD50	Rat	> 2000 mg/kg

\* Estimates for product may be based on additional component data not shown.

<b>Skin corrosion/irritation</b>	Causes skin irritation.
<b>Serious eye damage/eye irritation</b>	Causes serious eye irritation.
<b>Respiratory or skin sensitization</b>	
<b>Respiratory sensitization</b>	Not available.
<b>Skin sensitization</b>	This product is not expected to cause skin sensitization.
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Carcinogenicity</b>	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
<b>ACGIH Carcinogens</b>	
Aluminium sulphate (CAS 10043-01-3)	A4 Not classifiable as a human carcinogen.
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	
Not listed.	
<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.
<b>Specific target organ toxicity - single exposure</b>	May cause respiratory irritation.
<b>Specific target organ toxicity - repeated exposure</b>	Not classified.
<b>Aspiration hazard</b>	Not available.
<b>Chronic effects</b>	Prolonged inhalation may be harmful.

## 12. Ecological information

<b>Ecotoxicity</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
--------------------	--

Product	Species	Test Results
KLARAID CDP1304 (CAS Mixture)	LC50	Ceriodaphnia
		0.57 mg/L, Static Renewal Bioassay, 48 hour
		Fathead Minnow
		5.3 mg/L, Static Renewal Bioassay, 96 hour
	NOEL	Ceriodaphnia
		0.31 mg/L, Static Renewal Bioassay, 48 hour
		Fathead Minnow
		1.3 mg/L, Static Renewal Bioassay, 96 hour
Crustacea	LC50	Daphnia magna
		5 mg/L, Static Renewal Bioassay, 48 hour
Other	NOEL	Daphnia magna
		0.31 mg/L, Static Renewal Bioassay, 48 hour
	LC50	Rainbow Trout
		0.97 mg/L, Static Renewal Bioassay, 96 hour
	NOEL	Rainbow Trout
		0.63 mg/L, Static Renewal Bioassay, 96 hour

\* Estimates for product may be based on additional component data not shown.

<b>Bioaccumulative potential</b>	No data available.
<b>Mobility in soil</b>	No data available.
<b>Other adverse effects</b>	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.
<b>Environmental fate</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.



## Persistence and degradability

- COD (mgO <sub>2</sub> /g)	Testing has shown product not to be readily biodegradable. 55 (calculated data)
- BOD 5 (mgO <sub>2</sub> /g)	0 (calculated data)
- BOD 28 (mgO <sub>2</sub> /g)	0 (calculated data)
- Closed Bottle Test (% Degradation in 28 days)	2 (calculated data)
- Zahn-Wellens Test (% Degradation in 28 days)	1 (calculated data)
- TOC (mg C/g)	27 (calculated data)

## 13. Disposal considerations

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	D002: Waste Corrosive material [pH ≤2 or ≥12.5, or corrosive to steel] The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
<b>Contaminated packaging</b>	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

## 14. Transport information

### DOT

UN number	UN3264
UN proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (ALUMINUM SULFATE), RQ
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	III
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
ERG number	154
Some containers may be DOT exempt, please check BOL for exact container classification.	

### IATA

UN number	UN3264
UN proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (Aluminium sulphate)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	III
Environmental hazards	No.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

### IMDG

UN number	UN3264
UN proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (ALUMINUM SULPHATE)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	III
Environmental hazards	
Marine pollutant	No.
EmS	Not available.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

DOT



IATA; IMDG



## 15. Regulatory information

### US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

All components are on the U.S. EPA TSCA Inventory List.

#### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

#### US CWA Section 304(a)(1) Ambient Water Quality Criteria: Listed substance

Aluminium sulphate (CAS 10043-01-3)

Listed. LISTED ALUMINUM PH 6.5-9.0 US CWA Section 304(a)(1)  
Ambient Water Quality Criteria: Listed substance

#### CERCLA Hazardous Substance List (40 CFR 302.4)

Aluminium sulphate (CAS 10043-01-3)

Listed.

#### SARA 304 Emergency release notification

Not regulated.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

### Superfund Amendments and Reauthorization Act of 1986 (SARA)

#### Hazard categories

Immediate Hazard - Yes  
Delayed Hazard - No  
Fire Hazard - No  
Pressure Hazard - No  
Reactivity Hazard - No

#### SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity	Threshold planning quantity	Threshold planning quantity, lower value	Threshold planning quantity, upper value
---------------	------------	---------------------	-----------------------------	--	--

Epichlorhydrin	106-89-8	100	1000 lbs		
----------------	----------	-----	----------	--	--

SARA 311/312 Hazardous chemical

No

#### SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Epichlorhydrin	106-89-8	0 - 0.1

### Other federal regulations

#### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

#### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

**Safe Drinking Water Act (SDWA)** Not regulated.

**Inventory status**

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)  
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

**Food and drug administration** Food process use authorized 21CFR.

**NSF Registered and/or meets USDA (according to 1998 guidelines):** Registration No. – 145571  
Category Code(s):  
G5 Cooling and retort water treatment products  
G7 Boiler, steam line treatment products – nonfood contact

**US state regulations** WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

**US - Massachusetts RTK - Substance List**

Aluminium sulphate (CAS 10043-01-3)

**US - Pennsylvania RTK - Hazardous Substances**

Aluminium sulphate (CAS 10043-01-3)

**US - Rhode Island RTK**

Aluminium sulphate (CAS 10043-01-3)

**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

**US. New Jersey Worker and Community Right-to-Know Act**

Not regulated.

**US. California Proposition 65**

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

Epichlorohydrin (CAS 106-89-8) Listed: October 1, 1987

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Female reproductive toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Male reproductive toxin**

Epichlorohydrin (CAS 106-89-8) Listed: September 1, 1996

**16. Other information, including date of preparation or last revision**

**Issue date** Oct-07-2014

**Revision date** Oct-08-2014

**Version #** 1.0

**List of abbreviations**

CAS: Chemical Abstract Service Registration Number  
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.  
ACGIH: American Conference of Governmental Industrial Hygienists  
NOEL: No Observed Effect Level  
STEL: Short Term Exposure Limit  
LC50: Lethal Concentration, 50%  
TWA: Time Weighted Average  
BOD: Biochemical Oxygen Demand  
COD: Chemical Oxygen Demand  
TOC: Total Organic Carbon  
IATA: International Air Transport Association  
IMDG: International Maritime Dangerous Goods Code  
TLV: Threshold Limit Value  
LD50: Lethal Dose, 50%  
NFPA: National Fire Protection Association

**References:** No data available

**Disclaimer**

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**Revision Information**

GHS: Classification

**Prepared by**

This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.





## SAFETY DATA SHEET

### KLEEN MCT103

#### 1. Identification

Product identifier	KLEEN MCT103
Other means of identification	None.
Recommended use	Reverse Osmosis membrane cleaner
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Skin corrosion/irritation	Category 1B
	Serious eye damage/eye irritation	Category 1
	Carcinogenicity	Category 2
	Reproductive toxicity	Category 1B
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
OSHA defined hazards	Not classified.	

#### Label elements



Signal word	Danger
Hazard statement	Causes severe skin burns and eye damage. Causes serious eye damage. May cause respiratory irritation. Suspected of causing cancer. May damage fertility or the unborn child.

#### Precautionary statement

Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe mist or vapor. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection.
Response	If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor/. Specific treatment (see on this label). Wash contaminated clothing before reuse.
Storage	Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal	Dispose of contents/container to an approved facility.

**Hazard(s) not otherwise classified (HNOC)**      None known.

**Supplemental information**      None.

### 3. Composition/information on ingredients

#### Mixtures

Components	CAS #	Percent
N-hydroxyethylenediamine triacetic acid trisodium salt	139-89-9	20 - 40
Hydroxyacetic acid	79-14-1	10 - 20
Sodium glycollate	2836-32-0	1 - 2.5
methoxyacetic acid	625-45-6	0.1 - 1

**Composition comments**      Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

### 4. First-aid measures

**Inhalation**      Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Seek medical attention.

**Skin contact**      Wash thoroughly with soap and water. Remove contaminated clothing. Chemical burns must be treated by a physician. Call a physician or poison control center immediately. Thoroughly wash clothing before reuse.

**Eye contact**      Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Keep eyelids apart. Continue rinsing. Call a physician or poison control center immediately.

**Ingestion**      Do not feed anything by mouth to an unconscious or convulsive victim. Dilute contents of stomach using 2-8 fluid ounces (60-240ml) of milk or water. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Immediately contact a physician.

**Most important symptoms/effects, acute and delayed**      Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation.

**Indication of immediate medical attention and special treatment needed**      No special instructions. Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim under observation. Symptoms may be delayed.

**General information**      IF exposed or concerned: Get medical advice/attention. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

### 5. Fire-fighting measures

**Suitable extinguishing media**      Dry chemical, CO2, water spray or regular foam. Powder. Foam.

**Unsuitable extinguishing media**      Do not use water jet as an extinguisher, as this will spread the fire.

**Specific hazards arising from the chemical**      Oxides of carbon and sulphur evolved in fire.

**Special protective equipment and precautions for firefighters**      Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

**Fire fighting equipment/instructions**      Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

**Specific methods**      Area should be well-ventilated. Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

**General fire hazards**      No unusual fire or explosion hazards noted. Non flammable liquid

### 6. Accidental release measures

**Personal precautions, protective equipment and emergency procedures**      Wear appropriate protective equipment and clothing during clean-up. See Section 8 of the SDS for Personal Protective Equipment. Keep unnecessary personnel away. Do not breathe mist or vapor. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

<b>Methods and materials for containment and cleaning up</b>	<p>Ventilate the area. Soak up with inert absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.</p> <p>Large Spills: Stop the flow of material, if this is without risk. Use water spray to reduce vapors or divert vapor cloud drift. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.</p> <p>Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.</p> <p>Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.</p>
<b>Environmental precautions</b>	<p>Avoid discharge into drains, water courses or onto the ground.</p> <p>Prevent from entering sewers or the immediate environment.</p>

## 7. Handling and storage

<b>Precautions for safe handling</b>	<p>Acidic. Do not mix with alkaline material. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe mist or vapor. Do not get in eyes, on skin, or on clothing. Avoid prolonged exposure. Pregnant or breastfeeding women must not handle this product. Should be handled in closed systems, if possible. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.</p>
<b>Conditions for safe storage, including any incompatibilities</b>	<p>Do not freeze. If frozen, thaw completely and mix thoroughly prior to use. Keep away from strong bases. Store locked up. Store in original tightly closed container. Store in accordance with local/regional/national/international regulation. Keep container tightly closed in a dry and well-ventilated place.</p>

## 8. Exposure controls/personal protection

<b>Occupational exposure limits</b>	No exposure limits noted for ingredient(s).
<b>Biological limit values</b>	No biological exposure limits noted for the ingredient(s).
<b>Appropriate engineering controls</b>	<p>Provide adequate ventilation. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Provide eyewash station.</p>
<b>Individual protection measures, such as personal protective equipment</b>	
<b>Eye/face protection</b>	Splash proof chemical goggles. Face shield.
<b>Skin protection</b>	
<b>Hand protection</b>	Rubber, butyl, viton or neoprene glove. Wash off after each use. Replace as necessary. Wear appropriate chemical resistant gloves.
<b>Other</b>	Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.
<b>Respiratory protection</b>	<p>If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.</p>
<b>Thermal hazards</b>	Not applicable. Wear appropriate thermal protective clothing, when necessary.
<b>General hygiene considerations</b>	<p>When using, do not eat, drink or smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.</p>

## 9. Physical and chemical properties

<b>Appearance</b>	
<b>Color</b>	Colorless to amber
<b>Physical state</b>	Liquid
<b>Odor</b>	Slight acetic
<b>Odor threshold</b>	Not available.
<b>pH (concentrated product)</b>	3.4
<b>pH in aqueous solution</b>	3.3 (5% SOL.)
<b>Melting point/freezing point</b>	-5 °F (-21 °C)

<b>Initial boiling point and boiling range</b>	210 °F (99 °C)
<b>Flash point</b>	Not applicable.
<b>Evaporation rate</b>	< 1 (Ether = 1)
<b>Flammability (solid, gas)</b>	Not applicable.
<b>Upper/lower flammability or explosive limits</b>	
<b>Flammability limit - lower (%)</b>	Not available.
<b>Flammability limit - upper (%)</b>	Not available.
<b>Explosive limit - lower (%)</b>	Not available.
<b>Explosive limit - upper (%)</b>	Not available.
<b>Vapor pressure</b>	18 mm Hg
<b>Vapor pressure temp.</b>	70 °F (21 °C)
<b>Vapor density</b>	> 1 (Air = 1)
<b>Relative density</b>	1.35
<b>Relative density temperature</b>	70 °F (21 °C)
<b>Solubility(ies)</b>	
<b>Solubility (water)</b>	100 %
<b>Partition coefficient (n-octanol/water)</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Viscosity</b>	28 cps
<b>Viscosity temperature</b>	70 °F (21 °C)
<b>Other information</b>	
<b>Percent volatile</b>	10 (Estimated)
<b>Pour point</b>	0 °F (-18 °C)
<b>Specific gravity</b>	1.35

## 10. Stability and reactivity

<b>Reactivity</b>	May react violently with alkaline materials.
<b>Chemical stability</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions</b>	Hazardous polymerization does not occur.
<b>Conditions to avoid</b>	Protect from freezing.
<b>Incompatible materials</b>	Avoid contact with strong oxidizers. Avoid contact with strong bases.
<b>Hazardous decomposition products</b>	Oxides of carbon and sulphur evolved in fire.

## 11. Toxicological information

### Information on likely routes of exposure

<b>Inhalation</b>	Mists/aerosols may cause irritation to upper respiratory tract.
<b>Skin contact</b>	Causes severe skin burns. Corrosive to skin.
<b>Eye contact</b>	Causes severe eye burns.
<b>Ingestion</b>	Causes digestive tract burns. Ingestion may cause severe irritation of the mouth, the esophagus and the gastrointestinal tract.

**Symptoms related to the physical, chemical and toxicological characteristics** Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation.

### Information on toxicological effects

<b>Acute toxicity</b>	May cause respiratory irritation. Not classified.
-----------------------	---



Product	Species	Test Results
KLEEN MCT103 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg, (Calculated according to GHS additivity formula)
<i>Inhalation</i>		
LC50	Rat	> 5 mg/l, 4 Hour, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	Rat	4669 mg/kg, (Calculated according to GHS additivity formula (Category 5))

Components	Species	Test Results
Hydroxyacetic acid (CAS 79-14-1)		
<b>Acute</b>		
<i>Inhalation</i>		
LC50	Rat	3.6 mg/L, 4 Hour
<i>Oral</i>		
LD50	Rat	1938 mg/kg
methoxyacetic acid (CAS 625-45-6)		
<b>Acute</b>		
<i>Oral</i>		
LD50	Rat	1000 mg/kg
N-hydroxyethylenediamine triacetic acid trisodium salt (CAS 139-89-9)		
<b>Acute</b>		
<i>Inhalation</i>		
LC50	Rat	> 10.054 mg/l, 4 Hour
<i>Oral</i>		
LD50	Rat	1780 mg/kg
Sodium glycollate (CAS 2836-32-0)		
<b>Acute</b>		
<i>Oral</i>		
LD50	Rat	7110 mg/kg

\* Estimates for product may be based on additional component data not shown.

<b>Skin corrosion/irritation</b>	Causes skin burns.
<b>Serious eye damage/eye irritation</b>	Causes burns, possibly corrosive.
<b>Respiratory or skin sensitization</b>	
<b>Respiratory sensitization</b>	Not classified.
<b>Skin sensitization</b>	Not classified.
<b>Germ cell mutagenicity</b>	Not classified.
<b>Carcinogenicity</b>	Category 2 Risk of cancer cannot be excluded with prolonged exposure.

#### IARC Monographs. Overall Evaluation of Carcinogenicity

Not available.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

#### US. National Toxicology Program (NTP) Report on Carcinogens

Not available.

<b>Reproductive toxicity</b>	Category 1B / Reproductive Toxicity ANIMALS : Positive May damage fertility or the unborn child.
<b>Specific target organ toxicity - single exposure</b>	May cause respiratory irritation.
<b>Specific target organ toxicity - repeated exposure</b>	Not classified.

<b>Aspiration hazard</b>	Based on available data, the classification criteria are not met. Aspiration of this product may cause the same corrosiveness/irritation impacts as if it were ingested.
<b>Chronic effects</b>	May increase the risk of cancer based on limited animal data. Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects.

## 12. Ecological information

### Ecotoxicity

Product		Species	Test Results
KLEEN MCT103 (CAS Mixture)	0% Mortality	Fathead Minnow	2000 mg/L, Static Bioassay with 48-Hour Renewal, 96 hour, (pH adjusted)
<b>Aquatic</b>			
Crustacea	LC50	Daphnia magna	1890 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)
	NOEL	Daphnia magna	1060 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)

\* Estimates for product may be based on additional component data not shown.

### Bioaccumulative potential

#### Partition coefficient n-octanol / water (log Kow)

Hydroxyacetic acid -1.11

**Mobility in soil** No data available.

**Other adverse effects** Not available.

### Persistence and degradability

No data is available on the degradability of this product.

- COD (mgO2/g)	335 (calculated data)
- BOD 5 (mgO2/g)	70 (calculated data)
- BOD 28 (mgO2/g)	105 (calculated data)
- Closed Bottle Test (% Degradation in 28 days)	23 (calculated data)
- Zahn-Wellens Test (% Degradation in 28 days)	27 (calculated data)
- TOC (mg C/g)	150 (calculated data)

## 13. Disposal considerations

<b>Disposal instructions</b>	Dispose of contents/container in accordance with local/regional/national/international regulations. Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	D002: Waste Corrosive material (pH ≤2 or ≥12.5, or corrosive to steel) The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
<b>Contaminated packaging</b>	Via an authorized waste disposal contractor to an approved waste disposal site, observing all local and national regulations. Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

## 14. Transport information

### DOT

<b>UN number</b>	UN3265
<b>UN proper shipping name</b>	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (HYDROXYACETIC ACID)
<b>Transport hazard class(es)</b>	
<b>Class</b>	8
<b>Subsidiary risk</b>	-
<b>Packing group</b>	II

Material name: KLEEN MCT103

Version number: 2.0

Page: 6 / 9

**Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.  
**ERG number** 153  
Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

#### IATA

**UN number** UN3265  
**UN proper shipping name** CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (HYDROXYACETIC ACID)  
**Transport hazard class(es)**  
    **Class** 8  
    **Subsidiary risk** -  
**Packing group** II  
**Environmental hazards** No.  
**ERG Code** 153  
**Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.

#### IMDG

**UN number** UN3265  
**UN proper shipping name** CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (HYDROXYACETIC ACID)  
**Transport hazard class(es)**  
    **Class** 8  
    **Subsidiary risk** -  
**Packing group** II  
**Environmental hazards**  
    **Marine pollutant** No.  
**EmS** Not available.  
**Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.

#### DOT



#### IATA; IMDG



## 15. Regulatory information

**US federal regulations** This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**

Not regulated.

**CERCLA Hazardous Substance List (40 CFR 302.4)**

Not listed.

**SARA 304 Emergency release notification**

Not regulated.

**OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)**

Not listed.

## Superfund Amendments and Reauthorization Act of 1986 (SARA)

**Hazard categories**  
Immediate Hazard - Yes  
Delayed Hazard - Yes  
Fire Hazard - No  
Pressure Hazard - No  
Reactivity Hazard - No

### SARA 302 Extremely hazardous substance

Not listed.

**SARA 311/312 Hazardous chemical** Yes

### SARA 313 (TRI reporting)

Not regulated.

## Other federal regulations

### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

**Safe Drinking Water Act (SDWA)** Not regulated.

## Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

## US state regulations

### US - Massachusetts RTK - Substance List

Not regulated.

### US - Pennsylvania RTK - Hazardous Substances

Not regulated.

### US - Rhode Island RTK

Not regulated.

### US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

### US. New Jersey Worker and Community Right-to-Know Act

Not listed.

### US. Pennsylvania Worker and Community Right-to-Know Law

Not listed.

### US. California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

#### US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Formaldehyde (CAS 50-00-0)

Listed: January 1, 1988

#### US - California Proposition 65 - CRT: Listed date/Developmental toxin

No ingredient listed.

#### US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

No ingredient listed.

#### US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

No ingredient listed.

## 16. Other information, including date of preparation or last revision

**Issue date** Jul-03-2014

**Revision date** Aug-12-2015

**Version #** 2.0

### List of abbreviations

Material name: KLEEN MCT103

Version number: 2.0



CAS: Chemical Abstract Service Registration Number  
NFPA: National Fire Protection Association  
ACGIH: American Conference of Governmental Industrial Hygienists  
TWA: Time Weighted Average  
STEL: Short Term Exposure Limit  
LD50: Lethal Dose, 50%  
LC50: Lethal Concentration, 50%  
EC50: Effect Concentration, 50%  
NOEL: No Observed Effect Level  
COD: Chemical Oxygen Demand  
BOD: Biochemical Oxygen Demand  
TOC: Total Organic Carbon  
CEN: European Committee for Standardisation  
IATA: International Air Transport Association  
IMDG: International Maritime Dangerous Goods Code  
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.

**References:**

Safety data sheets of raw materials.

**Disclaimer**

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**Revision Information**

Composition/information on ingredients: Component information  
Exposure controls/personal protection: Respiratory protection  
Physical & Chemical Properties: Multiple Properties  
Transport Information: Material Transportation Information  
HazReg Data: North America

**Prepared by**

This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).



## SAFETY DATA SHEET

### KLEEN MCT511

#### 1. Identification

Product identifier	KLEEN MCT511
Other means of identification	None.
Recommended use	Reverse Osmosis membrane cleaner
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Corrosive to metals	Category 1
Health hazards	Acute toxicity, inhalation	Category 4
	Skin corrosion/irritation	Category 1B
	Serious eye damage/eye irritation	Category 1
	Carcinogenicity	Category 2
	Reproductive toxicity	Category 2
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
	Specific target organ toxicity, single exposure	Category 3 narcotic effects
	Specific target organ toxicity, repeated exposure (oral, dermal)	Category 2 (liver, kidney)
OSHA defined hazards	Not classified.	

#### Label elements



#### Signal word

Danger

#### Hazard statement

May be corrosive to metals. Causes severe skin burns and eye damage. Causes serious eye damage. Harmful if inhaled. May cause respiratory irritation. May cause drowsiness or dizziness. Suspected of causing cancer. Suspected of damaging fertility or the unborn child. May cause damage to organs (liver, kidney) through prolonged or repeated exposure by skin contact. May cause damage to organs (liver, kidney) through prolonged or repeated exposure by ingestion.

#### Precautionary statement

##### Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep only in original container. Do not breathe mist or vapor. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection.

<b>Response</b>	If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor/. Specific treatment (see on this label). Wash contaminated clothing before reuse. Absorb spillage to prevent material damage.
<b>Storage</b>	Store in a well-ventilated place. Keep container tightly closed. Store locked up. Store in corrosive resistant/ container with a resistant inner liner.
<b>Disposal</b>	Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Hazard(s) not otherwise classified (HNOC)</b>	None known.
<b>Supplemental information</b>	None.

### 3. Composition/information on ingredients

#### Mixtures

Components	CAS #	Percent
Ethylenediamine tetraacetic acid, tetrasodium salt (EDTA.4Na)	64-02-8	20 - 40
Triethanolamine	102-71-6	20 - 40
Diethanolamine	111-42-2	2.5 - 10
Ethanolamine	141-43-5	2.5 - 10
2-hydroxyethylammonium chloride	2002-24-6	1 - 2.5
Benzene, 1,1'-oxybis-, Tetrapropylene Derivs., Sulfonated, Sodium Salts	119345-04-9	1 - 2.5
Sodium glycollate	2836-32-0	1 - 2.5

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

<b>Composition comments</b>	Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.
-----------------------------	--

### 4. First-aid measures

<b>Inhalation</b>	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Do not use mouth-to-mouth method if victim inhaled the substance. Oxygen or artificial respiration if needed. Seek medical attention.
<b>Skin contact</b>	Remove contaminated clothing. Wash thoroughly with soap and water. Seek medical attention. Thoroughly wash clothing before reuse.
<b>Eye contact</b>	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Keep eyelids apart. Call a physician or poison control center immediately.
<b>Ingestion</b>	Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Immediately give 1-2 glasses of water, if victim is fully conscious. Call a physician or poison control center immediately.
<b>Most important symptoms/effects, acute and delayed</b>	Burning pain and severe corrosive skin damage. Edema. Jaundice. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Vapors have a narcotic effect and may cause headache, fatigue, dizziness and nausea. May cause respiratory irritation. Prolonged exposure may cause chronic effects.
<b>Indication of immediate medical attention and special treatment needed</b>	Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
<b>General information</b>	IF exposed or concerned: Get medical advice/attention. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

### 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Alcohol resistant foam. Water fog. Dry chemical powder. Carbon dioxide (CO2).
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards arising from the chemical</b>	During fire, gases hazardous to health may be formed.
<b>Special protective equipment and precautions for firefighters</b>	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

**Fire fighting  
equipment/instructions**

Move containers from fire area if you can do so without risk.

**Specific methods**

Use standard firefighting procedures and consider the hazards of other involved materials.

## 6. Accidental release measures

**Personal precautions, protective  
equipment and emergency  
procedures**

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

**Methods and materials for  
containment and cleaning up**

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb spillage to prevent material damage. Absorb in vermiculite, dry sand or earth and place into containers. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

**Environmental precautions**

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS. Avoid discharge into drains, water courses or onto the ground.

## 7. Handling and storage

**Precautions for safe handling**

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe mist or vapor. Do not get this material in contact with eyes. Do not get this material in contact with skin. Avoid contact during pregnancy/while nursing. Avoid prolonged exposure. Do not get this material on clothing. When using, do not eat, drink or smoke. Should be handled in closed systems, if possible. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Observe good industrial hygiene practices.

**Conditions for safe storage,  
including any incompatibilities**

Store locked up. Store containers closed when not in use. Do not freeze. If frozen, thaw completely and mix thoroughly prior to use. Store in corrosive resistant container with a resistant inner liner. Keep only in the original container. Store in a cool, dry place out of direct sunlight. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

## 8. Exposure controls/personal protection

**Occupational exposure limits**

**US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)**

Components	Type	Value
Ethanolamine (CAS 141-43-5)	PEL	6 mg/m <sup>3</sup> 3 ppm

**US. ACGIH Threshold Limit Values**

Components	Type	Value	Form
Diethanolamine (CAS 111-42-2)	TWA	1 mg/m <sup>3</sup>	Inhalable fraction and vapor.
Ethanolamine (CAS 141-43-5)	STEL	6 ppm	
	TWA	3 ppm	
Triethanolamine (CAS 102-71-6)	TWA	5 mg/m <sup>3</sup>	

**US. NIOSH: Pocket Guide to Chemical Hazards**

Components	Type	Value
Diethanolamine (CAS 111-42-2)	TWA	15 mg/m <sup>3</sup> 3 ppm
Ethanolamine (CAS 141-43-5)	STEL	15 mg/m <sup>3</sup> 6 ppm
	TWA	8 mg/m <sup>3</sup> 3 ppm

**Biological limit values**

No biological exposure limits noted for the ingredient(s).

**Exposure guidelines**

**US. ACGIH Threshold Limit Values**

Diethanolamine (CAS 111-42-2)

Can be absorbed through the skin.



<b>Appropriate engineering controls</b>	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.
<b>Individual protection measures, such as personal protective equipment</b>	
<b>Eye/face protection</b>	Splash proof chemical goggles. Face shield.
<b>Skin protection</b>	
<b>Hand protection</b>	Chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.
<b>Other</b>	Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.
<b>Respiratory protection</b>	A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE. Chemical respirator with organic vapor cartridge and full facepiece.
<b>Thermal hazards</b>	Wear appropriate thermal protective clothing, when necessary.
<b>General hygiene considerations</b>	When using, do not eat, drink or smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

<b>Appearance</b>	
<b>Color</b>	Colorless to amber
<b>Physical state</b>	Liquid
<b>Odor</b>	Slight
<b>Odor threshold</b>	Not available.
<b>pH (concentrated product)</b>	10.9
<b>pH in aqueous solution</b>	10.7 (5% SOL.)
<b>Melting point/freezing point</b>	-10 °F (-23 °C)
<b>Initial boiling point and boiling range</b>	220 °F (104 °C)
<b>Flash point</b>	> 200 °F (> 93 °C) P-M(CC)
<b>Evaporation rate</b>	< 1 (Ether = 1)
<b>Flammability (solid, gas)</b>	Not available.
<b>Upper/lower flammability or explosive limits</b>	
<b>Flammability limit - lower (%)</b>	Not available.
<b>Flammability limit - upper (%)</b>	Not available.
<b>Explosive limit - lower (%)</b>	Not available.
<b>Explosive limit - upper (%)</b>	Not available.
<b>Vapor pressure</b>	18 mm Hg
<b>Vapor pressure temp.</b>	70 °F (21 °C)
<b>Vapor density</b>	5 (Air = 1)
<b>Relative density</b>	1.22
<b>Relative density temperature</b>	70 °F (21 °C)
<b>Solubility(ies)</b>	
<b>Solubility (water)</b>	100 %
<b>Partition coefficient (n-octanol/water)</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Viscosity</b>	99 cps
<b>Viscosity temperature</b>	70 °F (21 °C)

## Other information

Percent volatile	36 (Calculated)
Pour point	-5 °F (-21 °C)
Specific gravity	1.22

## 10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Contact with water reactive compounds may cause fire or explosion. Hazardous polymerization does not occur.
Conditions to avoid	Protect from freezing. Avoid contact with strong oxidizers.
Incompatible materials	Strong acids. Strong oxidizing agents.
Hazardous decomposition products	Ammonia, oxides of carbon, nitrogen and sulphur evolved in fire. Hydrogen chloride gas (HCl). Volatile amines.

## 11. Toxicological information

### Information on likely routes of exposure

Inhalation	Harmful if inhaled. May cause damage to organs by inhalation. Vapors have a narcotic effect and may cause headache, fatigue, dizziness and nausea.
Skin contact	Causes severe skin burns.

Prolonged or repeated exposure may cause liver and kidney damage. These effects have not been observed in humans.

Eye contact	Direct contact with eyes may cause temporary irritation.
-------------	--

Ingestion	Causes digestive tract burns.
-----------	-------------------------------

Symptoms related to the physical, chemical and toxicological characteristics	Burning pain and severe corrosive skin damage. Edema. Jaundice. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
--	---

### Information on toxicological effects

Acute toxicity	Harmful if inhaled. Narcotic effects. May cause respiratory irritation.
----------------	---

Product	Species	Test Results
KLEEN MCT511 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	Rat	3070 mg/kg, (Calculated according to GHS additivity formula)
Components	Species	Test Results
Benzene, 1,1'-oxybis-, Tetrapropylene Derivs., Sulfonated, Sodium Salts (CAS 119345-04-9)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 2000 mg/kg
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg
Diethanolamine (CAS 111-42-2)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	4000 mg/kg
<i>Oral</i>		
LD50	Rat	1600 mg/kg

Components	Species	Test Results
Ethanolamine (CAS 141-43-5)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	1025 mg/kg
<i>Inhalation</i>		
LC50	Rat	> 1.5 mg/l, 4 Hour
<i>Oral</i>		
LD50	Rat	1720 mg/kg
Ethylenediamine tetraacetic acid, tetrasodium salt (EDTA.4Na) (CAS 64-02-8)		
<b>Acute</b>		
<i>Oral</i>		
LD50	Rat	1658 mg/kg
Sodium glycollate (CAS 2836-32-0)		
<b>Acute</b>		
<i>Oral</i>		
LD50	Rat	7110 mg/kg
Triethanolamine (CAS 102-71-6)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 2000 mg/kg
<i>Oral</i>		
LD50	Rat	8000 mg/kg

\* Estimates for product may be based on additional component data not shown.

<b>Skin corrosion/irritation</b>	Prolonged skin contact may cause temporary irritation.
<b>Serious eye damage/eye irritation</b>	Direct contact with eyes may cause temporary irritation.
<b>Respiratory or skin sensitization</b>	
<b>Respiratory sensitization</b>	Not available.
<b>Skin sensitization</b>	Not applicable.
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Carcinogenicity</b>	Risk of cancer cannot be excluded with prolonged exposure.
<b>IARC Monographs. Overall Evaluation of Carcinogenicity</b>	
Diethanolamine (CAS 111-42-2)	2B Possibly carcinogenic to humans.
Triethanolamine (CAS 102-71-6)	3 Not classifiable as to carcinogenicity to humans.
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	
Not listed.	
<b>Reproductive toxicity</b>	Suspected of damaging fertility or the unborn child.
<b>Specific target organ toxicity - single exposure</b>	Narcotic effects. May cause respiratory irritation.
<b>Specific target organ toxicity - repeated exposure</b>	May cause damage to organs (liver, kidney) through prolonged or repeated exposure by skin contact. May cause damage to organs (liver, kidney) through prolonged or repeated exposure by ingestion.
<b>Aspiration hazard</b>	Based on available data, the classification criteria are not met. May be harmful if swallowed and enters airways.
<b>Chronic effects</b>	May cause damage to organs through prolonged or repeated exposure. May be harmful if absorbed through skin. Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects.  Prolonged or repeated exposure may cause liver and kidney damage. These effects have not been observed in humans.

## 12. Ecological information

<b>Ecotoxicity</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
--------------------	--

Product		Species	Test Results
KLEEN MCT511 (CAS Mixture)	LC50	Fathead Minnow	61.6 mg/L, Static Renewal Bioassay, 96 hour, (pH adjusted)
	NOEL	Fathead Minnow	25 mg/L, Static Renewal Bioassay, 96 hour, (pH adjusted)
<b>Aquatic</b>			
Crustacea	LC50	Daphnia magna	342 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)
	NOEL	Daphnia magna	250 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)

\* Estimates for product may be based on additional component data not shown.

**Bioaccumulative potential** No data available.

**Partition coefficient n-octanol / water (log Kow)**

Diethanolamine	-1.43
Ethanolamine	-1.31
Triethanolamine	-1

**Mobility in soil** No data available.

**Other adverse effects** No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

**Environmental fate** The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

**Persistence and degradability**

No data is available on the degradability of this product.

- COD (mgO <sub>2</sub> /g)	805 (calculated data)
- BOD 5 (mgO <sub>2</sub> /g)	130 (calculated data)
- BOD 28 (mgO <sub>2</sub> /g)	142 (calculated data)
- Closed Bottle Test (% Degradation in 28 days)	10 (calculated data)
- Zahn-Wellens Test (% Degradation in 28 days)	12 (calculated data)
- TOC (mg C/g)	242 (calculated data)

### 13. Disposal considerations

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	D002: Waste Corrosive material [pH ≤2 or ≥12.5, or corrosive to steel] The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
<b>Contaminated packaging</b>	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

### 14. Transport information

**DOT**

UN number	UN3267
UN proper shipping name	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S. (MONOETHANOLAMINE, ETHYLENEDIAMINE TETRAACETIC ACID SODIUM SALT), (DIETHANOLAMINE) RQ
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	III
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
ERG number	153



Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

#### IATA

UN number	UN3267
UN proper shipping name	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S. (MONOETHANOLAMINE, ETHYLENEDIAMINE TETRAACETIC ACID SODIUM SALT)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	III
Environmental hazards	No.
ERG Code	153
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

#### IMDG

UN number	UN3267
UN proper shipping name	CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S. (MONOETHANOLAMINE, ETHYLENEDIAMINE TETRAACETIC ACID SODIUM SALT), RQ (DIETHANOLAMINE)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	III
Environmental hazards	
Marine pollutant	No.
EmS	Not available.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

#### DOT



#### IATA; IMDG



## 15. Regulatory information

### US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

All components are on the U.S. EPA TSCA Inventory List.

### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

### CERCLA Hazardous Substance List (40 CFR 302.4)

Diethanolamine (CAS 111-42-2)

Listed.

### SARA 304 Emergency release notification

Not regulated.

### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

**Superfund Amendments and Reauthorization Act of 1986 (SARA)**

**Hazard categories** Immediate Hazard - Yes  
Delayed Hazard - Yes  
Fire Hazard - No  
Pressure Hazard - No  
Reactivity Hazard - No

**SARA 302 Extremely hazardous substance**

Not listed.

**SARA 311/312 Hazardous chemical** No

**SARA 313 (TRI reporting)**

Chemical name	CAS number	% by wt.
Diethanolamine	111-42-2	2.5 - 10

**Other federal regulations****Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Diethanolamine (CAS 111-42-2)

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)**

Not regulated.

**Safe Drinking Water Act (SDWA)** Not regulated.

**Inventory status**

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

**US state regulations**

WARNING: This product contains a chemical known to the State of California to cause cancer.

**US - Massachusetts RTK - Substance List**

Diethanolamine (CAS 111-42-2)  
Ethanolamine (CAS 141-43-5)  
Triethanolamine (CAS 102-71-6)

**US - Pennsylvania RTK - Hazardous Substances**

Diethanolamine (CAS 111-42-2)  
Ethanolamine (CAS 141-43-5)  
Triethanolamine (CAS 102-71-6)

**US - Rhode Island RTK**

Diethanolamine (CAS 111-42-2)

**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

**US. New Jersey Worker and Community Right-to-Know Act**

Diethanolamine (CAS 111-42-2)  
Ethanolamine (CAS 141-43-5)  
Triethanolamine (CAS 102-71-6)

**US. Pennsylvania Worker and Community Right-to-Know Law**

Diethanolamine (CAS 111-42-2)  
Ethanolamine (CAS 141-43-5)  
Triethanolamine (CAS 102-71-6)

**US. California Proposition 65**

WARNING: This product contains a chemical known to the State of California to cause cancer.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

ARSENIC (CAS 7440-38-2)	Listed: February 27, 1987
Diethanolamine (CAS 111-42-2)	Listed: June 22, 2012
Formaldehyde (CAS 50-00-0)	Listed: January 1, 1988

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

No ingredient listed.

## 16. Other information, including date of preparation or last revision

Issue date Oct-25-2014

Revision date Jun-15-2015

Version # 1.1

### List of abbreviations

CAS: Chemical Abstract Service Registration Number

NFPA: National Fire Protection Association

ACGIH: American Conference of Governmental Industrial Hygienists

TWA: Time Weighted Average

STEL: Short Term Exposure Limit

LD50: Lethal Dose, 50%

LC50: Lethal Concentration, 50%

EC50: Effect Concentration, 50%

NOEL: No Observed Effect Level

COD: Chemical Oxygen Demand

BOD: Biochemical Oxygen Demand

TOC: Total Organic Carbon

IATA: International Air Transport Association

IMDG: International Maritime Dangerous Goods Code

CEN: European Committee for Standardisation

TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.

TLV: Threshold Limit Value

### References:

No data available

### Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

### Revision Information

This document has undergone significant changes and should be reviewed in its entirety.

### Prepared by

This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

# Safety Data Sheet Limestone

## Section 1. Identification

**GHS product identifier:** Limestone  
**Other means of identification:** Crushed Stone, Calcium Carbonate, Aggregate  
**Relevant identified uses of the substance or mixture and uses advised against:** Limestone may be used in the manufacture of bricks, mortar, cement, concrete, plasters, paving materials, and other construction materials. Limestone aggregate may be distributed in bags, totes, and bulk shipments. No known recommended restrictions.

**Supplier's details:** 300 E. John Carpenter Freeway, Suite 1645  
Irving, TX 75062  
(972) 653-5500

**Emergency telephone number (24 hours):** CHEMTREC: (800) 424-9300

## Section 2. Hazards Identification

**GHS Classification:** CARCINOGENICITY – Category 1A  
SPECIFIC TARGET ORGAN TOXICITY – Category 2  
REPEATED EXPOSURE  
SKIN CORROSION/IRRITATION – Category 2  
EYE DAMAGE/IRRITATION – Category 2A

### GHS label elements

**Hazard pictograms:**



**Signal word:** Danger  
**Hazard statements:** May cause cancer  
May cause damage to organs (lung) through prolonged or repeated exposure  
Causes skin irritation  
Causes serious eye irritation

**Precautionary statements:**  
**Prevention:** Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wash any exposed body parts. Wear protective gloves/protective clothing/eye protection/face protection.  
**Response:** If exposed or concerned: Get medical advice/attention. If on skin: Wash with plenty of water. Take off contaminated clothing and wash it before reuse. If in eyes: Rinse continuously with water for several minutes. Remove contact lenses, if present and easy to do.  
**Storage:** Restrict or control access to stockpile areas (store locked up). Engulfment hazard: To prevent burial or suffocation, do not enter a confined space, such as a silo, bulk truck or other storage container or vessel that stores or contains aggregates without an effective procedure for assuring safety.  
**Disposal:** Dispose of contents/container in accordance with local/regional/national/international regulations.  
**Hazards not otherwise classified (HNOC):** None known

**Supplemental Information:** Respirable Crystalline Silica (RCS) may cause cancer. Limestone is a naturally occurring mineral complex that contains varying quantities of quartz (crystalline silica). In its natural bulk state, limestone is not a known health hazard. Limestone may be subjected to various natural or mechanical forces that produce small particles (dust) which may contain respirable crystalline silica (particles less than 10 micrometers in aerodynamic diameter). Repeated inhalation of respirable crystalline silica (quartz) may cause lung cancer according to IARC and NTP; ACGIH states that it is a suspected cause of cancer. Other forms of RCS (e.g., tridymite and cristobalite) may also be present or formed under certain industrial processes.



### Section 3. Composition/information on ingredients

#### CAS number/other identifiers

Substance/mixture: Limestone, Calcium Carbonate, Quartz

Ingredient name	%	CAS number
Limestone	> 50	1317-65-3
Crystalline Silica (Quartz)	> 1	14808-60-7

Any concentration shown as a range is to protect confidentiality or is due to process variation. There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section. These materials are mined from the earth. Trace amounts of naturally occurring elements might be detected during chemical analysis of these materials.

Occupational exposure limits, if available, are listed in Section 8.

### Section 4. First aid measures

#### Description of necessary first aid measures

Eye Contact:	Dust: Immediately flush with plenty of water for at least 15 minutes. Hold eyelids apart. Remove contacts if present and easy to do. Occasionally lift the eyelid(s) to ensure thorough rinsing. Beyond flushing, do not attempt to remove material from the eye(s). Get medical attention if irritation develops or persists.
Inhalation:	Dust: Move to fresh air. Call a physician if symptoms develop or persist.
Skin Contact:	Dust: Wash off with soap and water. Get medical attention if irritation develops and persists.
Ingestion:	Dust: Rinse mouth and drink plenty of water. Never give anything by mouth to an unconscious person. Get medical attention.

#### Most important symptoms/effects, acute and delayed

Inhaling dust may cause discomfort in the chest, shortness of breath, and coughing. Prolonged inhalation may cause chronic health effects. This product contains crystalline silica. Prolonged or repeated inhalation of respirable crystalline silica liberated from this product can cause silicosis, and may cause cancer.

#### Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician:	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
Specific treatments:	Not Applicable
Protection of first-aiders:	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.
General information:	Pre-existing medical conditions that may be aggravated by exposure include disorders of the eye, skin and lung (including asthma and other breathing disorders). If addicted to tobacco, smoking will impair the ability of the lungs to clear themselves of dust.

See toxicological information (Section 11)

### Section 5. Fire-fighting measures

#### Extinguishing media

Suitable extinguishing media:	Not flammable. Use fire-extinguishing media appropriate for surrounding materials.
Unsuitable extinguishing media:	None known.
Specific hazards arising from the chemical:	No unusual fire or explosion hazards noted. Not a combustible dust.
Hazardous thermal decomposition Products:	None known

Special protective equipment for fire-fighters:

General fire hazards:

Use protective equipment appropriate for surrounding materials. No specific precautions. Contact with powerful oxidizing agents may cause fire and/or explosions (see section 10 of SDS). No unusual fire or explosion hazards.

## Section 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

Wear appropriate protective equipment and clothing during clean-up of materials that contain or may liberate dust.

### Methods and materials for containment, cleaning up and Environmental precautions

Spilled material, where dust is generated, may overexpose cleanup personnel to respirable crystalline silica-containing dust. Do not dry sweep or use compressed air for clean-up. Wetting of spilled material and/or use of respiratory protective equipment may be necessary. Avoid discharge of fine particulate matter into drains or water courses.

## Section 7. Handling and storage

### Precautions for safe handling

Protective measures:

Do not handle until all safety precautions have been read and understood. Keep formation of airborne dusts to a minimum. Provide appropriate exhaust ventilation at places where dust is formed. Do not breathe dust. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment.

Advice on general occupational hygiene:

Observe good industrial hygiene practices. Promptly remove dusty clothing and launder before reuse.

Conditions for safe storage, including any incompatibilities:

Avoid dust formation or accumulation.

## Section 8. Exposure controls/personal protection

### Control parameters

Occupational exposure limits:

- 1 – Value equivalent to OSHA formulas (29 CFR 1910.1000; 29 CFR 1917; 29 CFR 1918)
- 2 – Value also applies to MSHA metal/Non-Metal (1973 TLVs at 30 CFR 56/57.5001)
- 3 – OSHA enforces 0.250 mg/m<sup>3</sup> in construction and shipyards (CPL-03-00-007)
- 4 – Value also applies to OSHA construction (29 CFR 1926.55 Appendix A) and shipyards (29 CFR 1915.1000 Table Z)
- 5 – MSHA limit = 10 mg/m<sup>3</sup>

Ingredient name	Exposure limits
Particulates not otherwise classified (CAS SEQ250)	ACGIH TLV (United States, 3/2012) TWA: 3 mg/m <sup>3</sup> . Form: Respirable particles (2) TWA: 10 mg/m <sup>3</sup> . Form: Inhalable particles (2) OSHA PEL (United States, 6/2010) PEL: 5 mg/m <sup>3</sup> . Form: Respirable fraction PEL: 15 mg/m <sup>3</sup> . Form: Total dust (4) TWA: 5 mg/m <sup>3</sup> . Form: Respirable fraction (1) TWA: 15 mg/m <sup>3</sup> . Form: Total dust (1, 4, 5)
Limestone (Calcium Carbonate) (CAS 1317-65-3)	OSHA PEL (United States, 6/2010) TWA: 5 mg/m <sup>3</sup> . Form: Respirable fraction (4) TWA: 15 mg/m <sup>3</sup> . Form: Total dust (5) NIOSH REL (United States, 6/2009) TWA: 5 mg/m <sup>3</sup> . Form: Respirable fraction TWA: 10 mg/m <sup>3</sup> . Form: Total dust

Crystalline Silica (Quartz) (CAS 14808-60-7)	OSHA PEL (United States, 6/2010) TWA: 0.3 mg/m <sup>3</sup> . Form: Total dust (1,2) TWA: 0.1 mg/m <sup>3</sup> . Form: Respirable (1,2,3)
Crystalline Silica (all forms; CAS mixture)	ACGIH TLV (United States, 3/2012) TWA: 0.025 mg/m <sup>3</sup> . Form: Respirable fraction NIOSH REL (United States, 6/2009) TWA: 0.05 mg/m <sup>3</sup> . Form: Respirable dust
Tridymite and Cristobalite (other forms of crystalline silica) (CAS Mixture)	OSHA PEL (United States, 6/2010) TWA: 0.15 mg/m <sup>3</sup> . Form: Total dust (1) TWA: 0.05 mg/m <sup>3</sup> . Form: Respirable (1,2)

Appropriate engineering controls:	Good general ventilation (typically 10 air changes per hour indoors) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.
Exposure guidelines:	OSHA PELs, MSHA PELs, and ACGIH TLVs are 8-hr TWA values. NIOSH RELs are for TWA exposures up to 10-hr/day and 40-hr/wk. Occupational exposure to nuisance dust (total and respirable) and respirable crystalline silica should be monitored and controlled. Terms including "Particulates Not Otherwise Classified," "Particulates Not Otherwise Regulated," "Particulates Not Otherwise Specified," and "Inert or Nuisance Due" are often used interchangeably; however, the user should review each agency's terminology for differences in meanings.
Biological limit values:	No biological exposure limits noted for the ingredient(s)

## Individual protection measures

Hygiene measures:	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.
Eye/face protection:	Wear safety glasses with side shields (or goggles).
Hand protection:	Use personal protective equipment as required.
Body protection:	Use personal protective equipment as required.
Other skin protection:	Use personal protective equipment as required.
Respiratory protection:	When handling or performing work that produces dust or respirable crystalline silica in excess of applicable exposure limits, wear a NIOSH-approved respirator that is properly fitted and is in good condition. Respirators must be used in accordance with all applicable workplace regulations.
Thermal hazards:	Not anticipated. Wear appropriate thermal protective clothing if necessary.

## Section 9. Physical and chemical properties

### Appearance

Physical State:	Solid, particles of granular and angular mixture	Lower and Upper explosive flammable limits	Not applicable
Color:	Various colors	Vapor pressure:	Not applicable
Odor:	Not applicable	Vapor density:	Not applicable
Odor threshold:	Not applicable	Relative density:	Not available
pH:	Not available	Solubility:	Not available
Melting point:	Not applicable	Solubility in water:	Insoluble
Boiling point:	Not applicable	Partition coefficient: n-octanol/water:	Not applicable
Flash point:	Non-combustible	Auto-ignition temperature:	Not applicable
Burning time:	Not applicable	Decomposition temperature:	Not applicable
Burning rate:	Not applicable	SADT:	Not available
Evaporation Rate:	Not applicable	Viscosity:	Not applicable
Flammability (solid, gas):	Not applicable		

## Section 10. Stability and reactivity

<b>Reactivity:</b>	The product is stable and non-reactive under normal conditions of use, storage and transport.
<b>Chemical Stability:</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions:</b>	No dangerous reaction known under conditions of normal use.
<b>Conditions to avoid:</b>	Avoid contact with strong oxidizing agents.
<b>Incompatible materials:</b>	Crystalline silica may react violently with strong oxidizing agents, causing fire and explosions.
<b>Hazardous decomposition products:</b>	Silica dissolves in hydrofluoric acid producing a corrosive gas-silicon tetrafluoride.

## Section 11. Toxicological information

### Information on toxicological effects

<b>Acute toxicity:</b>	Not expected to be acutely toxic.
<b>Irritation/Corrosion:</b>	<b>Skin:</b> Dust: May cause irritation through mechanical abrasion. This product is not expected to be a skin hazard. <b>Eyes:</b> Direct contact with eyes may cause temporary irritation through mechanical abrasion. <b>Inhalation:</b> Repeated inhalation of respirable crystalline silica (quartz) may cause silicosis, a fibrosis (scarring) of the lungs. Silicosis is irreversible and may be fatal. Silicosis increases the risk of contracting pulmonary tuberculosis. Some studies suggest that repeated inhalation of respirable crystalline silica may cause other adverse health effects including lung and kidney cancer. <b>Ingestion:</b> Not likely due to product form. However accidental ingestion may cause discomfort.
<b>Sensitization:</b>	<b>Respiratory sensitization:</b> No respiratory sensitizing effects known.
<b>Mutagenicity:</b>	<b>Skin sensitization:</b> Not known to be a dermal irritant or sensitizer. No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Aspiration Hazard:</b>	Not expected to be an aspiration hazard.
<b>Reproductive toxicity:</b>	Not expected to be a reproductive hazard.
<b>Symptoms related to physical, chemical and toxicological characteristics:</b>	Dust: discomfort in the chest. Shortness of breath. Coughing.
<b>Carcinogenicity:</b>	Respirable crystalline silica has been classified by IARC and NTP as a known human carcinogen, and classified by ACGIH as a suspected human carcinogen.

Product/Ingredient name	OSHA	IARC	ACGIH	NTP
Crystalline Silica (Quartz) CAS 14808-60-7)	Not listed	1 Carcinogenic to humans	A2	Known to be human Carcinogen
Respirable Tridymite and Cristobalite (Other forms of Crystalline) (CAS Mixture)	Not listed	1 Carcinogenic to humans	-	-

#### Specific target organ toxicity (acute exposure)

Name	Category	Route of Exposure	Target Organs
Crystalline Silica (Quartz) CAS 14808-60-7)	-	Inhalation	Not reported to have effects
Respirable Tridymite and Cristobalite (Other forms of Crystalline) (CAS Mixture)	-	Inhalation	Not reported to have effects

#### Specific target organ toxicity (chronic exposure)

Name	Category	Route of Exposure	Target Organs
Crystalline Silica (Quartz) CAS 14808-60-7)		Inhalation	May cause damage to organs (lung through prolonged or repeated exposure.
Respirable Tridymite and Cristobalite (Other forms of Crystalline) (CAS Mixture)		Inhalation	May cause damage to organs (lung through prolonged or repeated exposure.



**Potential chronic health effects: General:** Prolonged inhalation of respirable crystalline silica may be harmful. May cause damage to organs (lungs) through prolonged or repeated exposure. There are reports in the literature suggesting that excessive crystalline silica exposure may be associated with autoimmune disorders and other adverse health effects involving the kidney. In particular, the incidence of scleroderma (thickening of the skin caused by swelling and the thickening of fibrous tissue) appears to be higher in silicotic individuals. To date, the evidence does not conclusively determine a causal relationship between silica exposure and these adverse health effects.

## Section 12. Ecological Information

### Ecotoxicity

Not expected to be harmful to aquatic organisms. Discharging sand and gravel dust and fines into waters may increase total suspended particulate (TSP) levels that can be harmful to certain aquatic organisms.

**Persistence and degradability:** Not applicable.  
**Bioaccumulative potential:** Not applicable.  
**Mobility in soil:** Not applicable.  
**Other adverse effects:** No other adverse environmental effects (e.g., ozone depletion, photochemical ozone creation potential, global warming potential) are expected from this component.

## Section 13. Disposal considerations

**Disposal methods:** Do not allow fine particulate matter to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with fine particulates. Dispose of contents in accordance with local/regional/national/international regulations.

**Hazardous waste code:** Not regulated.

**Waste from residues/unused products:** Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner.

**Contaminated packaging:** Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty packaging materials should be recycled or disposed of in accordance with applicable regulations and practices.

## Section 14. Transportation information

	DOT Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-
Environmental hazards	-	-	-
Additional information	-	-	-

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

## Section 15. Regulatory Information

**U.S. Federal regulations:**  
**OSHA Hazard Communication Standard, 29 CFR 1910.1200** This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200  
**TSCA Section 12(b) Export Notification (40 CFR 707, Subpart. D):** Not regulated  
**OSHA Specifically Regulated**

Substances (29 CFR 1910.1001-1050): Not listed  
 CERCLA Hazardous Substance List (40 CFR 302.4): Not listed  
 Clean Air Act Section 112 (b): Hazardous Air Pollutants (HAPs): Not regulated  
 Clean Air Act Section 112 (r) Accidental Release Prevention (40 CFR 68.130): Not regulated  
 Safe Drinking Water Act (SDWA): Not regulated

## SARA 311/312

Classification: Delayed (chronic) health hazard

Composition/Information on ingredients

Name	%	Fire Hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Crystalline Silica (Quartz) CAS 14808-60-7	>1	No	No	No	No	Yes

## SARA 313 (TRI)

	Product name	CAS number	%
Form R-Report requirements	Crystalline Silica (Quartz)	14808-60-7	Not regulated

## State regulations

**Massachusetts RTK:** The following components are listed: Crystalline Silica (Quartz) (CAS 14808-60-7), Respirable Tridymite and Cristobalite (other forms of crystalline silica) (CAS Mixture)

**New Jersey RTK:** The following components are listed: Crystalline Silica (Quartz) (CAS 14808-60-7), Respirable Tridymite and Cristobalite (other forms of crystalline silica) (CAS mixture)

**Pennsylvania RTK:** The following components are listed: Crystalline Silica (Quartz) (CAS 14808-60-7), Respirable Tridymite and Cristobalite (other forms of crystalline silica) (CAS Mixture)

**Rhode Island RTK:** Not regulated.

## California Prop. 65

WARNING: This product contains crystalline silica and chemicals (trace metals) known to the State of California to cause cancer.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Crystalline Silica (Quartz) CAS 14808-60-7	Yes	No	No	No

## International regulations

Ingredient name	CAS #	TSCA	Canada	WHMIS	EEC
Crystalline Silica (Quartz)	14808-60-7	Yes	DSL	D2A	EINECS
Limestone	1317-65-3	Yes	NDL	N/Ap	EINECS

WHMIS Classification:

D2A "Materials Causing Other Toxic Effects"



## Section 16. Other Information

Date of issue: 06/01/2015

Version: 06/01/2015

Revised Section(s): N/Ap

### Notice to reader

While the information provided in this safety data sheet is believed to provide a useful summary of the hazards of limestone as it is commonly used, the sheet cannot anticipate and provide all of the information that might be needed in every situation. Inexperienced product users should obtain proper training before using this product. In particular, the data furnished in this sheet do not address hazards that may be posed by other materials mixed with limestone to produce limestone products. Users should review other relevant material safety data sheets before working with this limestone or working on limestone products.

SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY Lehigh Hanson, except that the product shall conform to contracted specifications. The information provided herein was believed by the Lehigh Hanson to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information to comply with all laws and procedures applicable to the safe handling and use of product and to determine the suitability of the product for its intended use. Buyer's exclusive remedy shall be for damages and no claim of any kind, whether as to product delivered or for non-delivery of product, and whether based on contract, breach of warranty, negligence, or otherwise shall be greater in amount than the purchase price of the quantity of product in respect of which damages are claimed. In no event shall Seller be liable for incidental or consequential damages, whether Buyer's claim is based on contract, breach of warranty, negligence or otherwise.

### Abbreviations

ACGIH — American Conference of Governmental Industrial Hygienists  
CAS — Chemical Abstract Service  
CERCLA — Comprehensive Emergency Response and Comprehensive Liability Act  
CFR — Code of Federal Regulations  
DOT — Department of Transportation  
GHS — Globally Harmonized System  
HEPA — High Efficiency Particulate Air  
IATA — International Air Transport Association  
IARC — International Agency for Research on Cancer  
IMDG — International Maritime Dangerous Goods  
NIOSH — National Institute of Occupational Safety and Health  
NOEC — No Observed Effect Concentration  
NTP — National Toxicology Program  
OSHA — Occupational Safety and Health Administration  
PEL — Permissible Exposure Limit  
REL — Recommended Exposure Limit  
RQ — Reportable Quantity  
SARA — Superfund Amendments and Reauthorization Act  
SDS — Safety Data Sheet  
TLV — Threshold Limit Value  
TPQ — Threshold Planning Quantity  
TSCA — Toxic Substances Control Act  
TWA — Time-Weighted Average  
UN — United Nations

**SECTION I: CHEMICAL PRODUCT & COMPANY INFORMATION**

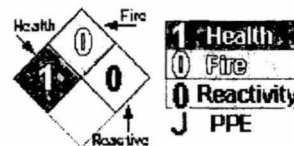
**MARTIN MARIETTA MAGNESIA SPECIALTIES LLC**  
195 Chesapeake Park Plaza, Suite 200  
BALTIMORE, MARYLAND 21220-0470  
(410) 780-5500  
424-9300 CHEMTREC

MSDS #: xxxx

DATE: July 19, 2005  
Emergency Phone: (800)

PRODUCT NAME(S): Magnesium Hydroxide Slurry (liquid)

CHEMICAL DESCRIPTION: Magnesium Hydroxide Slurry, Aqueous  
FORMULA:  $Mg(OH)_2$

**SECTION II: COMPOSITION / INFORMATION ON INGREDIENTS**

HAZARDOUS COMPONENT	CAS No	Approx Wt %	LD50 or LC50 (species/rc)
Magnesium Hydroxide	01309-42-8	60-100	No data available
Magnesium oxide *FUME*	01309-48-4	unknown	TCLo 400 mg/m3 (human/ir)

Magnesium oxide \*FUME\* may be generated in a reducing environment when temperatures

**SECTION III: HAZARDS IDENTIFICATION**

**EMERGENCY OVERVIEW:** Product contains mechanical irritants to skin, eyes and respiratory tract and may present a nuisance dust hazard if allowed to dry out. Avoid breathing dust. Avoid contact with skin. Wear protective clothing including gloves, goggles or safety glasses with side shields and NIOSH approved dust mask. Magnesium oxide FUME may be generated in a reducing environment when temperatures exceed 1700°C (3092°F).

**EFFECTS OF ACUTE EXPOSURE:** Ingestion generally causes purging of the bowels, however, swallowing large amounts may lead to bowel obstruction. If allowed to dry out, dust may irritate eyes, skin, nasal passages and respiratory tract. If heated over 1700°C (in a reducing environment), inhalation of freshly generated magnesium oxide fume may result in metal fume fever.

**EFFECTS OF CHRONIC EXPOSURE:** No data available.

**SIGNS & SYMPTOMS OF EXPOSURE:**

INHALED DUST: sneezing, coughing, discolored sputum

INHALED FUME: metal fume fever has influenza-like symptoms including fever, chills, perspiration, cough, nasal irritation, chest pain, nausea, head aches, vomiting and muscular weakness. Symptoms may be delayed 1-3 hours after exposure however no reports of such exposures from industrial contact have been reported.

EYE CONTACT: redness, tearing, conjunctivitis.

SKIN CONTACT: drying, chapping, dermatitis.

**MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:** As with exposure to any



environment without adequate personal protection, inhalation of magnesium oxide dust or fume may aggravate any pre-existing respiratory disease; prolonged/frequent skin contact may lead to dermatitis.

#### SECTION IV: FIRST AID MEASURES

INHALATION: Remove to fresh air immediately. Do not permit exposed person to remain in dusty environment without adequate respiratory protection. Treat metal fume fever with bed rest and treat for fever and pain.

EYE CONTACT: Do not rub eyes. Wash eyes under slowly running water for at least fifteen minutes, making sure eyes are held wide open and moved slowly in every direction. Ensure no solid particles remain in creases of eyelids. If so, continue to wash. If irritation persists, consult an ophthalmologist.

SKIN CONTACT: Remove from source of irritation. Remove contaminated clothing and wash affected area thoroughly with a mild soap and water. Wash contaminated clothing before reusing.

INGESTION: Treat symptomatically. If bowel obstruction occurs, immediately consult a physician.

#### SECTION V: FIRE FIGHTING MEASURES

FLASH POINT (METHOD): Product is not flammable or combustible.

AUTO-IGNITION TEMP: Not applicable LEL: Not applicable UEL: Not applicable

SENSITIVE TO MECHANICAL IMPACT? No SENSITIVE TO STATIC DISCHARGE? No

FLAMMABILITY CLASSIFICATION: Not flammable CONDITIONS OF FLAMMABILITY: Not flammable

EXTINGUISHING MEDIA: Use media appropriate to primary source of fire. Otherwise, use dry chemical, carbon dioxide, water spray or foam.

SPECIAL FIREFIGHTING PROCEDURES: No special procedures; avoid breathing fumes or dust; keep upwind.

UNUSUAL FIRE & EXPLOSION HAZARDS: None known.

HAZARDOUS COMBUSTION PRODUCTS: None known.

#### SECTION VI: ACCIDENTAL RELEASE MEASURES

Ventilate enclosed spaces and use appropriate respiratory protection. Sweep or vacuum spilled material in a manner to avoid generation of dust. Reclaim product for re-use, if possible, or collect in containers for disposal in an appropriate manner.

#### SECTION VII: HANDLING & STORAGE

HANDLING PROCEDURES AND EQUIPMENT: Keep container closed when not in use. Avoid contact with eyes. Avoid breathing dust or fume and only use in a well ventilated area. Consumption of food and beverages should be avoided in work area where product is being used. After handling product, always wash hands and face thoroughly with soap and water before eating, drinking or smoking.

STORAGE REQUIREMENTS: Suitable for any general chemical storage area.

**SECTION VIII: EXPOSURE CONTROLS / PERSONAL PROTECTION**

SPECIFIC ENGINEERING CONTROLS: Local and general mechanical dust collection and ventilation in accordance with good engineering practices should be provided to maintain dust levels below permissible exposure levels specified in Section VIII.

PERSONAL PROTECTIVE EQUIPMENT:

GLOVES: Dust impervious gloves during manual handling of product.

EYES: Safety glasses with side-shields or tight fitting goggles.

FOOTWEAR: Steel reinforced shoes when handling pallets of product.

CLOTHING: Long sleeves, buttoned collar, long pants extended over shoes or coveralls.

RESPIRATORY - UP TO 100 MG/M3: Any dust, mist or fume respirator; any air supplied respirator; or, self-contained breathing apparatus.

UP TO 250 MG/M3: Any supplied air respirator operated in a continuous flow mode or any powered air purifying respirator with a dust/mist/fume filter.

UP TO 500 MG/M3: High efficiency particulate filter with full face piece; any powered air supplied respirator with a tight fitting face piece and a high efficiency particulate filter; any self contained breathing apparatus with a full face piece; any supplied air respirator with a full face piece.

UP TO 7500 MG/M3: Any air supplied respirator with full face piece and operated in a pressure demand or other positive pressure mode.

EMERGENCY or ENTRY INTO UNKNOWN CONCENTRATIONS: Self contained breathing apparatus with full face piece and operated in pressure demand mode or air supplied respirator with full face piece operated in a pressure demand or other positive pressure mode in combination with auxiliary self contained breathing apparatus operated in pressure demand or positive pressure mode.

ESCAPE: Any air purifying full face piece respirator with high efficiency particulate filter or any appropriate escape type self contained apparatus.

EXPOSURE LIMITS

Magnesium hydroxide: No exposure limits established by OSHA, ACGIH or NIOSH.

If magnesium hydroxide is heated over 1700°C (in a reducing environment), magnesium oxide fume may be generated. Exposure limits for magnesium oxide fume include:

ACGIH - Time Weighted Averages Magnesium oxide fume 10 mg/m3 TWA

ACGIH - TLV Basis: Critical Effects Magnesium oxide fume irritation; metal fume fever

Australian Exposure Standards Magnesium oxide fume 10 mg/m3 TWA

California - Exposure Limits: PELs Magnesium oxide fume as Mg: 10 mg/m3

Canada - Alberta -

15 Minute Occupational Exposure Limit Magnesium oxide fume 20 mg/m3 STEL

8 Hour Occupational Exposure Limit Magnesium oxide fume as Mg: 10 mg/m3  
TWA

Canada - British Columbia -

15 Minute Exposure Limits Magnesium oxide fume 10 mg/m3

8 Hour Exposure Limits Magnesium oxide fume as Mg;

Total dusts: 10 mg/m3 TWA;

Respirable dust and fumes: 3 mg/m3 TWA

Canada - Ontario -

OHSAA - TWAEVs Magnesium oxide fume 10 mg/m3 TWAEV

Proposed Occupational STEVs 5 mg/m3 STEV

Canada - Quebec - Magnesium oxide fume

Time-Weighted Average Exposure Magnesium oxide fume as Mg: 10 mg/m3 TWAEV

German (DFG) -

MAK Values Magnesium oxide fume respirable fraction: 1.5 mg/m3 MAK  
(includes magnesium oxide fume)

Peak Limitations Magnesium oxide fume 2 x normal MAK (30 min. average  
value); don't exceed 4 times during shift; half-life <2h

Israel -

Action Levels Magnesium oxide fume 5 mg/m3 AL

Time Weighted Averages Magnesium oxide fume 10 mg/m3 TWA

Mexico - Instruction No. 10 - TWAs Magnesium oxide fume 10 mg/m3 TWA

US - OSHA -

Final PELs: Time Weighted Average Magnesium oxide fume total particulate:  
15 mg/m3 TWA

Vacated PELs: Time Weighted Avg Magnesium oxide fume total particulate:  
10 mg/m3 TWA

United Kingdom -

Occupational Exposure Standard: STEL Magnesium oxide fume fume and  
respirable dust, as Mg: 10 mg/m3 STEL

Occupational Exposure Standards: TWA Magnesium oxide fume fume and  
respirable dust, as Mg: 5 mg/m3 TWA; total inhalable dust, as Mg: 10  
mg/m3 TWA

**SECTION IX: PHYSICAL & CHEMICAL PROPERTIES**

APPEARANCE AND ODOR: Milky white aqueous slurry; no odor

BOILING POINT (F): 212 F (100 C)	FREEZE POINT (F): Not applicable
pH: ~10 saturated sol	VAP PRESS (mm Hg): Not determined
% VOLATILE (by VOL): 40 - 45%	SPEC GRAV: 1.48 to 1.62
VAPOR DENSITY: Not applicable	EVAPOR RATE: Not applicable
SOLUBILITY IN WATER: Slightly soluble	ODOR THRESH (ppm): Not determined
PHYSICAL STATE: Aqueous slurry	OIL/WATER COEFFIC: Not applicable

**SECTION X: STABILITY & REACTIVITY**

STABLE: Yes

CONDITIONS OF REACTIVITY: Will react with incompatibles (see below)

CONDITIONS OF CHEMICAL INSTABILITY: Stable under ambient temperatures and pressures.

INCOMPATIBILITY (MATERIALS TO AVOID): ACID (Strong) - vigorous reaction, heat generated; MALEIC ANHYDRIDE - Alkali and other alkaline earth compounds, including magnesium compounds, will cause explosive decomposition; PHOSPHORUS - when boiled with alkaline hydroxides yields mixed phosphines which may ignite spontaneously in air.

HAZARDOUS DECOMPOSITION PRODUCTS: Steam, acrid smoke and trace amounts of carbon dioxide, carbon monoxide and nitrous oxides. If magnesium hydroxide is heated to the point of volatilization (i.e., >1700°C), magnesium oxide FUMES may be generated.

IS THIS PRODUCT SUBJECT TO POLYMERIZATION? No

CONDITIONS UNDER WHICH PRODUCT WILL POLYMERIZE: None known.

**SECTION XI: TOXICOLOGICAL INFORMATION**

<u>ROUTES OF ENTRY</u> - SKIN CONTACT: Yes	SKIN ABSORPTION: No	
EYE CONTACT: Yes	INHALATION: Yes	INGESTION: Yes

NAME OF TOXICOLOGICALLY SYNERGISTIC PRODUCTS: None known.

IRRITANCY OF PRODUCT: No data available.

REPRODUCTIVE TOXIN? No    TERATOGEN? No    MUTAGEN? No    SENSITIZER? No

CONSIDERED CARCINOGENIC BY - NTP? No    IARC? No    OSHA? No

**SECTION XII: ECOLOGICAL INFORMATION**

No data available.

**SECTION XIII: DISPOSAL CONSIDERATIONS**

Dispose according to local, state/provincial and federal regulations.

If discarded in its purchased form, this product would not be hazardous waste



either by listing or by characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste. (40 CFR 261.20-24)

### SECTION XIII: TRANSPORT INFORMATION

DOT SHIPPING NAME: Not regulated under DOT      DOT CLASS: Not applicable

SPECIAL SHIPPING INFORMATION: No special precautions. For further information, refer to -

- Handling & Storage (Section VII)
- Stability & Reactivity (Section X)

### SECTION XV: REGULATORY INFORMATION

All of the ingredient(s) contained in this product are included on the following inventory and/or regulatory lists:

Australian Inventory of Chemical Substances (ACIS): Magnesium hydroxide (1309-42-8)

Canada - Domestic Substance List (DSL): Magnesium hydroxide (1309-42-8)

Canada - WHMIS: Ingredient Disclosure List - Magnesium hydroxide (Not listed)

European Inventory of Existing Commercial Chemical Substances (EINECS): Magnesium hydroxide (215-170-3)

Japan - Existing and New Chemical Substances (ENCS) - Magnesium hydroxide (1-386)

Korea - Existing and Evaluated Chemical Substances (KECL) - Magnesium hydroxide (KE-22716)

Philippines Inventory of Chemicals and Chemical Substances (PICCS) - Magnesium hydroxide (present)

Swiss Giftliste 1 (List of Toxic Substances 1), 31 May 1999 - Magnesium hydroxide (G-8166) Toxic Category 4: Acute oral lethal dose of 500 - 2000 mg/kg.

U.S. Toxic Substances Control Act (TSCA) 8(b) Inventory List: Magnesium hydroxide (1309-42-8)

#### US REPORTING REQUIREMENTS:

CERCLA Hazardous Substance: No

SARA Title III:

Section 311/312 - Categories: Magnesium hydroxide - Acute hazard (nuisance dust if allowed to dry out)

Section 312 - Inventory Reporting: Although not specifically listed, magnesium hydroxide does meet the definition of a hazardous material

under OSHA's Hazard Communication Standard at 29 CFR 1910.1200, and therefore is subject to Tier I and/or Tier II annual inventory reporting.

Section 313 - Emission Reporting - This notification must not be detached from this MSDS and any copying and redistribution of this MSDS must include this notice, as required by 40 CFR part 372:

Magnesium hydroxide is not subject to Form R reporting requirements.

Section 302 - Extremely Hazardous Substances: Magnesium hydroxide is not listed.

#### US CLEAN AIR ACT:

This product complies in all respects to the requirements of Section 611 of Title VI (Stratospheric Ozone Depletion) of the Clean Air Act as amended 1990; namely, that the product neither contains, nor is "manufactured with" (as defined by U.S. EPA) any Class I or Class II Ozone Depleting Substances listed in Title VI, and therefore is not required to carry the warning stated as dictated in the amended Act.

STATE LISTS -- Magnesium Hydroxide is NOT listed on any of the following state lists:

California - Directors List of Hazardous Substances (8 CCR 339)  
Florida Hazardous Substance List  
Illinois Right-to-Know Toxic Substances List  
Massachusetts Right To Know List  
Minnesota Hazardous Substance List  
NJ Department of Health RTK List  
Pennsylvania Right to Know List  
Rhode Island Hazardous Substance List

#### INTERNATIONAL REGULATORY INFORMATION:

##### EU DIRECTIVES:

- Dangerous Substance Directive 67\548.
- Dangerous Preparations Directive 88\379.

APPROVED CODE OF PRACTICE: Classification and Labelling of Substances and Preparations Dangerous for Supply.

### SECTION XVI: OTHER INFORMATION

<u>NFPA Ratings:</u>	Health: 1	Flammability: 0	Reactivity: 0	Other: <blank>
<u>HMIS Ratings:</u>	Health: 1	Flammability: 0	Reactivity: 0	PPE: J

#### SAFETY & RISK PHRASES:

R 20/22 Harmful By Inhalation And If Swallowed.  
R 36/37/38 Irritating To Eyes, Respiratory System And Skin.

- S 26            In Case Of Contact With Eyes, Rinse Immediately With  
Plenty Of Water and Seek Medical Advice.
- S 36            Wear Suitable Protective Clothing.
- S 39            Wear Eye/Face Protection.

SOURCES USED: ACGIH 2000; RTECS June 1998; Sax - 8th Ed.; Ind. Exposure & Control  
Techn. for OSHA Regulated Substances - MgO (fume), March, 1989, pp. 1181-1184;  
NIOSH Occupational Health Guide for Chemical Substances - Vol. II, September, 1978.

**Section: 1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : MERCONTROL® 7895

Other means of identification : Not applicable.

Recommended use : Mercury Control

Restrictions on use : Refer to available product literature or ask your local Sales Representative for restrictions on use and dose limits.

Company : Nalco Company  
1601 W. Diehl Road  
Naperville, Illinois 60563-1198  
USA  
TEL: (630)305-1000

Emergency telephone number : (800) 424-9300 (24 Hours) CHEMTREC

Issuing date : 11/18/2014

**Section: 2. HAZARDS IDENTIFICATION**

**GHS Classification**

Skin irritation : Category 2

Eye irritation : Category 2A

**GHS Label element**

Hazard pictograms :



Signal Word : Warning

Hazard Statements : Causes skin irritation.  
Causes serious eye irritation.

Precautionary Statements : **Prevention:**  
Wash skin thoroughly after handling. Wear eye protection/face protection. Wear protective gloves.  
**Response:**  
IF ON SKIN: Wash with plenty of soap and water. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If skin irritation occurs: Get medical advice/attention. If eye irritation persists: Get medical advice/ attention. Take off contaminated clothing and wash before reuse.

Other hazards : None known.

**Section: 3. COMPOSITION/INFORMATION ON INGREDIENTS**



## SAFETY DATA SHEET

### MERCONTROL® 7895

Pure substance/mixture : Mixture

Chemical Name	CAS-No.	Concentration: (%)
Calcium Bromide	7789-41-5	30 - 60

#### Section: 4. FIRST AID MEASURES

In case of eye contact : Rinse immediately with plenty of water, also under the eyelids. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if symptoms occur.

In case of skin contact : Wash off immediately with plenty of water. Use a mild soap if available. Get medical attention if irritation develops and persists.

If swallowed : Rinse mouth. Get medical attention if symptoms occur.

If inhaled : Get medical attention if symptoms occur.

Protection of first-aiders : In event of emergency assess the danger before taking action. Do not put yourself at risk of injury. If in doubt, contact emergency responders. Use personal protective equipment as required.

Notes to physician : Treat symptomatically.

Most important symptoms and effects, both acute and delayed : See Section 11 for more detailed information on health effects and symptoms.

#### Section: 5. FIREFIGHTING MEASURES

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media : None known.

Specific hazards during firefighting : Not flammable or combustible.

Hazardous combustion products : Carbon oxides

Special protective equipment for firefighters : Use personal protective equipment.

Specific extinguishing methods : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. In the event of fire and/or explosion do not breathe fumes.

#### Section: 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Ensure clean-up is conducted by trained personnel only. Refer to protective measures listed in sections 7 and 8.

Environmental precautions : Do not allow contact with soil, surface or ground water.

## SAFETY DATA SHEET

### MERCONTROL® 7895

Methods and materials for containment and cleaning up : Stop leak if safe to do so. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Flush away traces with water.

#### Section: 7. HANDLING AND STORAGE

Advice on safe handling : Avoid contact with skin and eyes. Wash hands thoroughly after handling. Use only with adequate ventilation.

Conditions for safe storage : Keep out of reach of children. Keep container tightly closed. Store in suitable labeled containers.

Suitable material : The following compatibility data is suggested based on similar product data and/or industry experience: Shipping and long term storage compatibility with construction materials can vary; we therefore recommend that compatibility is tested prior to use.

Unsuitable material : not determined

#### Section: 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

##### Components with workplace control parameters

Contains no substances with occupational exposure limit values.

Engineering measures : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

##### Personal protective equipment

Eye protection : Safety glasses with side-shields

Hand protection : Wear the following personal protective equipment:  
Standard glove type.  
Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.

Skin protection : Wear suitable protective clothing.

Respiratory protection : No personal respiratory protective equipment normally required.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Remove and wash contaminated clothing before re-use.  
Wash face, hands and any exposed skin thoroughly after handling.

#### Section: 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Liquid

Colour : Light yellow Amber

Odour : no data available

Flash point : does not flash

pH : 7.5

## SAFETY DATA SHEET

### MERCONTROL® 7895

Odour Threshold	: no data available
Melting point/freezing point	: no data available
Initial boiling point and boiling range	: 127.7 °C
Evaporation rate	: no data available
Flammability (solid, gas)	: no data available
Upper explosion limit	: no data available
Lower explosion limit	: no data available
Vapour pressure	: Not applicable.
Relative vapour density	: no data available
Relative density	: 1.69
Density	: 14 lb/gal
Water solubility	: completely soluble
Solubility in other solvents	: no data available
Partition coefficient: n-octanol/water	: no data available
Auto-ignition temperature	: no data available
Thermal decomposition temperature	: no data available
Viscosity, dynamic	: no data available
Viscosity, kinematic	: no data available
VOC	: no data available

### Section: 10. STABILITY AND REACTIVITY

Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: No dangerous reaction known under conditions of normal use.
Conditions to avoid	: None known.
Incompatible materials	: Strong acids Strong oxidizing agents
Hazardous decomposition products	: Hydrogen bromide Bromine

### Section: 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : Inhalation, Eye contact, Skin contact

#### Potential Health Effects

Eyes	: Causes serious eye irritation.
Skin	: Causes skin irritation.
Ingestion	: Health injuries are not known or expected under normal use.

## SAFETY DATA SHEET

### MERCONTROL® 7895

Inhalation : Health injuries are not known or expected under normal use.

Chronic Exposure : Health injuries are not known or expected under normal use.

#### Experience with human exposure

Eye contact : Redness, Pain, Irritation

Skin contact : Redness, Irritation

Ingestion : No symptoms known or expected.

Inhalation : No symptoms known or expected.

#### Toxicity

##### Product

Acute oral toxicity : rat: 2,210 mg/kg  
Test substance: Active Substance

Acute inhalation toxicity : no data available

Acute dermal toxicity : no data available

Skin corrosion/irritation : Result: Skin irritation

Serious eye damage/eye irritation : Result: Eye irritation

Respiratory or skin sensitization : no data available

Carcinogenicity : no data available

Reproductive effects : no data available

Germ cell mutagenicity : no data available

Teratogenicity : no data available

STOT - single exposure : no data available

STOT - repeated exposure : no data available

Aspiration toxicity : no data available

### Section: 12. ECOLOGICAL INFORMATION

#### Ecotoxicity

Environmental Effects : This product has no known ecotoxicological effects.

#### Product

Toxicity to fish : LC50 Guppy: 538 mg/l  
Exposure time: 96 hrs



## SAFETY DATA SHEET

**MERCONTROL® 7895**

Test substance: Similar Product

LC50 Rainbow Trout: > 1,000 mg/l  
Exposure time: 96 hrs  
Test substance: Similar Product

LC50 Fathead Minnow: > 1,000 mg/l  
Exposure time: 96 hrs  
Test substance: Similar Product

LC50 Inland Silverside: > 5,000.000 mg/l  
Exposure time: 96 hrs  
Test substance: Similar Product

### Product

Toxicity to daphnia and other aquatic invertebrates : LC50 Daphnia magna: > 1,000 mg/l  
Exposure time: 48 hrs  
Test substance: Similar Product

LC50 Mysid Shrimp (Mysidopsis bahia): 1,827.000 mg/l  
Exposure time: 96 hrs  
Test substance: Similar Product

### Persistence and degradability

Greater than 95% of this product consists of inorganic substances for which a biodegradation value is not applicable.

### Mobility

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	: <5%
Water	: 30 - 50%
Soil	: 50 - 70%

### Bioaccumulative potential

This preparation or material is not expected to bioaccumulate.

### Other information

no data available

**Section: 13. DISPOSAL CONSIDERATIONS**

## SAFETY DATA SHEET

### MERCONTROL® 7895

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

Disposal methods : Where possible recycling is preferred to disposal or incineration. If recycling is not practicable, dispose of in compliance with local regulations. Dispose of wastes in an approved waste disposal facility.

Disposal considerations : Dispose of as unused product. Empty containers should be taken to an approved waste handling site for recycling or disposal. Do not re-use empty containers.

### Section: 14. TRANSPORT INFORMATION

The shipper/consignor/sender is responsible to ensure that the packaging, labeling, and markings are in compliance with the selected mode of transport.

#### Land transport (DOT)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

#### Air transport (IATA)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

#### Sea transport (IMDG/IMO)

Proper shipping name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

### Section: 15. REGULATORY INFORMATION

#### EPCRA - Emergency Planning and Community Right-to-Know Act

##### CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

##### SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards : Acute Health Hazard

SARA 302 : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

#### California Prop 65

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

## SAFETY DATA SHEET

### MERCONTROL® 7895

INTERNATIONAL CHEMICAL CONTROL LAWS :

#### TOXIC SUBSTANCES CONTROL ACT (TSCA)

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

#### CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)

The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

#### AUSTRALIA

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

#### CHINA

All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on or exempt from the Inventory of Existing Chemical Substances China (IECSC).

#### EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

#### JAPAN

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

#### KOREA

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

#### NEW ZEALAND

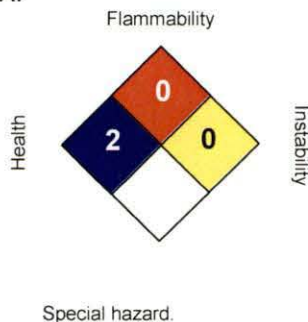
All substances in this product comply with the Hazardous Substances and New Organisms (HSNO) Act 1996, and are listed on or are exempt from the New Zealand Inventory of Chemicals.

#### PHILIPPINES

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

### Section: 16. OTHER INFORMATION

#### NFPA:



#### HMIS III:

HEALTH	2
FLAMMABILITY	0
PHYSICAL HAZARD	0

0 = not significant, 1 = Slight,  
2 = Moderate, 3 = High  
4 = Extreme, \* = Chronic

Revision Date : 11/18/2014  
Version Number : 1.1

## SAFETY DATA SHEET

**MERCONTROL® 7895**

Prepared By : Regulatory Affairs

REVISED INFORMATION: Significant changes to regulatory or health information for this revision is indicated by a bar in the left-hand margin of the SDS.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

For additional copies of an MSDS visit [www.nalco.com](http://www.nalco.com) and request access.



**Section: 1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : MERCONTROL® 8034

Other means of identification : Not applicable.

Restrictions on use : Refer to available product literature or ask your local Sales Representative for restrictions on use and dose limits.

Company : Nalco Company  
1601 W. Diehl Road  
Naperville, Illinois 60563-1198  
USA  
TEL: (630)305-1000

Emergency telephone number : (800) 424-9300 (24 Hours) CHEMTREC

Issuing date : 02/26/2014

**Section: 2. HAZARDS IDENTIFICATION**

**Emergency Overview**

**DANGER**

Corrosive. May cause tissue damage.

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Use a mild soap if available. Keep away from acids.

Wear suitable protective clothing, gloves and eye/face protection.

Not flammable or combustible.

**Potential Health Effects**

Eyes : Causes serious eye damage.

Skin : Causes severe skin burns.

Ingestion : Causes digestive tract burns.

Inhalation : May cause nose, throat, and lung irritation.

**Section: 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Chemical Name	CAS-No.	Concentration: (%)
Sodium Sulphide	1313-82-2	1 - 5
Sodium Hydroxide	1310-73-2	0.1 - 1

**Section: 4. FIRST AID MEASURES**

In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

## MERCONTROL® 8034

- In case of skin contact : Wash off immediately with plenty of water for at least 15 minutes. Use a mild soap if available. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
- If swallowed : Rinse mouth with water. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- If inhaled : Remove to fresh air. Treat symptomatically. Get medical attention if symptoms occur.
- Protection of first-aiders : In event of emergency assess the danger before taking action. Do not put yourself at risk of injury. If in doubt, contact emergency responders. Use personal protective equipment as required.
- Notes to physician : Treat symptomatically.

**See toxicological information (Section 11)**

### Section: 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Unsuitable extinguishing media : None known.
- Specific hazards during firefighting. : Not flammable or combustible.
- Hazardous combustion products : Carbon oxides
- Special protective equipment for firefighters : Use personal protective equipment
- Specific extinguishing methods : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. In the event of fire and/or explosion do not breathe fumes.

### Section: 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions, protective equipment and emergency procedures : Ensure adequate ventilation. Keep people away from and upwind of spill/leak. Avoid inhalation, ingestion and contact with skin and eyes. When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Ensure clean-up is conducted by trained personnel only. Refer to protective measures listed in sections 7 and 8.
- Environmental precautions : Do not allow contact with soil, surface or ground water.
- Methods and materials for containment and cleaning up : Stop leak if safe to do so. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Flush away traces with water. For large spills, dike spilled material or otherwise contain material to ensure runoff does not reach a waterway.

**Section: 7. HANDLING AND STORAGE**

- Advice on safe handling : Avoid contact with skin and eyes. Do not ingest. Do not breathe dust/fume/gas/mist/vapours/spray. Do not get in eyes, on skin, or on clothing. Wash hands thoroughly after handling. Use only with adequate ventilation.
- Conditions for safe storage : Keep out of reach of children. Keep container tightly closed. Store in suitable labeled containers.
- Packaging material : Suitable material: Keep in properly labelled containers.
- Unsuitable material: not determined

**Section: 8. EXPOSURE CONTROLS/PERSONAL PROTECTION****Components with workplace control parameters**

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Contains no substances with occupational exposure limit values.

Components	CAS-No.	Form of exposure	Permissible concentration	Basis
Sodium Hydroxide	1310-73-2	Ceiling	2 mg/m3	ACGIH
		Ceiling	2 mg/m3	NIOSH REL
		TWA	2 mg/m3	OSHA Z1

- Engineering measures : Effective exhaust ventilation system. Maintain air concentrations below occupational exposure standards.

**Personal protective equipment**

- Eye protection : Safety goggles  
Face-shield
- Hand protection : Wear the following personal protective equipment:  
Standard glove type.  
Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.
- Skin protection : Personal protective equipment comprising: suitable protective gloves, safety goggles and protective clothing
- Respiratory protection : When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.
- Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Remove and wash contaminated clothing before re-use.  
Wash face, hands and any exposed skin thoroughly after handling.  
Provide suitable facilities for quick drenching or flushing of the eyes and body in case of contact or splash hazard.

**Section: 9. PHYSICAL AND CHEMICAL PROPERTIES**

- Appearance : Liquid

**MERCONTROL® 8034**

Colour	: Brown
Odour	: Sulfurous
Flash point	: Method: ASTM D 93, Pensky-Martens closed cup does not flash
pH	: 11.5 - 13, 100 %
Odour Threshold	: no data available
Melting point/freezing point	: no data available
Initial boiling point and boiling range	: no data available
Evaporation rate	: no data available
Flammability (solid, gas)	: no data available
Upper explosion limit	: no data available
Lower explosion limit	: no data available
Vapour pressure	: no data available
Relative vapour density	: no data available
Relative density	: 1.1 - 1.35 (25 °C)
Density	: no data available
Water solubility	: completely soluble
Solubility in other solvents	: no data available
Partition coefficient: n-octanol/water	: no data available
Auto-ignition temperature	: no data available
Thermal decomposition	: Carbon oxides
Viscosity, dynamic	: no data available
Viscosity, kinematic	: no data available
VOC	: 0 %

**Section: 10. STABILITY AND REACTIVITY**

Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: No dangerous reaction known under conditions of normal use.
Conditions to avoid	: None known.
Incompatible materials	: Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors.  May release SO <sub>2</sub> or hydrogen sulfide on contact with acids.
Hazardous decomposition products	: Oxides of carbon Oxides of sulfur Oxides of nitrogen



**Section: 11. TOXICOLOGICAL INFORMATION**

Information on likely routes of exposure : Inhalation, Eye contact, Skin contact

**Potential Health Effects**

Eyes : Causes serious eye damage.  
Skin : Causes severe skin burns.  
Ingestion : Causes digestive tract burns.  
Inhalation : May cause nose, throat, and lung irritation.  
Chronic Exposure : Health injuries are not known or expected under normal use.

**Experience with human exposure**

Eye contact : Redness, Pain, Corrosion, Irritation  
Skin contact : Redness, Pain, Irritation, Corrosion  
Ingestion : Corrosion, Abdominal pain  
Inhalation : Respiratory irritation, Cough

**Toxicity****Product**

Acute oral toxicity : Acute toxicity estimate > 5,000 mg/kg  
Acute inhalation toxicity : no data available  
Acute dermal toxicity : Acute toxicity estimate : > 5,000 mg/kg  
Skin corrosion/irritation : no data available  
Serious eye damage/eye irritation : no data available  
Respiratory or skin sensitization : no data available  
Carcinogenicity : no data available  
Reproductive effects : no data available  
Germ cell mutagenicity : no data available  
Teratogenicity : no data available  
STOT - single exposure : no data available  
STOT - repeated exposure : no data available

Aspiration toxicity : no data available

**HUMAN HAZARD CHARACTERIZATION**

Based on our hazard characterization, the potential human hazard is: Moderate

**Section: 12. ECOLOGICAL INFORMATION****Ecotoxicity**

Environmental Effects : Harmful to aquatic life.  
Harmful to aquatic life with long lasting effects.

**Product**

Toxicity to fish : LC50 Rainbow Trout: 74 mg/l  
Exposure time: 96 hrs  
Test substance: Product

LC50 Sheepshead Minnow: > 1,000 mg/l  
Exposure time: 96 hrs  
Test substance: Product

LC50 Fathead Minnow: 602 mg/l  
Exposure time: 96 h  
Test substance: Product

Toxicity to daphnia and other aquatic invertebrates. : LC50 Daphnia magna: 73 mg/l  
Exposure time: 48 hrs  
Test substance: Product

EC50 Daphnia magna: 18 mg/l  
Exposure time: 48 hrs  
Test substance: Product

Toxicity to algae : no data available

Toxicity to fish (Chronic toxicity) : NOEC: 38 mg/l  
Exposure time: 7 d  
Species: Fathead Minnow  
Test substance: Product

EC25 / IC25: 72 mg/l  
Exposure time: 7 d  
Species: Fathead Minnow  
Test substance: Product

LOEC: 75 mg/l  
Exposure time: 7 d  
Species: Fathead Minnow  
Test substance: Product

**Persistence and degradability**

The organic portion of this preparation is expected to be poorly biodegradable.

Chemical Oxygen Demand (COD): 420,000 mg/l

**Mobility**

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.

If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	: <5%
Water	: 30 - 50%
Soil	: > 90%

The portion in water is expected to be soluble or dispersible.

#### **Bioaccumulative potential**

This preparation or material is not expected to bioaccumulate.

#### **Other information**

no data available

#### **ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION**

Based on our hazard characterization, the potential environmental hazard is: Moderate

### **Section: 13. DISPOSAL CONSIDERATIONS**

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: : D002

Disposal methods : The product should not be allowed to enter drains, water courses or the soil. Where possible recycling is preferred to disposal or incineration. If recycling is not practicable, dispose of in compliance with local regulations. Dispose of wastes in an approved waste disposal facility.

Disposal considerations : Dispose of as unused product. Empty containers should be taken to an approved waste handling site for recycling or disposal. Do not re-use empty containers.

### **Section: 14. TRANSPORT INFORMATION**

The shipper/consignor/sender is responsible to ensure that the packaging, labeling, and markings are in compliance with the selected mode of transport.

#### **Land transport (DOT)**

Proper shipping name	: SODIUM HYDROXIDE SOLUTION
Technical name(s)	:
UN/ID No.	: UN 1824
Transport hazard class(es)	: 8
Packing group	: III

**Air transport (IATA)**

Proper shipping name : SODIUM HYDROXIDE SOLUTION  
Technical name(s) :  
UN/ID No. : UN 1824  
Transport hazard class(es) : 8  
Packing group : III

**Sea Transport (IMDG/IMO)**

Proper shipping name : SODIUM HYDROXIDE SOLUTION  
Technical name(s) :  
UN/ID No. : UN 1824  
Transport hazard class(es) : 8  
Packing group : III

**Section: 15. REGULATORY INFORMATION****EPCRA - Emergency Planning and Community Right-to-Know Act****CERCLA Reportable Quantity**

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Sodium Hydroxide	1310-73-2	1000	*

\*: Calculated RQ exceeds reasonably attainable upper limit.

**SARA 304 Extremely Hazardous Substances Reportable Quantity**

This material does not contain any components with a section 304 EHS RQ.

**SARA 311/312 Hazards** : Acute Health Hazard

**SARA 302** : SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**SARA 313** : SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

**California Prop 65**

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

**INTERNATIONAL CHEMICAL CONTROL LAWS :****TOXIC SUBSTANCES CONTROL ACT (TSCA)**

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)**

This product contains substance(s) which are not listed on the Domestic Substances List (DSL) or the Non-Domestic Substances List (NDSL).



**AUSTRALIA**

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

**CHINA**

All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on or exempt from the Inventory of Existing Chemical Substances China (IECSC).

**EUROPE**

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

**JAPAN**

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

**KOREA**

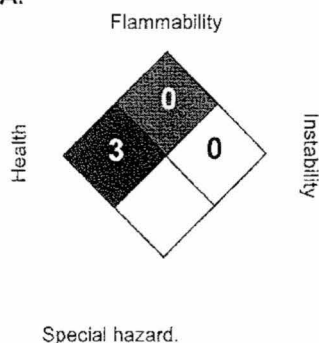
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

**NEW ZEALAND**

All substances in this product comply with the Hazardous Substances and New Organisms (HSNO) Act 1996, and are listed on or are exempt from the New Zealand Inventory of Chemicals.

**PHILIPPINES**

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

**Section: 16. OTHER INFORMATION****NFPA:****HMIS III:**

<b>HEALTH</b>	<b>3</b>
<b>FLAMMABILITY</b>	<b>0</b>
<b>PHYSICAL HAZARD</b>	<b>0</b>

0 = not significant, 1 = Slight,  
2 = Moderate, 3 = High  
4 = Extreme, \* = Chronic

Revision Date : 02/26/2014  
Version Number : 2.6  
Prepared By : Regulatory Affairs

**REVISED INFORMATION:** Significant changes to regulatory or health information for this revision is indicated by a bar in the left-hand margin of the SDS.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific

material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

For additional copies of an MSDS visit [www.nalco.com](http://www.nalco.com) and request access.



## MATERIAL SAFETY DATA SHEET

## Oil Eater® Cleaner/Degreaser

In compliance with International Regulations: GHS -SDS

Effective Date: June 2012

Federal regulations: CFR 29 and 42

State: Illinois Public Act 83-240

### SECTION 1 – CHEMICAL PRODUCT & COMPANY IDENTIFICATION

Common Name: Oil Eater® Degreaser/Cleaner  
Chemical Family: Aqueous Surfactant Solution  
Manufacturer Name: Kafko International, Ltd.  
Address: 3555 W Howard St. Skokie, IL. 60076-4012  
Phone: (847) 763-0333 Fax: (847) 763-0334  
Emergency Contact: Chemtrec (800) 424-9300  
Hazard Classification: **Non-Hazardous, Non-Corrosive, And Non-Toxic**

### SECTION 2 - HEALTH HAZARD IDENTIFICATION

**Emergency Overview:** Oil Eater® Cleaner Degreaser is Non-Corrosive, Non-Toxic, and does not pose any known acute or chronic physical hazards.

**Carcinogenic:** This product is not considered a carcinogen

**Effects of Overexposure:**

**Skin:** Non-Corrosive. No effect under normal use. Product may cause irritation or rash to those with hypersensitivity. Prolonged contact may result in dryness and ulceration.

**Eyes:** Can cause eye irritation. Category 2B

**Ingestion:** Non-Toxic per Consumer Product Safety Commission and FHSA standards. Acute oral LD50 greater than 5 g/kg.

**Inhalation:** No effect under normal use. Excessive inhalation may cause irritation of the respiratory passage

**NFPA Rating:** Health 1 Flammability 0 Reactivity 1

**Labeling:** EYE IRRITANT – Avoid contact with eyes. If contact occurs flush with water. If irritation persists, seek medical care.

### SECTION 3 - INGREDIENTS

<u>MATERIAL</u>	<u>CAS #</u>	<u>% by WT.</u>
Sodium metasilicate - pentahydrate	6834-92-0	< 5%
2 Butoxyethanol	111-76-2	< 5 %
Linear Alcohol Ethoxylate	68439-46-3	< 5 %

### SECTION 4 – FIRST AID MEASURES

**Skin Contact:** Remove contaminated clothing. Rinse skin with warm water for 15 minutes. If irritation occurs seek medical attention.

**Eye Contact:** Flush with water for 15 minutes. If irritation persists seek medical attention.

**Ingestion:** Drink large quantities of water. Call physician immediately.

**Inhalation:** Remove to fresh air immediately. If irritation persists, contact physician

### SECTION 5 - FIRE AND EXPLOSION HAZARD DATA

**Flammability of the product:** Non Flammable

**Flash Point:** None to Boiling

**Extinguishing Media:** Dry Chemical, Water Fog, Co2, Sand

**Fire Fighting Procedures:** Wear Self Contained Breathing Apparatus

**Products of combustion:** Carbon oxides

**Fire Hazards in the presence of other chemicals:** No specific information is available

**Unusual Fire Hazards:** None Expected

### SECTION 6 – ACCIDENTAL RELEASE MEASURES

**Small Spill:**  
Absorb with industrial absorbent. Dispose of in accordance with local, state & federal regulations. Rinse residue to avoid slippery conditions.

**Large Spill:**  
Non-flammable material. Wear chemical resistant gloves, boots and goggles. Stop the source of the spill. Collect the spill using mechanical means. Waste disposal method: Fully water-soluble. Follow all local, state and federal regulations.

### SECTION 7 – HANDLING & STORAGE

**Precautions:** Store containers upright in cool dry place

**Storage:** Store product in original containers. Do not store in metal vessels

**Other precautions:** Keep out of reach of children

### SECTION 8 – EXPOSURE CONTRIOLS & PERSONAL PROTECTION

**Engineering Controls:** No control measures are required under normal conditions. If large quantities are involved use NIOSH or MSHA approved respirator Limited personal exposures exist with this product. As always keep airborne vapors below TLV limits. Ensure that proper work-station safety mechanisms are operative and tested including showers and eyewash stations.

**Personal Protection:** Safety glasses are recommended, chemical resistant gloves aprons and suits are optional for those with dermatological sensitivity.

**SECTION 9 - PHYSICAL DATA**

Boiling point: 200o F  
 Voc content: .42 LBS/GAL  
 Vapor pressure: 4.0 mm Hg @ 77 F (ASTM D-2879)  
 Solubility in water: COMPLETE  
 Appearance and odor: Clear Solution With A Characteristic Odor  
 Specific gravity: 1.038 (ASTM 112H @ 20° C)  
 Evaporation rate: 1.2 (water=1.0)  
 pH: 12.4 – 13.0

**SECTION 10 - REACTIVITY DATA**

Conditions To Avoid: Extreme Heat  
 Stability: Stable  
 Incompatibility: Acids, Strong Oxidizers  
 Hazardous Polymerization: Will Not Occur  
 Corrosivity: Non-corrosive

**SECTION 11 - TOXICOLOGICAL DATA**

Test	Results	Basis
Oral Toxicity (Rats)	Greater than 5000mg/kg	FHSA/CPSC
Dermal Toxicity (Rabbits)	Greater than 2000mg/kg	OECD 402
Inhalation Toxicity, Vapor (Rats)	Greater than 2.3mg/L @ 4 hours	OECD 403
Eye Irritation (Rabbits)	Eye Irritant Category 2B	FHSA/CPSC
Dermal Irritation (Rabbits)	Non corrosive Non irritant	OECD 404

Special Remarks: May cause eye irritation which is reversible

**SECTION 12 - Ecological Data**

Persistence and degradability: This product is expected to be inherently biodegradable.  
 Bio-accumulative potential: There is no evidence to suggest bioaccumulation will occur.  
 Mobility: Accidental spillage may lead to penetration in the soil and groundwater. However, there is no evidence that this would cause adverse ecological effects.

**Aquatic Toxicity:**

Test	Results	Comments
Acute Toxicity	Non-toxic to Aquatic Organisms Fathead Minnow (Pimephales promelas) LC50 > 200mg/L at 96 hours	Product Test Data

**SECTION 13 – DISPOSAL CONSIDERATIONS**

Waste Disposal: Dispose of in accordance with local, state & federal regulations.  
 Rinse residue to avoid slippery conditions.

**SECTION 14 – TRANSPORT INFORMATION**

Not regulated

**SECTION 15 – REGULATORY INFORMATION**

All components used in this compound appear on the TSCA Inventory  
 Federal/National: 2 Butoxyethanol  
 This chemical is subject to S.A.R.A. Title III section 313 part 372 reporting. The hazard communication standard requires that mixtures such as this product be assumed to present the same health hazards, as do the components that constitute at least 1% of the mixture. OSHA has, however, noted that the health hazards of the individual components may be reduced or altered by including them in a mixture.  
 HMIS (USA) **HEALTH 1** **FIRE 0** **REACTIVITY 1** **PERSONAL PROTECTION 0**

**Food Facility Categories:** Per federal guidelines as detailed in FDA 21 CFR:

- (A1) General Purpose Cleaners
- (A4) Floor & Wall Degreasers
- (A8) Degreasers/Carbon Removers

**SECTION 16 – OTHER INFORMATION**

Performance Certifications:  
 Aircraft: Passed Boeing D6-17487 Rev P Exterior and General Cleaners and Liquid Waxes, Polishes and Polishing Compounds when diluted with 5 parts water.

For further questions regarding the safe use of this product consult our web page [www.oileater.com](http://www.oileater.com)  
 The Information Herein Is Based On Data Considered To Be Accurate As Of The Date Of The Presentation Of This Safety Data Sheet. No Warranty Or Representation, Expressed Or Implied, Is Made As To The Accuracy Or Completeness Of The Foregoing Data And Safety Information. The User Assumes All Liability For Any Damage Or Injury Resulting From Abnormal Uses, For Any Failure To Adhere To Recommended Practices, Or For Any Hazards Inherent In The Nature Of The Product.





## SAFETY DATA SHEET

### OPTISPERSE\* ADJ8400

#### 1. Identification

Product identifier	OPTISPERSE ADJ8400
Other means of identification	Not available.
Recommended use	Boiler corrosion inhibitor
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Oxidizing solids	Category 3
Health hazards	Serious eye damage/eye irritation	Category 2A
	Germ cell mutagenicity	Category 2
	Carcinogenicity	Category 2
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
OSHA defined hazards	Not classified.	

#### Label elements



Signal word Warning

Hazard statement May intensify fire; oxidizer. Causes serious eye irritation. May cause respiratory irritation. Suspected of causing genetic defects. Suspected of causing cancer.

#### Precautionary statement

##### Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat. Keep/Store away from clothing//combustible materials. Take any precaution to avoid mixing with combustibles/. Avoid breathing dust/fume/gas/mist/vapors/spray. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection.

##### Response

If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If exposed or concerned: Get medical advice/attention. Call a poison center/doctor// if you feel unwell. If eye irritation persists: Get medical advice/attention. In case of fire: Use to extinguish.

##### Storage

Store in a well-ventilated place. Keep container tightly closed. Store locked up.

##### Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

### 3. Composition/information on ingredients

#### Mixtures

Chemical name	Common name and synonyms	CAS number	%
Sodium nitrate		7631-99-4	90 - 100

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

**Composition comments** Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

### 4. First-aid measures

Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
Skin contact	Rinse skin with water/shower.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
Ingestion	Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately.
Most important symptoms/effects, acute and delayed	Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause respiratory irritation.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
General information	IF exposed or concerned: Get medical advice/attention. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

### 5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	May intensify fire; oxidizer.
Special protective equipment and precautions for firefighters	Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.
Fire-fighting equipment/instructions	Move containers from fire area if you can do so without risk. Cool containers / tanks with water spray. In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials.
Specific methods	Cool containers exposed to flames with water until well after the fire is out.
General fire hazards	May intensify fire; oxidizer.

### 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. Stop the flow of material, if this is without risk. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

### 7. Handling and storage

Precautions for safe handling	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat. Take any precaution to avoid mixing with combustibles. Avoid contact with eyes. Provide adequate ventilation. Should be handled in closed systems, if possible. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.
-------------------------------	---

**Conditions for safe storage,  
including any incompatibilities**

Store locked up. Keep away from heat. Store in original tightly closed container. Store in a cool, dry place out of direct sunlight. Store away from incompatible materials (see Section 10 of the SDS). Do not store near combustible materials. Store in accordance with local/regional/national/international regulation.

## 8. Exposure controls/personal protection

**Occupational exposure limits**

No exposure limits noted for ingredient(s).

**Biological limit values**

No biological exposure limits noted for the ingredient(s).

**Appropriate engineering controls**

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Provide eyewash station.

**Individual protection measures, such as personal protective equipment**

**Eye/face protection**

Wear eye/face protection. Wear safety glasses with side shields (or goggles).

**Skin protection**

**Hand protection**

Chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.

**Other**

Wear suitable protective clothing. Use of an impervious apron is recommended.

**Respiratory protection**

Chemical respirator with organic vapor cartridge and full facepiece. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

**Thermal hazards**

Wear appropriate thermal protective clothing, when necessary.

**General hygiene considerations**

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

**Appearance**

**Color**

White

**Physical state**

Prill

**Odor**

None

**Odor threshold**

Not available.

**pH in aqueous solution**

6.5 (1% SOL.)

**Melting point/freezing point**

Not available.

**Initial boiling point and boiling range**

Not available.

**Flash point**

> 200 °F (> 93 °C) SETA(CC)

**Evaporation rate**

< 1 (Ether = 1)

**Flammability (solid, gas)**

Not available.

**Upper/lower flammability or explosive limits**

**Flammability limit - lower (%)**

Not available.

**Flammability limit - upper (%)**

Not available.

**Explosive limit - lower (%)**

Not available.

**Explosive limit - upper (%)**

Not available.

**Vapor pressure**

< 1 mm Hg

**Vapor pressure temp.**

70 °F (21 °C)

**Vapor density**

< 1 (Air = 1)

**Relative density**

2.26

**Relative density temperature**

70 °F (21 °C)

**Solubility(ies)**

**Solubility (water)**

100 %

**Partition coefficient  
(n-octanol/water)**

Not available.

Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Viscosity temperature	70 °F (21 °C)
Other information	
Percent volatile	0 (Estimated)
Specific gravity	2.26

## 10. Stability and reactivity

Reactivity	Not available.
Chemical stability	Not available.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Excessive heat. Avoid temperatures exceeding the flash point. Contact with incompatible materials. None under normal conditions.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

## 11. Toxicological information

### Information on likely routes of exposure

Ingestion	Expected to be a low ingestion hazard.
Inhalation	May cause irritation to the respiratory system.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Causes serious eye irritation.

**Symptoms related to the physical, chemical and toxicological characteristics** May cause respiratory irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision.

### Information on toxicological effects

**Acute toxicity** May cause respiratory irritation.

Product	Species	Test Results
OPTISPERSE ADJ8400 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	Rat	3236 mg/kg, (Calculated according to GHS additivity formula)
Components	Species	Test Results
Sodium nitrate (CAS 7631-99-4)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg
<i>Oral</i>		
LD50	Rat	3236 mg/kg

\* Estimates for product may be based on additional component data not shown.

<b>Skin corrosion/irritation</b>	Prolonged skin contact may cause temporary irritation.
<b>Serious eye damage/eye irritation</b>	Causes serious eye irritation.
<b>Respiratory or skin sensitization</b>	
<b>Respiratory sensitization</b>	Not available.
<b>Skin sensitization</b>	This product is not expected to cause skin sensitization.



<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Carcinogenicity</b>	Suspected of causing cancer.
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	
Not listed.	
<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.
<b>Specific target organ toxicity - single exposure</b>	May cause respiratory irritation.
<b>Specific target organ toxicity - repeated exposure</b>	Not available.
<b>Aspiration hazard</b>	Not available.

## 12. Ecological information

### Ecotoxicity

Product		Species	Test Results
OPTISPERSE ADJ8400 (CAS Mixture)	0% Mortality	Fathead Minnow	2000 mg/L, Static Bioassay with 48-Hour Renewal, 96 hour
		Mysid Shrimp	5000 mg/L, Static Renewal Bioassay, 48 hour
		Sheepshead Minnow	5000 mg/L, Static Renewal Bioassay, 96 hour
	25% Mortality	Fathead Minnow	5000 mg/L, Static Bioassay with 48-Hour Renewal, 96 hour
	LC50	Bluegill Sunfish	2000 mg/L, Static Acute Bioassay, 96 hour
		Ceriodaphnia	3500 mg/L, Static Renewal Bioassay, 48 hour
	NOEL	Ceriodaphnia	2500 mg/L, Static Renewal Bioassay, 48 hour
Crustacea	0% Mortality	Daphnia magna	5000 mg/L, Static Screen, 48 hour
Other	LC50	Rainbow Trout	1355 mg/L, Static Acute Bioassay, 96 hour

\* Estimates for product may be based on additional component data not shown.

<b>Bioaccumulative potential</b>	No data available.
<b>Mobility in soil</b>	No data available.
<b>Other adverse effects</b>	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.
<b>Environmental fate</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
<b>Persistence and degradability</b>	This product, being inorganic and in its highest oxidation state, has no COD,BOD or TOC.

## 13. Disposal considerations

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Do not incinerate sealed containers. If discarded, this product is considered a RCRA ignitable waste, D001. Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	D001: Waste Flammable material with a flash point <140 F The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
<b>Contaminated packaging</b>	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

## 14. Transport information

### DOT

UN number	UN1498
UN proper shipping name	SODIUM NITRATE
Transport hazard class(es)	
Class	5.1
Subsidiary risk	-
Packing group	III
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
ERG number	140

Some containers may be DOT exempt, please check BOL for exact container classification.

### IATA

UN number	UN1498
UN proper shipping name	SODIUM NITRATE
Transport hazard class(es)	
Class	5.1
Subsidiary risk	-
Packing group	III
Environmental hazards	No.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

### IMDG

UN number	UN1498
UN proper shipping name	SODIUM NITRATE
Transport hazard class(es)	
Class	5.1
Subsidiary risk	-
Packing group	III
Environmental hazards	
Marine pollutant	No.
EmS	Not available.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

### DOT



### IATA; IMDG



## 15. Regulatory information

### US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

All components are on the U.S. EPA TSCA Inventory List.

### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

**CERCLA Hazardous Substance List (40 CFR 302.4)**

Not listed.

**SARA 304 Emergency release notification**

Not regulated.

**OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)**

Not listed.

**Superfund Amendments and Reauthorization Act of 1986 (SARA)**

**Hazard categories**  
Immediate Hazard - Yes  
Delayed Hazard - Yes  
Fire Hazard - Yes  
Pressure Hazard - No  
Reactivity Hazard - No

**SARA 302 Extremely hazardous substance**

Not listed.

**SARA 311/312 Hazardous chemical**  
No

**SARA 313 (TRI reporting)**

Chemical name	CAS number	% by wt.
Sodium nitrate	7631-99-4	90 - 100

**Other federal regulations****Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Not regulated.

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)**

Not regulated.

**Safe Drinking Water Act (SDWA)**  
Not regulated.

**Inventory status**

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

**Food and drug administration**  
ALL ingredients in this product are authorized in 21CFR173.310 for use as boiler water additives where the steam may contact food.

**NSF Registered and/or meets USDA (according to 1998 guidelines):**  
Registration No. - 145973  
Category Code(s):  
G5 Cooling and retort water treatment products  
G6 Boiler treatment products, steam line products - food contact

**US state regulations**  
California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - Massachusetts RTK - Substance List**

Sodium nitrate (CAS 7631-99-4)

**US - Pennsylvania RTK - Hazardous Substances**

Sodium nitrate (CAS 7631-99-4)

**US - Rhode Island RTK**

Sodium nitrate (CAS 7631-99-4)

**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

**US. New Jersey Worker and Community Right-to-Know Act**

Sodium nitrate (CAS 7631-99-4) 500 LBS

**US. California Proposition 65**

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Developmental toxin

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

No ingredient listed.

## 16. Other information, including date of preparation or last revision

**Issue date** Dec-03-2014

**Revision date** Dec-03-2014

**Version #** 1.0

**List of abbreviations** CAS: Chemical Abstract Service Registration Number  
NFPA: National Fire Protection Association  
ACGIH: American Conference of Governmental Industrial Hygienists  
TWA: Time Weighted Average  
STEL: Short Term Exposure Limit  
LD50: Lethal Dose, 50%  
LC50: Lethal Concentration, 50%  
NOEL: No Observed Effect Level  
COD: Chemical Oxygen Demand  
BOD: Biochemical Oxygen Demand  
TOC: Total Organic Carbon  
IATA: International Air Transport Association  
IMDG: International Maritime Dangerous Goods Code  
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.  
TLV: Threshold Limit Value

**References:** No data available

**Disclaimer** The information in the sheet was written based on the best knowledge and experience currently available. The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**Revision Information** Product and Company Identification  
Composition / Information on Ingredients: Disclosure Overrides  
Physical & Chemical Properties: Multiple Properties  
Toxicological Information: Toxicological Data  
Transport Information: Material Transportation Information  
Regulatory Information: Risk Phrases - Labeling  
HazReg Data: Europe - EU  
GHS: Classification

**Prepared by** This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.





GE Power & Water  
Water & Process Technologies

## SAFETY DATA SHEET

### OPTISPERSE\* HP9420

#### 1. Identification

Product identifier	OPTISPERSE HP9420
Other means of identification	Not available.
Recommended use	Powdered internal boiler treatment chemical.
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Serious eye damage/eye irritation	Category 2
OSHA defined hazards	Not classified.	

#### Label elements



Signal word	Warning
Hazard statement	Causes serious eye irritation.
Precautionary statement	
Prevention	Wash thoroughly after handling. Wear eye/face protection.
Response	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
Storage	Store away from incompatible materials.
Disposal	Dispose of waste and residues in accordance with local authority requirements.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

#### 3. Composition/information on ingredients

##### Mixtures

Chemical name	Common name and synonyms	CAS number	%
Disodium phosphate(sodium phosphate, dibasic)		7558-79-4	90 - 100

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

**Composition comments** Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

## 4. First-aid measures

<b>Inhalation</b>	If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.
<b>Skin contact</b>	Rinse skin with water/shower. Get medical attention if irritation develops and persists.
<b>Eye contact</b>	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.
<b>Ingestion</b>	Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately.
<b>Most important symptoms/effects, acute and delayed</b>	Symptoms may include stinging, tearing, redness, swelling, and blurred vision.
<b>Indication of immediate medical attention and special treatment needed</b>	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
<b>General information</b>	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

## 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO <sub>2</sub> ).
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards arising from the chemical</b>	During fire, gases hazardous to health may be formed.
<b>Special protective equipment and precautions for firefighters</b>	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.
<b>Fire-fighting equipment/instructions</b>	Use standard firefighting procedures and consider the hazards of other involved materials. In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk. Cool containers / tanks with water spray.
<b>General fire hazards</b>	No unusual fire or explosion hazards noted.

## 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	Keep unnecessary personnel away. Keep upwind. Keep out of low areas. Wear appropriate protective equipment and clothing during clean-up. Do not touch or walk through spilled material. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
<b>Methods and materials for containment and cleaning up</b>	Stop the flow of material, if this is without risk. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water. For waste disposal, see section 13 of the SDS.
<b>Environmental precautions</b>	Avoid discharge into drains, water courses or onto the ground. Water contaminated with this product may be sent to a sanitary sewer treatment facility, or a permitted waste treatment facility, in accordance with any local agreements.

## 7. Handling and storage

<b>Precautions for safe handling</b>	Avoid contact with eyes. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Use care in handling/storage.
<b>Conditions for safe storage, including any incompatibilities</b>	Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Store in accordance with local/regional/national/international regulation. Keep dry.

## 8. Exposure controls/personal protection

<b>Occupational exposure limits</b>	No exposure limits noted for ingredient(s).
<b>Biological limit values</b>	No biological exposure limits noted for the ingredient(s).
<b>Appropriate engineering controls</b>	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Provide eyewash station.

### Individual protection measures, such as personal protective equipment

<b>Eye/face protection</b>	Wear safety glasses with side shields (or goggles).
----------------------------	---

<b>Skin protection</b>	
<b>Hand protection</b>	Chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.
<b>Other</b>	Wear suitable protective clothing. Chemical resistant gloves.
<b>Respiratory protection</b>	If ventilation is insufficient, suitable respiratory protection must be provided. In case of insufficient ventilation, wear suitable respiratory equipment. Respiratory protection not required. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
<b>Thermal hazards</b>	Wear appropriate thermal protective clothing, when necessary.
<b>General hygiene considerations</b>	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

### Appearance

<b>Color</b>	White
<b>Physical state</b>	Powder
<b>Odor</b>	None
<b>Odor threshold</b>	Not available.
<b>pH in aqueous solution</b>	9.2 (5% SOL.)
<b>Melting point/freezing point</b>	Not available.
<b>Initial boiling point and boiling range</b>	Not available.
<b>Flash point</b>	> 212 °F (> 100 °C) P-M(CC)
<b>Evaporation rate</b>	< 1 (Water = 1)
<b>Flammability (solid, gas)</b>	Not available.

### Upper/lower flammability or explosive limits

<b>Flammability limit - lower (%)</b>	Not available.
<b>Flammability limit - upper (%)</b>	Not available.
<b>Explosive limit - lower (%)</b>	Not available.
<b>Explosive limit - upper (%)</b>	Not available.

<b>Vapor pressure</b>	< 1 mm Hg
<b>Vapor pressure temp.</b>	70 °F (21 °C)
<b>Vapor density</b>	< 0.1 (Air = 1)
<b>Relative density</b>	Not available.
<b>Relative density temperature</b>	70 °F (21 °C)
<b>Solubility(ies)</b>	
<b>Solubility (water)</b>	50 %
<b>Partition coefficient (n-octanol/water)</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Viscosity</b>	Not available.
<b>Viscosity temperature</b>	70 °F (21 °C)
<b>Other information</b>	
<b>Percent volatile</b>	0 (Estimated)

## 10. Stability and reactivity

<b>Reactivity</b>	The product is stable and non-reactive under normal conditions of use, storage and transport.
<b>Chemical stability</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions</b>	Hazardous polymerization does not occur.

<b>Conditions to avoid</b>	Avoid temperatures exceeding the flash point. Contact with incompatible materials. None under normal conditions.
<b>Incompatible materials</b>	Strong oxidizing agents.
<b>Hazardous decomposition products</b>	Elemental oxides

## 11. Toxicological information

### Information on likely routes of exposure

<b>Ingestion</b>	Expected to be a low ingestion hazard.
<b>Inhalation</b>	No adverse effects due to inhalation are expected.
<b>Skin contact</b>	No adverse effects due to skin contact are expected.
<b>Eye contact</b>	Causes serious eye irritation.

**Symptoms related to the physical, chemical and toxicological characteristics** Symptoms may include stinging, tearing, redness, swelling, and blurred vision.

### Information on toxicological effects

#### Acute toxicity

Product	Species	Test Results
OPTISPERSE HP9420 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg, (Calculated according to GHS additivity formula)

Components	Species	Test Results
Disodium phosphatesodium phosphate, dibasic) (CAS 7558-79-4)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rat	> 5000 mg/kg
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg

\* Estimates for product may be based on additional component data not shown.

<b>Skin corrosion/irritation</b>	Prolonged skin contact may cause temporary irritation.
<b>Serious eye damage/eye irritation</b>	Causes serious eye irritation.
<b>Respiratory or skin sensitization</b>	
<b>Respiratory sensitization</b>	This product is not expected to cause respiratory sensitization.
<b>Skin sensitization</b>	This product is not expected to cause skin sensitization.
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Carcinogenicity</b>	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	
Not listed.	
<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.
<b>Specific target organ toxicity - single exposure</b>	Not classified.
<b>Specific target organ toxicity - repeated exposure</b>	Not classified.
<b>Aspiration hazard</b>	Not an aspiration hazard.



## 12. Ecological information

### Ecotoxicity

The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Product		Species	Test Results
OPTISPERSE HP9420 (CAS Mixture)	LC50	Bluegill Sunfish	7600 mg/L, Static Acute Bioassay, 96 hour
		Fathead Minnow	3180 mg/L, Static Renewal Bioassay, 96 hour
	NOEL	Fathead Minnow	2110 mg/L, Static Renewal Bioassay, 96 hour
Crustacea	LC50	Daphnia magna	2621 mg/L, Static Renewal Bioassay, 48 hour
	NOEL	Daphnia magna	2110 mg/L, Static Renewal Bioassay, 48 hour
Other	LC50	Rainbow Trout	5600 mg/L, Static Acute Bioassay, 96 hour

\* Estimates for product may be based on additional component data not shown.

### Bioaccumulative potential

No data available.

### Mobility in soil

No data available.

### Other adverse effects

No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

### Environmental fate

The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

### Persistence and degradability

No data available

## 13. Disposal considerations

### Disposal instructions

Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.

### Hazardous waste code

The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

### Waste from residues / unused products

Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

### Contaminated packaging

Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

## 14. Transport information

### DOT

Not regulated as dangerous goods.

Some containers may be DOT exempt, please check BOL for exact container classification.

### IATA

Not regulated as dangerous goods.

### IMDG

Not regulated as dangerous goods.

## 15. Regulatory information

### US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

#### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

#### CERCLA Hazardous Substance List (40 CFR 302.4)

Disodium phosphate(sodium phosphate, dibasic) (CAS 7558-79-4) Listed.

#### SARA 304 Emergency release notification

Not regulated.

**OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)**

Not listed.

**Superfund Amendments and Reauthorization Act of 1986 (SARA)**

**Hazard categories**  
Immediate Hazard - Yes  
Delayed Hazard - No  
Fire Hazard - No  
Pressure Hazard - No  
Reactivity Hazard - No

**SARA 302 Extremely hazardous substance**

Not listed.

**SARA 311/312 Hazardous chemical** Yes

**SARA 313 (TRI reporting)**  
Not regulated.

**Other federal regulations****Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Not regulated.

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)**

Not regulated.

**Safe Drinking Water Act (SDWA)** Not regulated.

**Inventory status**

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

**Food and drug administration** ALL ingredients in this product are authorized in 21CFR173.310 for use as boiler water additives where the steam may contact food.

**NSF Registered and/or meets** Registration No. - 140702  
**USDA (according to 1998** Category Code(s):  
**guidelines):** G5 Cooling and retort water treatment products  
G6 Boiler treatment products, steam line products - food contact

**US state regulations****US - Massachusetts RTK - Substance List**

Disodium phosphate(sodium phosphate, dibasic) (CAS 7558-79-4)

**US - Pennsylvania RTK - Hazardous Substances**

Disodium phosphate(sodium phosphate, dibasic) (CAS 7558-79-4)

**US - Rhode Island RTK**

Disodium phosphate(sodium phosphate, dibasic) (CAS 7558-79-4)

**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

**US. New Jersey Worker and Community Right-to-Know Act**

Not regulated.

**US. California Proposition 65**

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Female reproductive toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Male reproductive toxin**

No ingredient listed.

## 16. Other information, including date of preparation or last revision

**Issue date** Dec-16-2014

**Revision date** Dec-16-2014

**Version #** 1.0

**List of abbreviations** CAS: Chemical Abstract Service Registration Number  
NFPA: National Fire Protection Association  
ACGIH: American Conference of Governmental Industrial Hygienists  
TWA: Time Weighted Average  
STEL: Short Term Exposure Limit  
LD50: Lethal Dose, 50%  
LC50: Lethal Concentration, 50%  
NOEL: No Observed Effect Level  
COD: Chemical Oxygen Demand  
BOD: Biochemical Oxygen Demand  
TOC: Total Organic Carbon  
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.  
IATA: International Air Transport Association  
IMDG: International Maritime Dangerous Goods Code  
TLV: Threshold Limit Value

**References:** No data available

**Disclaimer** The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**Revision Information** Product and Company Identification: Product and Company Identification  
Composition / Information on Ingredients: Disclosure Overrides  
Physical & Chemical Properties: Multiple Properties  
Toxicological Information: Toxicological Data  
Transport Information: Material Transportation Information  
Regulatory Information: Hazard Symbol - Labeling  
HazReg Data: North America  
GHS: Classification

**Prepared by** This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.



GE Power & Water  
Water & Process Technologies

## SAFETY DATA SHEET

### OPTISPERSE\* HP9430

#### 1. Identification

Product identifier	OPTISPERSE HP9430
Other means of identification	Not available.
Recommended use	Internal boiler treatment
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2A
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
OSHA defined hazards	Not classified.	

#### Label elements



Signal word	Warning
Hazard statement	Causes skin irritation. Causes serious eye irritation. May cause respiratory irritation.
Precautionary statement	
Prevention	Avoid breathing dust/fume/gas/mist/vapors/spray. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves. Wear eye/face protection.
Response	If on skin: Wash with plenty of water/. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a poison center/doctor// if you feel unwell. Specific treatment (see on this label). If skin irritation occurs: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. Take off contaminated clothing and wash before reuse.
Storage	Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.



### 3. Composition/information on ingredients

#### Substance

Chemical name	Common name and synonyms	CAS number	%
Trisodium phosphate		7601-54-9	90 - 100

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

**Composition comments** Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

### 4. First-aid measures

<b>Inhalation</b>	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
<b>Skin contact</b>	Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.
<b>Eye contact</b>	URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.
<b>Ingestion</b>	Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately.
<b>Most important symptoms/effects, acute and delayed</b>	Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause respiratory irritation. May cause redness and pain.
<b>Indication of immediate medical attention and special treatment needed</b>	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
<b>General information</b>	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

### 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards arising from the chemical</b>	During fire, gases hazardous to health may be formed.
<b>Special protective equipment and precautions for firefighters</b>	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
<b>Fire-fighting equipment/instructions</b>	Use water spray to cool unopened containers.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.
<b>General fire hazards</b>	No unusual fire or explosion hazards noted.

### 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
<b>Methods and materials for containment and cleaning up</b>	Stop the flow of material, if this is without risk. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water. For waste disposal, see section 13 of the SDS.
<b>Environmental precautions</b>	Avoid discharge into drains, water courses or onto the ground.

### 7. Handling and storage

<b>Precautions for safe handling</b>	Avoid contact with skin. Avoid contact with eyes. Avoid prolonged exposure. Avoid contact with clothing. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Use care in handling/storage.
<b>Conditions for safe storage, including any incompatibilities</b>	Keep dry. Store locked up. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Store in accordance with local/regional/national/international regulation.

## 8. Exposure controls/personal protection

### Occupational exposure limits

#### US. Workplace Environmental Exposure Level (WEEL) Guides

Components	Type	Value
Trisodium phosphate (CAS 7601-54-9)	STEL	5 mg/m <sup>3</sup>

**Biological limit values** No biological exposure limits noted for the ingredient(s).

**Appropriate engineering controls** Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

### Individual protection measures, such as personal protective equipment

**Eye/face protection** Airtight chemical goggles.

#### Skin protection

**Hand protection** Chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.

**Other** Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

**Respiratory protection** Chemical respirator with organic vapor cartridge and full facepiece. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

**Thermal hazards** Wear appropriate thermal protective clothing, when necessary.

**General hygiene considerations** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

### Appearance

**Color** White

**Physical state** Powder

**Odor** None

**Odor threshold** Not available.

**pH in aqueous solution** 11.5 (1% SOL.)

**Melting point/freezing point** Not available.

**Initial boiling point and boiling range** Not available.

**Flash point** > 212 °F (> 100 °C) P-M(CC)

**Evaporation rate** < 1 (Ether = 1)

**Flammability (solid, gas)** Not available.

### Upper/lower flammability or explosive limits

**Flammability limit - lower (%)** Not available.

**Flammability limit - upper (%)** Not available.

**Explosive limit - lower (%)** Not available.

**Explosive limit - upper (%)** Not available.

**Vapor pressure** < 0.1 mm Hg

**Vapor pressure temp.** 70 °F (21 °C)

**Vapor density** < 1 (Air = 1)

**Relative density** NA

**Relative density temperature** 70 °F (21 °C)

### Solubility(ies)

**Solubility (water)** 11 %

Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Viscosity temperature	70 °F (21 °C)
Other information	
Percent volatile	0 (Calculated)

## 10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use. Contact with strong acids may cause a violent reaction releasing heat.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	Oxides of phosphorus evolved in fire.

## 11. Toxicological information

### Information on likely routes of exposure

Ingestion	May cause gastrointestinal irritation.
Inhalation	Prolonged inhalation may be harmful. May cause irritation to the respiratory system.
Skin contact	Causes skin irritation.
Eye contact	Causes serious eye irritation.

Symptoms related to the physical, chemical and toxicological characteristics	May cause redness and pain. May cause respiratory irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision.
--	--

### Information on toxicological effects

Acute toxicity	May cause respiratory irritation.
----------------	-----------------------------------

Product	Species	Test Results
OPTISPERSE HP9430 (CAS Mixture)		
Acute		
Dermal		
LD50	Rabbit	> 7940 mg/kg, (Rabbit dermal LD50: >2,000 MG/KG alternate source)
Oral		
LD50	Rat	4150 mg/kg, (Rat oral LD50: 6,500 mg/kg alternate source. [oral data for dodecahydrate])
Components	Species	Test Results
Trisodium phosphate (CAS 7601-54-9)		
Acute		
Dermal		
LD50	Rabbit	> 7940 mg/kg
Oral		
LD50	Rat	4150 mg/kg

\* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation	Causes skin irritation.
Serious eye damage/eye irritation	Causes serious eye irritation.
Respiratory or skin sensitization	
Respiratory sensitization	Not available.

<b>Skin sensitization</b>	This product is not expected to cause skin sensitization.
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Carcinogenicity</b>	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	
Not listed.	
<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.
<b>Specific target organ toxicity - single exposure</b>	May cause respiratory irritation.
<b>Specific target organ toxicity - repeated exposure</b>	Not classified.
<b>Aspiration hazard</b>	Not classified.
<b>Chronic effects</b>	Prolonged inhalation may be harmful.

## 12. Ecological information

<b>Ecotoxicity</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
--------------------	--

Product		Species	Test Results
OPTISPERSE HP9430	LC50	Bluegill Sunfish	220 mg/L, Static Acute Bioassay, 96 hour
		Fathead Minnow	3695 mg/L, Static Renewal Bioassay, 96 hour, (pH adjusted)
	NOEL	Fathead Minnow	1370 mg/L, Static Renewal Bioassay, 96 hour, (pH adjusted)
Crustacea	LC50	Daphnia magna	1850 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)
	NOEL	Daphnia magna	1370 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)
Other	LC50	Rainbow Trout	120 mg/L, Static Acute Bioassay, 96 hour

\* Estimates for product may be based on additional component data not shown.

<b>Bioaccumulative potential</b>	No data available.
<b>Mobility in soil</b>	No data available.
<b>Other adverse effects</b>	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.
<b>Environmental fate</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
<b>Persistence and degradability</b>	This product, being inorganic and in its highest oxidation state, has no COD,BOD or TOC.

## 13. Disposal considerations

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	D002: Waste Corrosive material [pH <=2 or >=12.5, or corrosive to steel] The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
<b>Contaminated packaging</b>	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.



## 14. Transport information

### DOT

Not regulated as dangerous goods.

Some containers may be DOT exempt, please check BOL for exact container classification.

### IATA

Not regulated as dangerous goods.

### IMDG

Not regulated as dangerous goods.

## 15. Regulatory information

### US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

All components are on the U.S. EPA TSCA Inventory List.

#### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

#### CERCLA Hazardous Substance List (40 CFR 302.4)

Trisodium phosphate (CAS 7601-54-9)

Listed.

#### SARA 304 Emergency release notification

Not regulated.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

### Superfund Amendments and Reauthorization Act of 1986 (SARA)

#### Hazard categories

Immediate Hazard - Yes

Delayed Hazard - No

Fire Hazard - No

Pressure Hazard - No

Reactivity Hazard - No

#### SARA 302 Extremely hazardous substance

Not listed.

#### SARA 311/312 Hazardous chemical

No

#### SARA 313 (TRI reporting)

Not regulated.

### Other federal regulations

#### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

#### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

#### Safe Drinking Water Act (SDWA)

Not regulated.

### Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

### Food and drug administration

ALL ingredients in this product are authorized in 21CFR173.310 for use as boiler water additives where the steam may contact food.

### NSF Registered and/or meets USDA (according to 1998 guidelines):

Registration No. - 145976

Category Code(s):

G5 Cooling and retort water treatment products

G6 Boiler treatment products, steam line products - food contact

### US state regulations

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - Massachusetts RTK - Substance List**

Trisodium phosphate (CAS 7601-54-9)

**US - Pennsylvania RTK - Hazardous Substances**

Trisodium phosphate (CAS 7601-54-9)

**US - Rhode Island RTK**

Trisodium phosphate (CAS 7601-54-9)

**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

**US. New Jersey Worker and Community Right-to-Know Act**

Not regulated.

**US. California Proposition 65**

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Female reproductive toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Male reproductive toxin**

No ingredient listed.

**16. Other information, including date of preparation or last revision**

**Issue date** Nov-05-2014

**Revision date** Nov-05-2014

**Version #** 1.0

**List of abbreviations** CAS: Chemical Abstract Service Registration Number  
TWA: Time Weighted Average  
STEL: Short Term Exposure Limit  
TLV: Threshold Limit Value  
LD50: Lethal Dose, 50%  
LC50: Lethal Concentration, 50%  
NOEL: No Observed Effect Level  
COD: Chemical Oxygen Demand  
BOD: Biochemical Oxygen Demand  
TOC: Total Organic Carbon  
IATA: International Air Transport Association  
IMDG: International Maritime Dangerous Goods Code  
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.  
ACGIH: American Conference of Governmental Industrial Hygienists  
NFPA: National Fire Protection Association

**References:** No data available

**Disclaimer** The information in the sheet was written based on the best knowledge and experience currently available. The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**Revision Information** Product and Company Identification: Product and Company Identification  
Composition / Information on Ingredients: Disclosure Overrides  
Physical & Chemical Properties: Multiple Properties  
Transport Information: Material Transportation Information  
Regulatory Information: Risk Phrases - Labeling  
HazReg Data: Europe - EU  
GHS: Classification  
REACH: Registration Substance

**Prepared by** This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.



## SAFETY DATA SHEET

### OPTISPERSE\* HTP3001

#### 1. Identification

Product identifier	OPTISPERSE HTP3001
Other means of identification	None.
Recommended use	Water based internal boiler treatment chemical.
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Corrosive to metals	Category 1
Health hazards	Skin corrosion/irritation	Category 1B
	Serious eye damage/eye irritation	Category 1
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
OSHA defined hazards	Not classified.	

#### Label elements



Signal word	Danger
Hazard statement	May be corrosive to metals. Causes severe skin burns and eye damage. Causes serious eye damage. May cause respiratory irritation.
Precautionary statement	
Prevention	Keep only in original container. Do not breathe mist or vapor. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear eye protection/face protection.
Response	If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor/. Wash contaminated clothing before reuse. Absorb spillage to prevent material damage.
Storage	Store in a well-ventilated place. Keep container tightly closed. Store locked up. Store in corrosive resistant/ container with a resistant inner liner.
Disposal	Dispose of contents/container to an approved facility.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

### 3. Composition/information on ingredients

#### Mixtures

Components	CAS #	Percent
Sodium hydroxide	1310-73-2	2.5 - 10

**Composition comments** Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

### 4. First-aid measures

<b>Inhalation</b>	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
<b>Skin contact</b>	Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.
<b>Eye contact</b>	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.
<b>Ingestion</b>	Call a physician or poison control center immediately. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
<b>Most important symptoms/effects, acute and delayed</b>	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation.
<b>Indication of immediate medical attention and special treatment needed</b>	Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim under observation. Symptoms may be delayed.
<b>General information</b>	If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

### 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO <sub>2</sub> ).
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards arising from the chemical</b>	During fire, gases hazardous to health may be formed.
<b>Special protective equipment and precautions for firefighters</b>	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.
<b>Fire fighting equipment/instructions</b>	Move containers from fire area if you can do so without risk.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.

### 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
<b>Methods and materials for containment and cleaning up</b>	Absorb spillage to prevent material damage. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water. Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal.
<b>Environmental precautions</b>	Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS. Avoid discharge into drains, water courses or onto the ground.

### 7. Handling and storage

<b>Precautions for safe handling</b>	Alkaline. Do not mix with acidic material. Do not breathe mist or vapor. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Do not get in eyes, on skin, or on clothing. Use care in handling/storage.
<b>Conditions for safe storage, including any incompatibilities</b>	Protect from freezing. If frozen, thaw completely and mix thoroughly prior to use. Store in corrosive resistant container with a resistant inner liner. Store in a cool, dry place out of direct sunlight. Store locked up. Keep only in the original container. Store in accordance with local/regional/national/international regulation.



## 8. Exposure controls/personal protection

### Occupational exposure limits

#### US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	PEL	2 mg/m <sup>3</sup>

#### US. ACGIH Threshold Limit Values

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	Ceiling	2 mg/m <sup>3</sup>

#### US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Sodium hydroxide (CAS 1310-73-2)	Ceiling	2 mg/m <sup>3</sup>

### Biological limit values

No biological exposure limits noted for the ingredient(s).

### Appropriate engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

### Individual protection measures, such as personal protective equipment

**Eye/face protection** Splash proof chemical goggles. Face shield.

#### Skin protection

##### Hand protection

Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.

##### Other

Wear appropriate chemical resistant clothing. Gauntlet-type rubber, butyl or neoprene gloves. Wash off after each use. Replace as necessary.

#### Respiratory protection

If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

#### Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

### General hygiene considerations

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

### Appearance

**Color** Colorless to yellow

**Physical state** Liquid

**Odor** Slight

**Odor threshold** Not available.

**pH (concentrated product)** 13.5

**pH in aqueous solution** 12.5 (5% SOL.)

**Melting point/freezing point** 21 °F (-6 °C)

**Initial boiling point and boiling range** 220 °F (104 °C)

**Flash point** > 200 °F (> 93 °C) P-M(CC)

**Evaporation rate** < 1 (Ether = 1)

**Flammability (solid, gas)** Not applicable.

### Upper/lower flammability or explosive limits

**Flammability limit - lower (%)** Not available.

**Flammability limit - upper (%)** Not available.

**Explosive limit - lower (%)** Not available.

Explosive limit - upper (%)	Not available.
Vapor pressure	18 mm Hg
Vapor pressure temp.	70 °F (21 °C)
Vapor density	< 1 (Air = 1)
Relative density	1.08
Relative density temperature	70 °F (21 °C)
Solubility(ies)	
Solubility (water)	100 %
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	15 cps
Viscosity temperature	70 °F (21 °C)
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Percent volatile	0 (Estimated)
Pour point	26 °F (-3 °C)
Specific gravity	1.08

## 10. Stability and reactivity

Reactivity	May be corrosive to metals.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Contact with water reactive compounds may cause fire or explosion.
Conditions to avoid	Protect from freezing.
Incompatible materials	Strong acids. Strong oxidizing agents. Metals.
Hazardous decomposition products	Oxides of carbon and phosphorus evolved in fire.

## 11. Toxicological information

### Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns.

**Symptoms related to the physical, chemical and toxicological characteristics** Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation.

### Information on toxicological effects

**Acute toxicity** May cause respiratory irritation.

Product	Species	Test Results
OPTISPERSE HTP3001 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg, (Calculated according to GHS additivity formula)

Components	Species	Test Results
Sodium hydroxide (CAS 1310-73-2)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	1350 mg/kg
<i>Oral</i>		
LD50	Rabbit	> 500 mg/kg

\* Estimates for product may be based on additional component data not shown.

<b>Skin corrosion/irritation</b>	Causes severe skin burns and eye damage.
<b>Serious eye damage/eye irritation</b>	Causes serious eye damage.
<b>Respiratory or skin sensitization</b>	
<b>Respiratory sensitization</b>	Not a respiratory sensitizer.
<b>Skin sensitization</b>	This product is not expected to cause skin sensitization.
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Carcinogenicity</b>	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
<b>IARC Monographs. Overall Evaluation of Carcinogenicity</b>	
Not available.	
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	
Not listed.	
<b>US. National Toxicology Program (NTP) Report on Carcinogens</b>	
Not available.	
<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.
<b>Specific target organ toxicity - single exposure</b>	May cause respiratory irritation.
<b>Specific target organ toxicity - repeated exposure</b>	Not classified.
<b>Aspiration hazard</b>	Based on available data, the classification criteria are not met. May be harmful if swallowed and enters airways.
<b>Chronic effects</b>	Prolonged inhalation may be harmful.

## 12. Ecological information

Ecotoxicity			
Product	Species		Test Results
OPTISPERSE HTP3001 (CAS Mixture)			
	0% Mortality	Fathead Minnow	2000 mg/L, Static Bioassay with 48-Hour Renewal, 96 hour, (pH adjusted)
<b>Aquatic</b>			
Crustacea	0% Mortality	Daphnia magna	2000 mg/L, Static Screen, 48 hour, (pH adjusted)

\* Estimates for product may be based on additional component data not shown.

<b>Bioaccumulative potential</b>	No data available.
<b>Mobility in soil</b>	No data available.
<b>Other adverse effects</b>	Not available.
<b>Persistence and degradability</b>	
	No data is available on the degradability of this product.
- COD (mgO2/g)	66 (calculated data)
- BOD 5 (mgO2/g)	7 (calculated data)
- BOD 28 (mgO2/g)	7 (calculated data)
- Closed Bottle Test (% Degradation in 28 days)	11 (calculated data)

- Zahn-Wellens Test (% Degradation in 28 days)
- TOC (mg C/g)

18 (calculated data)

17 (calculated data)

### 13. Disposal considerations

#### Disposal instructions

Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Dispose of contents/container in accordance with local/regional/national/international regulations.

#### Local disposal regulations

Dispose in accordance with all applicable regulations.

#### Hazardous waste code

D002: Waste Corrosive material [pH  $\leq 2$  or  $\geq 12.5$ , or corrosive to steel]

The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

#### Waste from residues / unused products

Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

#### Contaminated packaging

Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

### 14. Transport information

#### DOT

UN number

UN1824

UN proper shipping name

SODIUM HYDROXIDE SOLUTION, RQ

Transport hazard class(es)

Class

8

Subsidiary risk

-

Packing group

III

Special precautions for user

Read safety instructions, SDS and emergency procedures before handling.

ERG number

154

Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

#### IATA

UN number

UN1824

UN proper shipping name

SODIUM HYDROXIDE SOLUTION

Transport hazard class(es)

Class

8

Subsidiary risk

-

Packing group

III

Environmental hazards

No.

Special precautions for user

Read safety instructions, SDS and emergency procedures before handling.

#### IMDG

UN number

UN1824

UN proper shipping name

SODIUM HYDROXIDE SOLUTION, RQ

Transport hazard class(es)

Class

8

Subsidiary risk

-

Packing group

III

Environmental hazards

Marine pollutant

No.

EmS

Not available.

Special precautions for user

Read safety instructions, SDS and emergency procedures before handling.

#### DOT







## 15. Regulatory information

### US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

#### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

#### CERCLA Hazardous Substance List (40 CFR 302.4)

Sodium hydroxide (CAS 1310-73-2)

Listed.

#### SARA 304 Emergency release notification

Not regulated.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

### Superfund Amendments and Reauthorization Act of 1986 (SARA)

#### Hazard categories

Immediate Hazard - Yes  
Delayed Hazard - No  
Fire Hazard - No  
Pressure Hazard - No  
Reactivity Hazard - No

#### SARA 302 Extremely hazardous substance

Not listed.

#### SARA 311/312 Hazardous chemical

Yes

#### SARA 313 (TRI reporting)

Not regulated.

### Other federal regulations

#### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

#### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

#### Safe Drinking Water Act (SDWA)

Not regulated.

### Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

### Food and drug administration

All ingredients in this product are authorized in 21 CFR176.170 for use in boilers where the steam will be used for manufacturing paper or paperboard.

### US state regulations

#### US - Massachusetts RTK - Substance List

Sodium hydroxide (CAS 1310-73-2)

#### US - Pennsylvania RTK - Hazardous Substances

Sodium hydroxide (CAS 1310-73-2)

**US - Rhode Island RTK**

Sodium hydroxide (CAS 1310-73-2)

**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

**US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))**

Sodium hydroxide (CAS 1310-73-2)

**US. New Jersey Worker and Community Right-to-Know Act**

Sodium hydroxide (CAS 1310-73-2)

**US. Pennsylvania Worker and Community Right-to-Know Law**

Sodium hydroxide (CAS 1310-73-2)

**US. California Proposition 65**

WARNING: This product contains a chemical known to the State of California to cause cancer.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

NICKEL (CAS 7440-02-0)

Listed: October 1, 1989

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Female reproductive toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Male reproductive toxin**

No ingredient listed.

**16. Other information, including date of preparation or last revision**

**Issue date** Oct-23-2014

**Revision date** Nov-09-2015

**Version #** 3.0

**References:** No data available

**Disclaimer** The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**Revision information** Hazard(s) identification: Disposal

**Prepared by** This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.



## SAFETY DATA SHEET

### OPTISPERSE\* SP8300

#### 1. Identification

Product identifier	OPTISPERSE SP8300
Other means of identification	Not available.
Recommended use	Internal boiler treatment
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Not classified.
Health hazards	Not classified.
OSHA defined hazards	Not classified.

#### Label elements

Hazard symbol	None.
Signal word	Not available.
Hazard statement	The mixture does not meet the criteria for classification.
Precautionary statement	
Prevention	Observe good industrial hygiene practices.
Response	Wash hands after handling.
Storage	Store away from incompatible materials.
Disposal	Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC)	None known.
---	-------------

Supplemental information	None.
--------------------------	-------

#### 3. Composition/information on ingredients

##### Mixtures

The components are not hazardous or are below required disclosure limits.

Composition comments	Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.
----------------------	--

#### 4. First-aid measures

Inhalation	If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.
------------	---

<b>Skin contact</b>	Rinse skin with water/shower.
<b>Eye contact</b>	Rinse with water. Get medical attention if irritation develops and persists.
<b>Ingestion</b>	Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately.
<b>Most important symptoms/effects, acute and delayed</b>	Direct contact with eyes may cause temporary irritation.
<b>Indication of immediate medical attention and special treatment needed</b>	Treat symptomatically.
<b>General information</b>	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

## 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards arising from the chemical</b>	During fire, gases hazardous to health may be formed.
<b>Special protective equipment and precautions for firefighters</b>	Self-contained breathing apparatus and full protective clothing must be worn in case of fire..
<b>Fire-fighting equipment/instructions</b>	Move containers from fire area if you can do so without risk.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.
<b>General fire hazards</b>	No unusual fire or explosion hazards noted.

## 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	Keep unnecessary personnel away. For personal protection, see section 8 of the SDS.
<b>Methods and materials for containment and cleaning up</b>	<p>Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.</p> <p>Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.</p> <p>Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.</p>
<b>Environmental precautions</b>	Avoid discharge into drains, water courses or onto the ground.

## 7. Handling and storage

<b>Precautions for safe handling</b>	Normal chemical handling.
<b>Conditions for safe storage, including any incompatibilities</b>	Protect from freezing. If frozen, thaw completely and mix thoroughly prior to use. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Store in accordance with local/regional/national/international regulation.

## 8. Exposure controls/personal protection

<b>Occupational exposure limits</b>	No exposure limits noted for ingredient(s).
<b>Biological limit values</b>	No biological exposure limits noted for the ingredient(s).
<b>Appropriate engineering controls</b>	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.
<b>Individual protection measures, such as personal protective equipment</b>	
<b>Eye/face protection</b>	Splash proof chemical goggles.
<b>Skin protection</b>	
<b>Hand protection</b>	Chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.
<b>Other</b>	Wear suitable protective clothing. Chemical resistant gloves.



<b>Respiratory protection</b>	If ventilation is insufficient, suitable respiratory protection must be provided. When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Respiratory protection not required. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
<b>Thermal hazards</b>	Wear appropriate thermal protective clothing, when necessary.
<b>General hygiene considerations</b>	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

### Appearance

Color	Yellow
Physical state	Liquid
Odor	Mild
Odor threshold	Not available.
pH (concentrated product)	10.3
pH in aqueous solution	9.6 (5% SOL.)
Melting point/freezing point	25 °F (-4 °C)
Initial boiling point and boiling range	220 °F (104 °C)
Flash point	> 212 °F (> 100 °C) P-M(CC)
Evaporation rate	< 1 (Ether = 1)
Flammability (solid, gas)	Not available.

### Upper/lower flammability or explosive limits

Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.

Vapor pressure	18 mm Hg
Vapor pressure temp.	70 °F (21 °C)
Vapor density	< 1 (Air = 1)
Relative density	1.2
Relative density temperature	70 °F (21 °C)

### Solubility(ies)

Solubility (water)	100 %
Partition coefficient (n-octanol/water)	Not available.

Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	320 cps
Viscosity temperature	70 °F (21 °C)

### Other information

Percent volatile	0 (ASTM 3960-93)
Pour point	30 °F (-1 °C)
Specific gravity	1.2

## 10. Stability and reactivity

<b>Reactivity</b>	The product is stable and non-reactive under normal conditions of use, storage and transport.
<b>Chemical stability</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions</b>	Hazardous polymerization does not occur. Contact with water reactive compounds may cause fire or explosion.

<b>Conditions to avoid</b>	Protect from freezing.
<b>Incompatible materials</b>	Avoid contact with strong oxidizers.
<b>Hazardous decomposition products</b>	Oxides of carbon evolved in fire.

## 11. Toxicological information

### Information on likely routes of exposure

<b>Ingestion</b>	May cause gastrointestinal irritation.
<b>Inhalation</b>	Mists/aerosols may cause irritation to upper respiratory tract.
<b>Skin contact</b>	Prolonged or repeated contact may cause transient irritation.
<b>Eye contact</b>	Direct contact with eyes may cause temporary irritation.

**Symptoms related to the physical, chemical and toxicological characteristics** Prolonged and repetitive exposure, depending on the route(s), may develop transient irritation on skin, eyes, ingestion tract, and/or respiratory tract.

### Information on toxicological effects

#### Acute toxicity

Product	Species	Test Results
OPTISPERSE SP8300 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg, (Calculated according to GHS additivity formula)

\* Estimates for product may be based on additional component data not shown.

**Skin corrosion/irritation** Prolonged skin contact may cause temporary irritation.

**Serious eye damage/eye irritation** Direct contact with eyes may cause temporary irritation.

#### Respiratory or skin sensitization

<b>Respiratory sensitization</b>	Not available.
<b>Skin sensitization</b>	This product is not expected to cause skin sensitization.

**Germ cell mutagenicity** No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

**Carcinogenicity** This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

**Reproductive toxicity** This product is not expected to cause reproductive or developmental effects.

**Specific target organ toxicity - single exposure** Not classified.

**Specific target organ toxicity - repeated exposure** Not classified.

**Aspiration hazard** Based on available data, the classification criteria are not met.

**Chronic effects** Prolonged inhalation may be harmful.

**Further information** This product has no known adverse effect on human health.

## 12. Ecological information

### Ecotoxicity

Product	Species	Test Results
OPTISPERSE SP8300 (CAS Mixture)		
0% Mortality	Sheepshead Minnow	16000 mg/L, Static Renewal Bioassay, 96 hour, (pH adjusted)

Product		Species	Test Results
	LC50	Ceriodaphnia	615 mg/L, Static Acute Bioassay, 48 hour, (pH adjusted)
		Fathead Minnow	4640 mg/L, Static Renewal Bioassay, 96 hour
		Mysid Shrimp	3480 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)
	NOEL	Ceriodaphnia	240 mg/L, Static Acute Bioassay, 48 hour, (pH adjusted)
		Fathead Minnow	1922 mg/L, Static Renewal Bioassay, 96 hour
		Mysid Shrimp	1000 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)
Crustacea	LC50	Daphnia magna	1700 mg/L, Static Renewal Bioassay, 48 hour
	NOEL	Daphnia magna	1370 mg/L, Static Renewal Bioassay, 48 hour
Other	NOEL	Rainbow Trout	5000 mg/L, Static Acute Bioassay, 96 hour, (pH adjusted)

\* Estimates for product may be based on additional component data not shown.

<b>Bioaccumulative potential</b>	No data available.
<b>Mobility in soil</b>	No data available.
<b>Other adverse effects</b>	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.
<b>Environmental fate</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
<b>Persistence and degradability</b>	Testing has shown product not to be readily biodegradable.
- COD (mgO2/g)	400
- BOD 5 (mgO2/g)	0
- BOD 28 (mgO2/g)	0
- Closed Bottle Test (% Degradation in 28 days)	0
- Zahn-Wellens Test (% Degradation in 28 days)	0
- TOC (mg C/g)	120

### 13. Disposal considerations

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
<b>Contaminated packaging</b>	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

### 14. Transport information

<b>DOT</b>	Not regulated as dangerous goods. Some containers may be DOT exempt, please check BOL for exact container classification.
------------	--

**IATA**

Not regulated as dangerous goods.

**IMDG**

Not regulated as dangerous goods.

**15. Regulatory information****US federal regulations**

This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

All components are on the U.S. EPA TSCA Inventory List.

**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**

Not regulated.

**CERCLA Hazardous Substance List (40 CFR 302.4)**

Not listed.

**SARA 304 Emergency release notification**

Not regulated.

**OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)**

Not listed.

**Superfund Amendments and Reauthorization Act of 1986 (SARA)****Hazard categories**

Immediate Hazard - No

Delayed Hazard - No

Fire Hazard - No

Pressure Hazard - No

Reactivity Hazard - No

**SARA 302 Extremely hazardous substance**

Chemical name	CAS number	Reportable quantity	Threshold planning quantity	Threshold planning quantity, lower value	Threshold planning quantity, upper value
Hydroquinone	123-31-9	100		500 lbs	10000 lbs

**SARA 311/312 Hazardous chemical**

No

**SARA 313 (TRI reporting)**

Not regulated.

**Other federal regulations****Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Not regulated.

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)**

Not regulated.

**Safe Drinking Water Act (SDWA)**

Not regulated.

**Inventory status**

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

**Food and drug administration**

ALL ingredients in this product are authorized in 21CFR173.310 for use as boiler water additives where the steam may contact food.

**NSF Registered and/or meets USDA (according to 1998 guidelines):**

Registration No. – 146614

Category Code(s):

G5 Cooling and retort water treatment products

G6 Boiler treatment products, steam line products – food contact

**US state regulations**

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.



**US - Massachusetts RTK - Substance List**

Not regulated.

**US - Pennsylvania RTK - Hazardous Substances**

Not regulated.

**US - Rhode Island RTK**

Not regulated.

**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

**US. New Jersey Worker and Community Right-to-Know Act**

Not regulated.

**US. California Proposition 65**

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Female reproductive toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Male reproductive toxin**

No ingredient listed.

**16. Other information, including date of preparation or last revision**

**Issue date** Nov-12-2014

**Revision date** Nov-12-2014

**Version #** 1.0

**List of abbreviations** CAS: Chemical Abstract Service Registration Number  
TWA: Time Weighted Average  
STEL: Short Term Exposure Limit  
LD50: Lethal Dose, 50%  
LC50: Lethal Concentration, 50%  
NOEL: No Observed Effect Level  
COD: Chemical Oxygen Demand  
BOD: Biochemical Oxygen Demand  
TOC: Total Organic Carbon  
TLV: Threshold Limit Value  
IATA: International Air Transport Association  
IMDG: International Maritime Dangerous Goods Code  
NFPA: National Fire Protection Association  
ACGIH: American Conference of Governmental Industrial Hygienists  
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.

**References:** No data available

**Disclaimer** The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**Revision Information** Product and Company Identification: Product and Company Identification  
Composition / Information on Ingredients: Disclosure Overrides  
Physical & Chemical Properties: Multiple Properties  
Toxicological Information: Toxicological Data  
Transport Information: Material Transportation Information  
Regulatory Information: Hazard Symbol - Labeling  
HazReg Data: Europe - EU  
GHS: Classification

**Prepared by** This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.



## SAFETY DATA SHEET

### POLYFLOC\* AE1703

#### 1. Identification

Product identifier	POLYFLOC AE1703
Other means of identification	None.
Recommended use	Flocculant
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 1
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
	Specific target organ toxicity, single exposure	Category 3 narcotic effects
OSHA defined hazards	Not classified.	

#### Label elements



Signal word	Danger
Hazard statement	Causes skin irritation. Causes serious eye damage. May cause respiratory irritation. May cause drowsiness or dizziness.
Precautionary statement	
Prevention	Wear eye/face protection. Avoid breathing mist or vapor. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves. Wear eye/face protection.
Response	If on skin: Wash with plenty of water/. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor/. Specific treatment (see on this label). If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.
Storage	Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.

### 3. Composition/information on ingredients

#### Mixtures

Components	CAS #	Percent
Distillates (petroleum), hydrotreated light	64742-47-8	20 - 40
Alcohols, C10-16, ethoxylated	68002-97-1	2.5 - 10
Polyoxyethylene oleylamine	26635-93-8	1 - 2.5

**Composition comments** Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

### 4. First-aid measures

<b>Inhalation</b>	Remove victim to fresh air and keep at rest in a position comfortable for breathing. If breathing stops, provide artificial respiration. For breathing difficulties, oxygen may be necessary. Get medical attention immediately.
<b>Skin contact</b>	Take off contaminated clothing and wash before reuse. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention.
<b>Eye contact</b>	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.
<b>Ingestion</b>	Never give anything by mouth to a victim who is unconscious or is having convulsions. Do not induce vomiting. Call a physician or poison control center immediately. Rinse mouth. Dilute contents of stomach using 2-8 fluid ounces (60-240ml) of milk or water. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
<b>Most important symptoms/effects, acute and delayed</b>	May cause respiratory irritation. Diarrhea. May cause drowsiness and dizziness. Headache. Nausea, vomiting. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Skin irritation. May cause redness and pain.
<b>Indication of immediate medical attention and special treatment needed</b>	No specific antidotes are recommended. Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
<b>General information</b>	If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

### 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Dry chemical, CO2, water spray or regular foam.
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards arising from the chemical</b>	Oxides of carbon and nitrogen evolved in fire. Ammonia and volatile amines.
<b>Special protective equipment and precautions for firefighters</b>	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.
<b>Fire fighting equipment/instructions</b>	In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials. Move containers from fire area if you can do so without risk. Cool containers / tanks with water spray.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.
<b>General fire hazards</b>	No unusual fire or explosion hazards noted.

### 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	Wear appropriate protective equipment and clothing during clean-up. See Section 8 of the SDS for Personal Protective Equipment. Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Avoid breathing mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
--	---

## Methods and materials for containment and cleaning up

Ventilate the area. Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Flush with plenty of water. Spread sand/grit.

Large Spills: Stop the flow of material, if this is without risk. Use water spray to reduce vapors or divert vapor cloud drift. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

## Environmental precautions

Avoid discharge into drains, water courses or onto the ground.

## 7. Handling and storage

### Precautions for safe handling

No special precautions are necessary beyond normal good hygiene practices. See Section 8 of the SDS for additional personal protection advice when handling this product. Do not get this material in contact with eyes. Avoid breathing mist or vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated contact with skin. Avoid prolonged exposure. Use only in well-ventilated areas. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Use care in handling/storage.

### Conditions for safe storage, including any incompatibilities

Store locked up. Keep away from heat and sources of ignition. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Store in accordance with local/regional/national/international regulation. Keep container tightly closed in a dry and well-ventilated place. Store away from oxidizers. Store between 5 - 27 °C

## 8. Exposure controls/personal protection

### Occupational exposure limits

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Distillates (petroleum), hydrotreated light (CAS 64742-47-8)	TWA	100 mg/m3

### Biological limit values

No biological exposure limits noted for the ingredient(s).

### Appropriate engineering controls

Provide adequate ventilation. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

### Individual protection measures, such as personal protective equipment

#### Eye/face protection

Splash proof chemical goggles.

#### Skin protection

##### Hand protection

Wear appropriate chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.

##### Other

Wear appropriate chemical resistant clothing.

#### Respiratory protection

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

#### Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

### General hygiene considerations

Do not smoke or drink in the workplace. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

### Appearance

#### Color

Yellow

#### Physical state

Emulsion

### Odor

Ammonia

### Odor threshold

Not available.

### pH in aqueous solution

8.7 (0.5% SOL.)

### Melting point/freezing point

23 °F (-5 °C)

Material name: POLYFLOC\* AE1703

Version number: 4.0



<b>Initial boiling point and boiling range</b>	Not available.
<b>Flash point</b>	> 212 °F (> 100 °C) P-M(CC)
<b>Evaporation rate</b>	< 1 (Ether = 1)
<b>Flammability (solid, gas)</b>	Not applicable.
<b>Upper/lower flammability or explosive limits</b>	
<b>Flammability limit - lower (%)</b>	Not available.
<b>Flammability limit - upper (%)</b>	Not available.
<b>Explosive limit - lower (%)</b>	Not available.
<b>Explosive limit - upper (%)</b>	Not available.
<b>Vapor pressure</b>	18 mm Hg
<b>Vapor pressure temp.</b>	70 °F (21 °C)
<b>Vapor density</b>	> 1 (Air = 1)
<b>Relative density</b>	1.08
<b>Relative density temperature</b>	70 °F (21 °C)
<b>Solubility(ies)</b>	
<b>Solubility (water)</b>	Not available.
<b>Partition coefficient (n-octanol/water)</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Viscosity</b>	2800 cps
<b>Viscosity temperature</b>	70 °F (21 °C)
<b>Other information</b>	
<b>Percent volatile</b>	30 (Estimated)
<b>Pour point</b>	< 28 °F (< -2 °C)
<b>Specific gravity</b>	1.08

## 10. Stability and reactivity

<b>Reactivity</b>	The product is stable and non-reactive under normal conditions of use, storage and transport.
<b>Chemical stability</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions</b>	Hazardous polymerization does not occur.
<b>Conditions to avoid</b>	Avoid temperatures exceeding the flash point. Contact with incompatible materials. None under normal conditions.
<b>Incompatible materials</b>	Strong oxidizing substances.
<b>Hazardous decomposition products</b>	Toxic gas. Carbon oxides. Nitrogen oxides (NOx). Ammonia and volatile amines.

## 11. Toxicological information

<b>Information on likely routes of exposure</b>	
<b>Inhalation</b>	May cause drowsiness and dizziness. May cause irritation to the respiratory system.
<b>Skin contact</b>	Causes skin irritation.
<b>Eye contact</b>	Causes serious eye damage.
<b>Ingestion</b>	May cause gastrointestinal irritation.
<b>Symptoms related to the physical, chemical and toxicological characteristics</b>	May cause drowsiness and dizziness. Headache. Nausea, vomiting. Diarrhea. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Upper respiratory tract irritation. Skin irritation. May cause redness and pain.
<b>Information on toxicological effects</b>	
<b>Acute toxicity</b>	Narcotic effects. May cause respiratory irritation.

Product	Species	Test Results
POLYFLOC AE1703 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg, (Calculated according to GHS additivity formula)
<i>Inhalation</i>		
LC50	Rat	> 17.3 mg/l, 4 Hour, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg, (Calculated according to GHS additivity formula)

Components	Species	Test Results
Alcohols, C10-16, ethoxylated (CAS 68002-97-1)		
<b>Acute</b>		
<i>Oral</i>		
LD50	Rat	384 mg/kg
Distillates (petroleum), hydrotreated light (CAS 64742-47-8)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 2000 mg/kg
<i>Inhalation</i>		
LC50	Rat	> 5.2 mg/l, 4 Hour
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg

\* Estimates for product may be based on additional component data not shown.

<b>Skin corrosion/irritation</b>	Causes skin irritation.
<b>Serious eye damage/eye irritation</b>	Causes serious eye damage.
<b>Respiratory or skin sensitization</b>	
<b>Respiratory sensitization</b>	Not a respiratory sensitizer.
<b>Skin sensitization</b>	This product is not expected to cause skin sensitization.
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Carcinogenicity</b>	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	
Not listed.	
<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.
<b>Specific target organ toxicity - single exposure</b>	Narcotic effects. May cause drowsiness and dizziness. Respiratory tract irritation.
<b>Specific target organ toxicity - repeated exposure</b>	Not classified.
<b>Aspiration hazard</b>	Based on available data, the classification criteria are not met.
<b>Chronic effects</b>	Prolonged inhalation may be harmful.

## 12. Ecological information

Ecotoxicity			
Product		Species	Test Results
POLYFLOC AE1703 (CAS Mixture)			
LC50	Fathead Minnow		17.3 mg/L, Static Acute Bioassay, 96 hour
	Zebra Fish		> 100 mg/l, 96 Hour, Fresh water. Based on test data for structurally similar materials.
NOEL	Fathead Minnow		7.8 mg/L, Static Acute Bioassay, 96 hour

Product		Species	Test Results
Other	IC50	Selenastrum capricornutum (new name) Pseudokirchnerella subca	> 100 mg/l, 72 Hour, Based on test data for structurally similar materials.
<b>Aquatic</b>			
Crustacea	EC50	Daphnia magna	> 100 mg/l, 48 Hour, Fresh water. Based on test data for structurally similar materials.
	LC50	Daphnia magna	6.2 mg/L, Static Acute Bioassay, 48 hour
	NOEL	Daphnia magna	0.81 mg/L, Static Acute Bioassay, 48 hour
Fish	LC50	Rainbow Trout	30.8 mg/L, Static Acute Bioassay, 96 hour
	NOEL	Rainbow Trout	20 mg/L, Static Acute Bioassay, 96 hour

\* Estimates for product may be based on additional component data not shown.

#### Bioaccumulative potential

**Mobility in soil** No data available.

**Other adverse effects** No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

#### Persistence and degradability

CO2 Evolution (Modified Sturm Test) (OECD 301B)  
Testing has shown product not to be readily biodegradable.

### 13. Disposal considerations

**Disposal instructions** Dispose of contents/container in accordance with local/regional/national/international regulations. Collect and reclaim or dispose in sealed containers at licensed waste disposal site.

**Local disposal regulations** Dispose in accordance with all applicable regulations.

**Hazardous waste code** The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

**Waste from residues / unused products** Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner. Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

**Contaminated packaging** Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

### 14. Transport information

#### DOT

**UN number** UN3082  
**UN proper shipping name** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, N.O.S. (AMMONIUM ACETATE), RQ  
**Transport hazard class(es)**  
**Class** 9  
**Subsidiary risk** -  
**Packing group** III  
**Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.  
**ERG number** 171

Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

#### IATA

Not regulated as dangerous goods.

#### IMDG

Not regulated as dangerous goods.

DOT



## 15. Regulatory information

### US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

#### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

#### CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

#### SARA 304 Emergency release notification

Not regulated.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

### Superfund Amendments and Reauthorization Act of 1986 (SARA)

#### Hazard categories

Immediate Hazard - Yes  
Delayed Hazard - No  
Fire Hazard - No  
Pressure Hazard - No  
Reactivity Hazard - No

#### SARA 302 Extremely hazardous substance

Not listed.

#### SARA 311/312 Hazardous chemical

Yes

#### SARA 313 (TRI reporting)

Not regulated.

### Other federal regulations

#### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

#### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

#### Safe Drinking Water Act (SDWA)

Not regulated.

### Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

**Food and drug administration** 21 CFR 176.170 (components of paper and paperboard in contact with aqueous and fatty foods)

### US state regulations

#### US - Massachusetts RTK - Substance List

Distillates (petroleum), hydrotreated light (CAS 64742-47-8)

#### US - Pennsylvania RTK - Hazardous Substances

Distillates (petroleum), hydrotreated light (CAS 64742-47-8)

#### US - Rhode Island RTK

Not regulated.

Material name: POLYFLOC\* AE1703

Version number: 4.0



**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

**US. New Jersey Worker and Community Right-to-Know Act**

Distillates (petroleum), hydrotreated light (CAS 64742-47-8)

**US. Pennsylvania Worker and Community Right-to-Know Law**

Distillates (petroleum), hydrotreated light (CAS 64742-47-8)

**US. California Proposition 65**

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

Acrylamide (CAS 79-06-1)

Listed: January 1, 1990

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**

Acrylamide (CAS 79-06-1)

Listed: February 25, 2011

**US - California Proposition 65 - CRT: Listed date/Female reproductive toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Male reproductive toxin**

Acrylamide (CAS 79-06-1)

Listed: February 25, 2011

## 16. Other information, including date of preparation or last revision

**Issue date** Jul-15-2014

**Revision date** Jul-07-2015

**Version #** 4.0

### List of abbreviations

CAS: Chemical Abstract Service Registration Number

EC-No: European Commission Number

CLP: Regulation on classification, labeling and packaging of substances and mixtures

DSD: Dangerous Substances Directive

CEN: European Committee for Standardisation

TWA: Time Weighted Average

STEL: Short Term Exposure Limit

LD50: Lethal Dose, 50%

LC50: Lethal Concentration, 50%

EC50: Effect Concentration, 50%

NOEL: No Observed Effect Level

COD: Chemical Oxygen Demand

BOD: Biochemical Oxygen Demand

TOC: Total Organic Carbon

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways

IATA: International Air Transport Association

IMDG: International Maritime Dangerous Goods Code

RID: International Rule for Transport of Dangerous Substances by Railway

TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.

ACGIH: American Conference of Governmental Industrial Hygienists

NFPA: National Fire Protection Association

### References:

No data available

### Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**Revision Information**

Product and Company Identification: Physical States  
Composition / Information on Ingredients: Additional Components  
First-aid measures: Ingestion  
Fire-fighting measures: Fire fighting equipment/instructions  
Fire-fighting measures: Special protective equipment and precautions for firefighters  
Exposure controls/personal protection: Eye/face protection  
Physical & Chemical Properties: Multiple Properties  
Stability and reactivity: Hazardous decomposition products  
Toxicological Information: Toxicological Data  
Ecological Information: Ecotoxicity  
Regulatory Information: Risk Phrases - Classification  
Other information, including date of preparation or last revision: Prepared by  
HazReg Data: North America  
GHS: Classification

**Prepared by**

This SDS has been prepared by GE Water & Process Technologies Regulatory Department  
(1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.



# CAIROX<sup>®</sup> Potassium Permanganate

## EC- SAFETY DATA SHEET according to EC directive 2001/58/EC




### Material Safety Data Sheet

Page 1 of 9

#### Section 1 Chemical Product and Company Identification

<b>PRODUCT NAME:</b> CAIROX <sup>®</sup> Potassium permanganate, KMnO <sub>4</sub> <b>TRADE NAME:</b> CAIROX <sup>®</sup> Potassium permanganate <b>SYNONYMS:</b> Permanganic acid potassium salt Potassium permanganate Chameleon mineral Condyl's crystals Permanganate of potash		<b>Revision Date: June 2007</b>
<b>USES OF SUBSTANCE:</b> Potassium permanganate is an oxidant recommended for applications that require a strong oxidant.		
<b>COMPANY NAME (US):</b> CARUS CORPORATION	<b>COMPANY ADDRESS:</b> 315 Fifth Street Peru, IL 61354, USA <b>INFORMATION:</b> (815) 223-1500 (815) 224-6816 (FAX) <a href="http://www.caruscorporation.com">www.caruscorporation.com</a> (Web) <a href="mailto:salesmkt@caruscorporation.com">salesmkt@caruscorporation.com</a> (Email) <b>EMERGENCY TELEPHONE:</b> (800) 435 -6856 (USA) (815) 223-1500 (Other countries) (800) 424-9300 (Chemtrec, USA) (703) 527-3887 (Chemtrec, Other countries)	

#### Section 2 Hazardous Ingredients

<u>MATERIAL OR COMPONENT</u>	<u>CAS NO.</u>	<u>EINECS</u>	<u>%</u>	<u>HAZARD DATA</u>
Potassium Permanganate air	7722-64-7	231-760-3	>97.5%	<b>PEL/C</b> 5 mg Mn per cubic meter of  TLV-TWA 0.2 mg Mn per cubic meter of air
<b><u>HAZARD SYMBOLS:</u></b>				
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">   <b>O</b> </div> <div style="text-align: center;">   <b>Xn</b> </div> <div style="text-align: center;">   <b>N</b> </div> </div>				
<b><u>RISK PHRASES:</u></b>				
8 Contact with combustibles may cause fire. 22 Harmful if swallowed. 50/53 Very toxic to aquatic organisms, may cause long-term effects in the aquatic environment.				
<b><u>SAFETY PHRASES:</u></b>				
60 This material and its container must be disposed of as hazardous waste. 61 Avoid releases to the environment. Refer to special instructions / Safety data sheet.				



**CAIROX<sup>®</sup> Potassium Permanganate**  
**EC- SAFETY DATA SHEET** according to EC directive 2001/58/EC  
**Material Safety Data Sheet**

Page 2 of 9

**Section 3 Hazards Identification**

**1. EYE CONTACT**

Potassium Permanganate is damaging to eye tissue on contact. It may cause severe burns that result in damage to the eye.

**2. SKIN CONTACT**

Contact of solutions at room temperature may be irritating to the skin, leaving brown stains. Concentrated solutions at elevated temperature and crystals are damaging to the skin.

**3. INHALATION**

Acute inhalation toxicity data are not available. However, airborne concentrations of potassium permanganate in the form of dust or mist may cause damage to the respiratory tract.

**4. INGESTION**

Potassium permanganate, if swallowed, may cause severe burns to mucous membranes of the mouth, throat, esophagus, and stomach.

**Section 4 First Aid Measures**

**1. EYES**

Immediately flush eyes with large amounts of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface. Do not attempt to neutralize chemically. Seek medical attention immediately.

**Note to physician:** Soluble decomposition products are alkaline. Insoluble decomposition product is brown manganese dioxide.

**2. SKIN**

Immediately wash contaminated areas with water. Remove contaminated clothing and footwear. Wash clothing and decontaminate footwear before reuse. Seek medical attention immediately if irritation is severe or persistent.

**3. INHALATION**

Remove person from contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

**4. INGESTION**

Never give anything by mouth to an unconscious or convulsing person. If person is conscious, give large quantities of water. Seek medical attention immediately.





**CAIROX<sup>®</sup> Potassium Permanganate**  
**EC- SAFETY DATA SHEET** according to EC directive 2001/58/EC  
**Material Safety Data Sheet**

Page 3 of 9

**Section 5 Fire Fighting Measures**

**NFPA\* HAZARD SIGNS**

Health Hazard	1	=	Materials which under fire conditions would give off irritating combustion products. (less than 1 hour exposure) Materials that on the skin could cause irritation.
Flammability Hazard	0	=	Materials that will not burn.
Reactivity Hazard	0	=	Materials which in themselves are normally stable, even under fire exposure conditions, and which are not reactive with water.
Special Hazard	OX	=	Oxidizer

**\*National Fire Protection Association 704 (USA)**

**FIRST RESPONDERS:**

Wear protective gloves, boots, goggles, and respirator. In case of fire, wear positive pressure breathing apparatus. Approach incident with caution.

**FLASHPOINT**

None

**FLAMMABLE OR EXPLOSIVE LIMITS**

Lower: Nonflammable    Upper: Nonflammable

**EXTINGUISHING MEDIA**

Use large quantities of water. Water will turn pink to purple if in contact with potassium permanganate. Dike to contain. Do not use dry chemicals, CO<sub>2</sub> Halon<sup>®</sup> or foams.

**SPECIAL FIREFIGHTING PROCEDURES**

If material is involved in fire, flood with water. Cool all affected containers with large quantities of water. Apply water from as far a distance as possible. Wear self-contained breathing apparatus and full protective clothing.

**UNUSUAL FIRE AND EXPLOSION**

Powerful oxidizing material. May decompose spontaneously if exposed to heat (150°C / 302°F). May be explosive in contact with certain other chemicals (Section 10). May react violently with finely divided and readily oxidizable substances. Increases burning rate of combustible material.

**Section 6 Accidental Release Measures**

**PERSONAL PRECAUTIONS:**

Ensure adequate ventilation. Avoid dust formation. Avoid inhalation and contact with eyes and skin. Personnel should wear protective clothing suitable for the task. Remove all ignition sources and incompatible materials before attempting clean up.

**ENVIRONMENTAL PRECAUTIONS:**

Do not flush into sanitary sewer system or surface water. If accidental release into the environment occurs, inform the responsible authorities. Keep the product away from drains, sewers, surface and ground water and soil.

**STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:**

Clean up spills immediately by sweeping or shoveling up the material. Do not return spilled material to the original container – transfer to a clean metal drum. To clean contaminated surfaces or floors, flush with abundant quantities of water into sewer, if permitted by federal, state, and local regulations - if not, collect water and treat chemically (Section 13).



**CAIROX<sup>®</sup> Potassium Permanganate**  
**EC- SAFETY DATA SHEET** according to EC directive 2001/58/EC  
**Material Safety Data Sheet**

Page 4 of 9

**Section 7 Handling and Storage**

**WORK/HYGIENIC PRACTICES**

Wash hands thoroughly with soap and water after handling potassium permanganate. Do not eat, drink or smoke when working with potassium permanganate. Wear proper protective equipment. Remove clothing, if it becomes contaminated.

**VENTILATION REQUIREMENTS**

Provide sufficient mechanical and/or local exhaust to maintain exposure below the TLV/TWA.

**CONDITIONS FOR SAFE STORAGE**

Store in accordance with NFPA 430 requirements for Class II oxidizers. Protect containers from physical damage. Store in a cool, dry area in closed containers. Segregate from acids, peroxides, formaldehyde, and all combustible, organic, or easily oxidizable materials including antifreeze and hydraulic fluid.

**Section 8 Exposure Controls and Personal Protection**

**RESPIRATORY PROTECTION**

In cases where overexposure to dust may occur, the use of an approved NIOSH-MSHA dust respirator or an air supplied respirator is advised. Engineering or administrative controls should be implemented to control dust

**EYE**

Faceshield, goggles, or safety glasses with side shields should be worn. Provide eyewash in working area.

**GLOVES**

Rubber or plastic gloves should be worn.

**OTHER PROTECTIVE EQUIPMENT**

Normal work clothing covering arms and legs, and rubber, or plastic apron should be worn.

**Section 9 Physical and Chemical Properties**

**APPEARANCE AND ODOR**

Dark purple solid with metallic luster, odorless

**BOILING POINT, 760 mm Hg**

Not applicable

**VAPOR PRESSURE (mm Hg)**

Not applicable

**SOLUBILITY IN WATER % BY SOLUTION**

6% at 20°C (68°F) and 20% at 65°C (149°F)

**PERCENT VOLATILE BY VOLUME**

Not volatile

**EVAPORATION RATE**

Not applicable

**MELTING POINT**

Starts to decompose with evolution of oxygen (O<sub>2</sub>) at temperatures above 150°C (302°F). Once initiated, the decomposition is exothermic and self sustaining.

**SPECIFIC GRAVITY**

2.7 at 20°C (68°F)

**BULK DENSITY**

Approximately 1.45 - 1.6 kg / l

**VAPOR DENSITY (AIR=1)**

Not applicable

**OXIDIZING PROPERTIES**

Strong oxidizer



**CAIROX<sup>®</sup> Potassium Permanganate**  
**EC- SAFETY DATA SHEET** according to EC directive 2001/58/EC  
**Material Safety Data Sheet**

Page 5 of 9

**Section 10 Stability and Reactivity**

<b>STABILITY</b>	Under normal conditions, the material is stable.
<b>CONDITIONS TO AVOID</b>	Contact with incompatible materials or heat (150°C / 302°F) could result in violent exothermic chemical reaction.
<b>INCOMPATIBLE MATERIALS</b>	Acids, peroxides, formaldehyde, anti-freeze, hydraulic fluids and all combustible organic or readily oxidizable inorganic materials including metal powders. With hydrochloric acid, chlorine gas is liberated.
<b>HAZARDOUS DECOMPOSITION PRODUCTS</b>	When involved in a fire, potassium permanganate may liberate corrosive fumes.
<b>CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION</b>	Material is not known to polymerize.

**Section 11 Toxicological Information**

**1. ACUTE TOXICITY**

**INGESTION:**

LD 50 oral rat: 780 mg/kg male (14 days); 525 mg/kg female (14 days).

Harmful if swallowed. ALD: 10g. Ingestion may cause nausea, vomiting, sore throat, stomach-ache and eventually lead to a perforation of the intestine. Liver and kidney injuries may occur.

**SKIN CONTACT:**

LD 50 dermal no data available.

The product may be absorbed into the body through the skin. Major effects of exposure: severe irritation, brown staining of skin.

**INHALATION:**

LC 50 inhalation: No data available.

The product may be absorbed into the body by inhalation. Major effects of exposure: respiratory disorder, cough.

**2. CHRONIC TOXICITY**

No known cases of chronic poisoning due to permanganates have been reported. Prolonged exposure, usually over many years, to heavy concentrations of manganese oxides in the form of dust and fumes may lead to chronic manganese poisoning, chiefly involving the central nervous system.

**3. CARCINOGENICITY**

Potassium permanganate has not been classified as a carcinogen by ACGIH, NIOSH, OSHA, NTP, or IARC.

**4. MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE**

Potassium permanganate solution will cause further irritation of tissue, open wounds, burns or mucous membranes.



**CAIROX<sup>®</sup> Potassium Permanganate**  
**EC- SAFETY DATA SHEET** according to EC directive 2001/58/EC  
**Material Safety Data Sheet**

Page 6 of 9

**Section 12 Ecological Information**

**ENTRY TO THE ENVIRONMENT**

Permanganate has a low estimated lifetime in the environment, being readily converted by oxidizable materials to insoluble MnO<sub>2</sub>.

**BIOCONCENTRATION POTENTIAL**

In non-reducing and non-acidic environments, MnO<sub>2</sub> is insoluble and has a very low bioaccumulative potential.

**AQUATIC TOXICITY**

The toxicity data for potassium permanganate is given below:

Rainbow trout, 96 hour LC <sub>50</sub> :	1.8 mg/L
Bluegill sunfish, 96 hour LC <sub>50</sub> :	2.3 mg/L
Milk fish (Chanos Chanos)/ 96 hour LC <sub>50</sub> :	>1.4mg/l

**Section 13 Disposal Considerations**

Offer surplus and non-recyclable product or solutions to a licensed disposal company.

Reduce potassium permanganate in aqueous solutions with sodium thiosulfate, a bisulfite or ferrous salt solution. The bisulfite or ferrous salt may require some dilute sulfuric acid (10% w/w) to promote reduction. Neutralize with sodium carbonate to neutral pH, if acid was used. Decant or filter and deposit sludge in approved landfill. Where permitted, the sludge may be drained into sewer with large quantities of water. Contact Carus Chemical Company for additional recommendations.

Packaging materials must be triple rinsed to remove all potassium permanganate prior to re-cycling or disposal.

**Section 14 Transport Information**

<b>USA (land, D.O.T.)</b>	<b>Proper Shipping Name:</b>	49 CFR172.101....Potassium Permanganate
	<b>Hazard Class:</b>	49 CFR172.101....Oxidizer
	<b>ID Number:</b>	49 CFR172.101....UN 1490
	<b>Packing Group:</b>	49 CFR172.101....II
	<b>Division:</b>	49 CFR172.101....5.1
<b>European Labeling in accordance Road/Rail Transport (ADR/RID)</b>	<b>ID Number:</b>	UN 1490
	<b>ADR/RID Class</b>	5.1
	<b>Description of Goods:</b>	Potassium Permanganate
	<b>Hazard Identification No.</b>	50
<b>European Labeling in accordance with EC directive (Water, I.M.O.)</b>	<b>Proper Shipping Name:</b>	Potassium Permanganate
	<b>Hazard Class:</b>	Oxidizer
	<b>ID Number:</b>	UN 1490
	<b>Packing Group:</b>	II
	<b>Division:</b>	5.1
	<b>Marine Pollutant:</b>	No





**CAIROX<sup>®</sup> Potassium Permanganate**  
**EC- SAFETY DATA SHEET** according to EC directive 2001/58/EC  
**Material Safety Data Sheet**

Page 7 of 9

**Section 14 Transport Information (contd.)**

<b>European Labeling in accordance with EC directive (Air, I.C.A.O.)</b>	<b>Proper Shipping Name:</b> Potassium Permanganate <b>Hazard Class:</b> Oxidizer <b>ID Number:</b> UN 1490 <b>Packing Group:</b> II <b>Division:</b> 5.1
--	---

**Section 15 Regulatory Information**

**EUROPEAN AND INTERNATIONAL REGULATIONS:**

**MARKINGS ACCORDING TO EU GUIDELINES:**

The product has been classified and marked in accordance with EU directives/ordinances on hazardous materials.

<b><u>CHEMICAL NAME</u></b>	<b><u>CAS NO.</u></b>	<b><u>EINECS</u></b>	<b><u>UN NUMBER</u></b>
Potassium Permanganate	7722-64-7	231-760-3	UN 1490

**CODE LETTER AND HAZARD DESIGNATION OF THE PRODUCT:**



**O**  
Oxidizer



**Xn**  
Harmful



**N**  
Dangerous to the Environment

**RISK PHRASES:**

- 8 Contact with combustibles may cause fire.
- 22 Harmful if swallowed.
- 50/53 Very toxic to aquatic organisms, may cause long-term effects in the aquatic environment.

**SAFETY PHRASES:**

- 60 This material and its container must be disposed of as hazardous waste.
- 61 Avoid releases to the environment. Refer to special instructions / Safety data sheet.



**CAIROX<sup>®</sup> Potassium Permanganate**  
**EC- SAFETY DATA SHEET** according to EC directive 2001/58/EC  
**Material Safety Data Sheet**

Page 8 of 9

**Section 15 Regulatory Information (contd.)**

**US FEDERAL REGULATIONS:**

**CHEMICAL INVENTORY STATUS – PART 1**

<u>Ingredient</u>	<u>CAS. NO.</u>	<u>TSCA</u>	<u>EC</u>	<u>Japan</u>	<u>Australia</u>
Potassium Permanganate	7722-64-7	Yes	Yes		

**CHEMICAL INVENTORY STATUS – PART 2 --- CANADA---**

<u>Ingredient</u>	<u>CAS. NO.</u>	<u>Korea</u>	<u>DSL</u>	<u>NDSL</u>	<u>PHIL</u>
Potassium Permanganate	7722-64-7	No	Yes		

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulation (CPR, Canada) and the MSDS contains all of the information required by the CPR.

**FEDERAL, STATE & INTERNATIONAL REGULATIONS – PART 1**

<u>Ingredient</u>	<u>CAS. NO.</u>	<u>SARA 302</u>		<u>SARA 313</u>	
		<u>RQ</u>	<u>TPQ</u>	<u>List</u>	<u>Chemical Catg.</u>
Potassium Permanganate	7722-64-7	N/A	N/A	Yes	Yes
(Manganese compounds)					

**FEDERAL, STATE & INTERNATIONAL REGULATIONS – PART 2**

<u>Ingredient</u>	<u>CAS. NO.</u>	<u>CERCLA</u>	<u>RCRA</u>	<u>TSCA 8(d)</u>			
Potassium Permanganate	7722-64-7	Yes (RQ =100 lbs)	D001	No			
<u>Ingredient</u>	<u>CAS. NO.</u>	<u>CWC</u>	<u>TSCA 12(b)</u>	<u>CDTA</u>	<u>SARA</u>		
Potassium Permanganate	7722-64-7	No	No		<u>311/312</u> 4545 Kg		
<u>Ingredient</u>	<u>CAS. NO.</u>	<u>Acute</u>	<u>Chronic</u>	<u>Fire</u>	<u>Pressure</u>	<u>Reactivity</u>	<u>Pure/Liquid</u>
Potassium Permanganate	7722-64-7	Yes	Yes	Yes	No	No	Pure
<u>Ingredient</u>	<u>CAS. NO.</u>	<u>Australian Hazchem Code</u>		<u>Poison Schedule</u>	<u>WHMIS</u>		
Potassium Permanganate	7722-64-7				C, D2B		



**CAIROX<sup>®</sup> Potassium Permanganate**  
**EC- SAFETY DATA SHEET** according to EC directive 2001/58/EC  
**Material Safety Data Sheet**

Page 9 of 9

**Section 16 Other Information**

NIOSH	National Institute for Occupational Safety and Health
MSHA	Mine Safety and Health Administration
OSHA	Occupational Safety and Health Administration
NTP	National Toxicology Program
IARC	International Agency for Research on Cancer
PEL	Permissible Exposure Limit
C	Ceiling Exposure Limit
TLV-TWA	Threshold Limit Value-Time Weighted Average
CAS	Chemical Abstract Service
EINECS	Inventory of Existing Chemical Substances (European)


Chithambarathanu Pillai (S.O.F.)  
June 2007

The information contained herein is accurate to the best of our knowledge. However, data, safety standards and government regulations are subject to change and, therefore, holders and users should satisfy themselves that they are aware of all current data and regulations relevant to their particular use of product. CARUS CORPORATION DISCLAIMS ALL LIABILITY FOR RELIANCE ON THE COMPLETENESS OR ACCURACY OR THE INFORMATION INCLUDED HEREIN. CARUS CORPORATION MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR USE OR PURPOSE OF THE PRODUCT DESCRIBED HEREIN. All conditions relating to storage, handling, and use of the product are beyond the control of Carus Chemical Company, and shall be the sole responsibility of the holder or user of the product.

---

CARUS CORPORATION 315 5<sup>TH</sup> STREET, PERU, ILLINOIS 61354



 is a registered service mark of Carus Corporation. CAIROX<sup>®</sup> is a registered trademark of Carus Corporation. Responsible Care<sup>®</sup> is a registered service mark of the American Chemistry Council.



## SAFETY DATA SHEET

SDS NUMBER: 6622223-16-LPI

SDS REVISIONS: FORMAT

DATE OF ISSUE: 01/07/16

**PRAMITOL® 5PS**

SUPERSEDES: 02/10/10

**FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT, CALL CHEMTREC - DAY OR NIGHT 1-800-424-9300**

### 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

**1.1 PRODUCT IDENTIFIER:**

**TRADE NAME:** PRAMITOL® 5PS PELLETTED HERBICIDE

**1.2 RECOMMENDED USE:** FOR TOTAL VEGETATION CONTROL OF WEEDS IN NON-CROP AREAS

**1.3 SUPPLIER DETAILS:**

LOVELAND PRODUCTS, INC.

P.O. Box 1286 • Greeley, CO 80632-1286

**1.4 24 Hour Emergency Phone:** 1-800-424-9300 - **Medical Emergencies:** 1-866-944-8565 - **Product Information:** 1-888-574-2878 (LPI-CUST)  
**U.S. Coast Guard National Response Center:** 1-800-424-8802

### 2. HAZARDS IDENTIFICATION

**2.1 Classification of the substance or mixture**

**Classification according to 29 CFR 1910.1200**

Acute toxicity - Oral

Category 4

H302

Acute Toxicity - Inhalation

Category 4

H332

Acute Toxicity - Dermal

Category 4

H312

Eye Damage/Irritation

Category 2A

H319

**Hazards Not Otherwise Classified (HNOC)**

Toxic to aquatic life with long lasting effects.

**2.2 Label elements**



**Signal word:**

WARNING

**Hazard Statement:**

H302 - Harmful if swallowed.

H332 - Harmful if inhaled.

H312 - Harmful in contact with skin.

H319 - Causes serious eye irritation.

**Precautionary**

**Statement:**

**(Prevention):**

P264 - Wash face, hands and any exposed skin thoroughly after handling.

P270 - Do not eat, drink or smoke when using this product.

P261 - Avoid breathing dust/fume/gas/mist/vapors/spray.

P271 - Use only outdoors or in a well-ventilated area.

P280 - Wear protective gloves/protective clothing/eye protection/face protection.

**Precautionary**

**Statement:**

**(Response):**

P301+P312 - IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

P330 - Rinse mouth.

P304+P340 - IF INHALED: Remove person to fresh air and keep at rest in a position comfortable for breathing.

P302+P352 - IF ON SKIN: Wash with plenty of soap and water.

P312 - Call a POISON CENTER or doctor/physician if you feel unwell.

P321 - Specific treatment (see NOTE TO PHYSICIAN on the product label).

P362 - Take off contaminated clothing and wash it before reuse.

P305+P351+P338: IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do - continue rinsing.

P337+P313: If eye irritation persists: Get medical advice/attention.

**Precautionary**

**Statement:**

**(Disposal):**

P501 - Dispose of contents/container to an approved waste disposal facility. Offer container for recycling.





## SAFETY DATA SHEET

SDS NUMBER: 6622223-16-LPI

SDS REVISIONS: FORMAT

DATE OF ISSUE: 01/07/16

**PRAMITOL® 5PS**  
SUPERSEDES: 02/10/10

- 2.3 Other hazards  
None known

### 3. COMPOSITION, INFORMATION ON INGREDIENTS

#### 3.1 Substances

#### 3.2 Mixtures

Classification according to 29 CFR 1910.1200

Chemical Name:	CAS No.	Classification	Concentration [%]
Prometon	1610-18-0	Oral tox. 4; H302	4.60 – 5.33
Sodium tetraborate	1330-43-4	Inh. tox. 4; H332	38.80 – 44.20
Proprietary Alkaline	Proprietary	Dermal tox. 4; H312 Eye dam./irrit. 2A; H319	< 25.00

\*\*If Chemical Name/CAS No. is "proprietary" and/or weight-% is listed as a range, the specific chemical identity and/or percentage of the composition has been withheld as a trade secret

### 4. FIRST AID MEASURES

#### 4.1 Description of First Aid Measures

General Advice: Get medical attention if symptoms occur.

- If swallowed:** Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.
- If in eyes:** Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.
- If on skin or clothing:** Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.
- If inhaled:** Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or doctor for further treatment advice.

#### 4.2 Most Important Symptoms and Effects, Acute and Delayed

Symptoms: If swallowed, mucous membranes may be damaged, resulting in breathing difficulty, abdominal pain. Nausea, vomiting, gastritis, weakness, or diarrhea. Ingestion of a large amount can lead to cyanosis and hematuria (blood in the urine).

#### 4.3 Immediate Medical Attention and Special Treatment

Treatment: **NOTES TO PHYSICIAN:** Probable mucosal damage may contraindicate the use of gastric lavage. Treat for circulatory shock, respiratory depression, and convulsions, if needed.  
**FOR A MEDICAL EMERGENCY INVOLVING THIS PRODUCT CALL: 1-866-944-8565**  
Take container, label or product name with you when seeking medical attention.

### 5. FIRE FIGHTING MEASURES

#### 5.1 EXTINGUISHING MEDIA:

Suitable Extinguishing Media: Use medium appropriate to surrounding fire. Dry chemical, carbon dioxide (CO<sub>2</sub>), foam.

#### 5.2 SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE:

Specific Hazards During Firefighting: Corrosive material.

#### 5.3 SPECIAL PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIREFIGHTERS

Special Protective Equipment for Firefighters: Self-contained breathing apparatus and full protective gear should be worn in fighting large fires involving chemicals. Use water spray to keep fire exposed containers cool. Keep people away. Isolate fire and deny unnecessary entry.



## SAFETY DATA SHEET

SDS NUMBER: 6622223-16-LPI

SDS REVISIONS: FORMAT

DATE OF ISSUE: 01/07/16

PRAMITOL® 5PS

SUPERSEDES: 02/10/10

### 6. ACCIDENTAL RELEASE MEASURES

#### 6.1 PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES

Personal Precautions: Wear suitable protective clothing as described in Section 8 of this safety data sheet. Isolate hazard area. Keep unnecessary and unprotected personnel from entering area.

#### 6.2 ENVIRONMENTAL PRECAUTIONS

Environmental Precautions: Prevent from entering into soil, ditches, sewers, waterways and groundwater. See also Section 12: Ecological Information and Section 13: Disposal Considerations.

#### 6.3 METHODS AND MATERIALS FOR CONTAINMENT AND CLEAN-UP

Methods for Containment: Prevent further leakage or spillage if safe to do so.  
Methods for Clean-Up: Avoid creating dust. Sweep up dry spills and place in a container for recovery or disposal. Wash spill area with a strong detergent water solution; rinse with water, but minimize water use during clean-up. Do not flush to sewer. Absorb rinsate with appropriate absorbent and transfer material to a properly labeled container for disposal.

### 7. HANDLING AND STORAGE

#### 7.1 PRECAUTIONS FOR SAFE HANDLING:

Advice on Safe Handling: Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Use personal protection recommended in Section 8. Wash face, hands, and any exposed skin thoroughly after handling. Follow all product label instructions. Use only as directed. Avoid generation of dust. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not eat, drink or smoke when using this product. Do not breathe dust.

#### 7.2 CONDITIONS FOR SAFE STORAGE:

Requirements for Storage Areas and Containers: Keep container tightly closed and store in a cool, dry, well-ventilated place. Store locked up. Keep out of reach of children. Store at ambient conditions. Do not store near combustible materials. Keep away from heat. Store away from incompatible materials. Do not reuse container. Do not contaminate water, food or feed by storage or disposal.

### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

#### 8.1 CONTROL PARAMETERS:

##### OCCUPATIONAL EXPOSURE LIMITS

##### U.S. Workplace Exposure Level (ACGIH) TLVs

Components	Type	Value
Borate compounds, inorganic	TWA	2 mg/m <sup>3</sup> (Inhalable fraction)
	STEL/CEIL(C)	6 mg/m <sup>3</sup> (Inhalable fraction)

##### U.S. Workplace Exposure Level (OSHA) PELs

Components	Type	Value
No listings		

##### Biological limit values

##### ACGIH Biological Exposure Indices

Components	Value	Specimen
No listings		





## SAFETY DATA SHEET

SDS NUMBER: 6622223-16-LPI

SDS REVISIONS: FORMAT

DATE OF ISSUE: 01/07/16

PRAMITOL® 5PS

SUPERSEDES: 02/10/10

### 8.2 EXPOSURE CONTROLS:

#### Engineering Measures

Please refer to the product label. Use only with adequate ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

#### Individual Protection Measures:

Eye / Face Protection: Goggles or shielded safety glasses are recommended.

Skin Protection: Long-sleeved shirt and long pants. Chemical-resistant gloves, such as viton, polyethylene or polyvinylchloride. Shoes plus socks.

Respiratory Protection: In case of inadequate ventilation or risk of inhalation of dusts, use suitable respiratory equipment approved by MSHA/NIOSH. Wear respiratory protection during operations where spraying or dusting occurs. If respirators are used, a program should be in place to assure compliance with 29 CFR 1910.134, the OSHA Respiratory Protection standard. Wear air supplied respiratory protection if exposure concentrations are unknown.

General Hygiene Considerations: Handle in accordance with good industrial hygiene and safety practice.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 APPEARANCE :	Solid
ODOR:	Odorless.
ODOR THRESHOLD:	No data available.
COLOR:	White.
pH:	10 (1% solution) @ 25°C
MELTING POINT / FREEZING POINT:	89 – 91°C / 192 – 195°F
BOILING POINT:	No data available.
FLASH POINT:	Not applicable.
FLAMMABILITY (solid, gas):	Not applicable.
UPPER / LOWER FLAMMABILITY OR EXPLOSIVE LIMITS:	No data available.
VAPOR PRESSURE:	3.10E-06 mbar @ 20°C (based on Prometon).
SOLUBILITY:	0.7 g/L @ 20°C (based on Prometon).
PARTITION CO-EFFICIENT, n-OCTANOL / WATER:	No data available.
AUTO-IGNITION TEMPERATURE:	No data available.
DECOMPOSITION TEMPERATURE:	No data available.
VISCOSITY: (kinematic):	No data available
SPECIFIC GRAVITY (Water = 1):	0.906 g/ml
DENSITY:	56.60 lbs./ft <sup>3</sup> / 906.6 kg/m <sup>3</sup>

Note: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specification items.

## 10. STABILITY AND REACTIVITY

### 10.1 REACTIVITY

Stable

### 10.2 CHEMICAL STABILITY

Stable under normal temperature conditions

### 10.3 POSSIBILITY OF HAZARDOUS REACTIONS

No data available. Will not polymerize.

### 10.4 CONDITIONS TO AVOID

Store away from incompatible materials. Do not store near combustible materials.

### 10.5 INCOMPATIBLE MATERIALS

Acids, organic compounds, phosphorous, sulfur, sulfides, ammonium compounds, and powdered metals.

### 10.6 HAZARDOUS DECOMPOSITION PRODUCTS

Reaction of sodium chlorate with acids may release chlorine gas and oxides of chlorine vapors which may ignite or explode spontaneously. This formulation is neutralized.



## SAFETY DATA SHEET

SDS NUMBER: 6622223-16-LPI

SDS REVISIONS: FORMAT

DATE OF ISSUE: 01/07/16

PRAMITOL® 5PS

SUPERSEDES: 02/10/10

### 11 TOXICOLOGICAL INFORMATION

#### 11.3 LIKELY ROUTES OF EXPOSURE

LC<sub>50</sub> (rat): 36 g/m<sup>3</sup> (4 HR) (Prometon) | > 3.727 mg/L (4 HR) for product

LD<sub>50</sub> Oral (rat): 503 mg/kg (Prometon); 2,403 mg/kg (Sodium tetraborate) | 3,396 mg/kg for product

LD<sub>50</sub> Dermal (rabbit): > 2,500 mg/kg (Prometon); > 2,000 mg/kg (Sodium tetraborate); 1,350 mg/kg (Proprietary Alkaline) | > 2.020 mg/kg for product

Acute Toxicity Estimates: No data available.

Skin Irritation: Harmful in contact with skin.

Eye Irritation: Causes serious eye irritation.

Inhalation: Harmful if inhaled.

Ingestion: Harmful if swallowed.

Specific Target Organ Toxicity: No data available.

Aspiration: No data available.

Skin Sensitization (guinea pig): Not a sensitizer

Carcinogenicity: Based on information provided, this product does not contain any carcinogens or potential carcinogens as listed by OSHA, IARC or NTP.

Germ Cell Mutagenicity: May cause genetic defects.

Interactive Effects: None known

### 12 ECOLOGICAL INFORMATION

#### 12.3 ECOTOXICITY

Toxic to aquatic life with long lasting effects. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment wash waters..

##### Ecotoxicological Data

	Species	Test Results
Sodium tetraborate	Limanda limanda	340 mg/L – 96-hour LC <sub>50</sub>
	Daphnia magna	1085 - 1402 mg/L – 48-hour EC <sub>50</sub>
Proprietary Alkaline	Oncorhynchus mykiss	45.4 mg/L – 96-hour LC <sub>50</sub> (Static)

Drift or runoff may adversely affect non-target plants.

Do not apply directly to water.

Do not contaminate water when disposing of equipment wash water.

Do not apply when weather conditions favor drift from target area.

#### 12.2 PERSISTENCE AND DEGRADABILITY

Biodegradability: No data available.

#### 12.3 BIOACCUMULATIVE POTENTIAL

Bioaccumulation: No data available.

#### 12.4 MOBILITY IN SOIL

No data available.

#### 12.5 OTHER ADVERSE EFFECTS

Assessment: No data available.

### 13 DISPOSAL CONSIDERATIONS

#### 13.1 WASTE TREATMENT METHODS

Wastes may be disposed of on site or at an approved waste disposal facility. Nonrefillable container. Do not reuse or refill the container. Offer container for recycling or dispose of in a sanitary landfill or by other procedures approved by appropriate authorities. Recycling decontaminated containers is the best option of container disposal. The Agricultural Container Recycling Council (ACRC) operates the national recycling program. To contact your state and local ACRC recycler visit the ACRC web page at <http://www.acrecycle.org/>. Do not contaminate water, food or feed by storage or disposal.

### 14 TRANSPORT INFORMATION

#### 14.3 LAND TRANSPORT

DOT Shipping Description: NOT REGULATED BY USDOT

U.S. Surface Freight Classification: COMPOUND, TREE OR WEED KILLING, NOI (NMFC 50320, SUB 2: CLASS: 60)





## SAFETY DATA SHEET

SDS NUMBER: 6622223-16-LPI

SDS REVISIONS: FORMAT

DATE OF ISSUE: 01/07/16

PRAMITOL® 5PS

SUPERSEDES: 02/10/10

### 15 REGULATORY INFORMATION

#### 15.1 SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS

##### NFPA & HMIS Hazard Ratings:

##### NFPA

2 Health  
0 Flammability  
0 Instability0 Least  
1 Slight  
2 Moderate  
3 High  
4 Severe

##### HMIS

2 Health  
0 Flammability  
0 Reactivity  
H PPE

##### SARA Hazard Notification/Reporting

##### SARA Title III Hazard Category:

Immediate Y  
Delayed YFire N  
Reactive NSudden Release of Pressure N

Reportable Quantity (RQ) under U.S. CERCLA: Not listed.

SARA, Title III, Section 313: Not listed.

RCRA Waste Code: Not listed.

CA Proposition 65: Not listed.

This chemical is a pesticide product registered by the United States Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS), and for workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label:

##### WARNING

Causes substantial but temporary eye injury.

Harmful if swallowed, inhaled, or absorbed through skin.

Do not get in eyes or on clothing.

Avoid contact with skin.

Avoid breathing dust.

Wear protective eyewear (goggles, face shield, or safety glasses).

Wash thoroughly with soap and water after handling.

Remove and wash contaminated clothing after use.

### 16 OTHER INFORMATION

SDS STATUS: Format revised.

PREPARED BY: Registrations and Regulatory Affairs

REVIEWED BY: Environmental Health and Safety

EPA REG. NO.: 66222-23-34704

©Pramitol is a registered trademark of Makhteshim-Agan of North America (dba ADAMA)

**Disclaimer and Limitation of Liability:** This data sheet was developed from information on the constituent materials identified herein and does not relate to the use of such materials in combination with any other material or process. No warranty is expressed or implied with respect to the completeness or ongoing accuracy of the information contained in this data sheet, and LOVELAND PRODUCTS, INC. disclaims all liability for reliance on such information. This data sheet is not a guarantee of safety. Users are responsible for ensuring that they have all current information necessary to safely use the product described by this data sheet for their specific purpose.



## SAFETY DATA SHEET

### SCALETROL \* PDC9333

#### 1. Identification

Product identifier	SCALETROL PDC9333
Other means of identification	None.
Recommended use	Deposit control agent
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Not classified.
Health hazards	Not classified.
OSHA defined hazards	Not classified.

#### Label elements

Hazard symbol	None.
Signal word	None.
Hazard statement	The mixture does not meet the criteria for classification.

#### Precautionary statement

Prevention	Observe good industrial hygiene practices.
Response	Wash hands after handling.
Storage	Store away from incompatible materials.
Disposal	Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

#### 3. Composition/information on ingredients

##### Mixtures

Components	CAS #	Percent
2-Phosphono-1,2,4 Butanetricarboxylic acid	37971-36-1	10 - 20

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

## 4. First-aid measures

### Inhalation

If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. If breathing stops, provide artificial respiration. For breathing difficulties, oxygen may be necessary. Call a physician if symptoms develop or persist. If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

### Skin contact

Rinse skin with water/shower. Get medical attention if irritation develops and persists.

### Eye contact

Rinse with water. Get medical attention if irritation develops and persists.

### Ingestion

Call a physician immediately. Rinse mouth. Never give anything by mouth to a victim who is unconscious or is having convulsions. If ingestion of a large amount does occur, call a poison control center immediately.

### Most important symptoms/effects, acute and delayed

Direct contact with eyes may cause temporary irritation.

### Indication of immediate medical attention and special treatment needed

Treat symptomatically.

### General information

Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

## 5. Fire-fighting measures

### Suitable extinguishing media

Water fog. Foam. Dry chemical powder. Carbon dioxide (CO<sub>2</sub>).

### Unsuitable extinguishing media

Do not use water jet as an extinguisher, as this will spread the fire.

### Specific hazards arising from the chemical

During fire, gases hazardous to health may be formed.

### Special protective equipment and precautions for firefighters

Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

### Fire fighting equipment/instructions

Use standard firefighting procedures and consider the hazards of other involved materials. Move containers from fire area if you can do so without risk.

### Specific methods

Use standard firefighting procedures and consider the hazards of other involved materials.

### General fire hazards

No unusual fire or explosion hazards noted.

## 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. See Section 8 of the SDS for Personal Protective Equipment. For personal protection, see section 8 of the SDS.

### Methods and materials for containment and cleaning up

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

### Environmental precautions

Avoid discharge into drains, water courses or onto the ground.

## 7. Handling and storage

### Precautions for safe handling

Clean spill immediately. Wash contaminated skin promptly.

### Conditions for safe storage, including any incompatibilities

Protect from freezing. Do not store at elevated temperatures. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Store in accordance with local/regional/national/international regulation.

## 8. Exposure controls/personal protection

### Occupational exposure limits

#### US. Workplace Environmental Exposure Level (WEEL) Guides

Components	Type	Value	Form
2-Phosphono-1,2,4-Butanetricarboxylic acid (CAS 37971-36-1)	TWA	10 mg/m <sup>3</sup>	Aerosol.

<b>Biological limit values</b>	No biological exposure limits noted for the ingredient(s).
<b>Appropriate engineering controls</b>	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.
<b>Individual protection measures, such as personal protective equipment</b>	
<b>Eye/face protection</b>	Splash proof chemical goggles.
<b>Skin protection</b>	
<b>Hand protection</b>	Chemical resistant gloves.
<b>Other</b>	Wear suitable protective clothing. Chemical resistant gloves. Rubber, butyl, viton or neoprene gloves. Wash off after each use. Replace as necessary.
<b>Respiratory protection</b>	If ventilation is insufficient, suitable respiratory protection must be provided. If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.
<b>Thermal hazards</b>	Not applicable. Wear appropriate thermal protective clothing, when necessary.
<b>General hygiene considerations</b>	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

<b>Appearance</b>	
<b>Color</b>	Colorless to yellow
<b>Physical state</b>	Liquid
<b>Odor</b>	Slight
<b>Odor threshold</b>	Not available.
<b>pH (concentrated product)</b>	3.4
<b>pH in aqueous solution</b>	3.8 (5% SOL.)
<b>Melting point/freezing point</b>	28 °F (-2 °C)
<b>Initial boiling point and boiling range</b>	220 °F (104 °C)
<b>Flash point</b>	Not applicable.
<b>Evaporation rate</b>	< 1 (Ether = 1)
<b>Flammability (solid, gas)</b>	Not available.
<b>Upper/lower flammability or explosive limits</b>	
<b>Flammability limit - lower (%)</b>	Not available.
<b>Flammability limit - upper (%)</b>	Not available.
<b>Explosive limit - lower (%)</b>	Not available.
<b>Explosive limit - upper (%)</b>	Not available.
<b>Vapor pressure</b>	18 mm Hg
<b>Vapor pressure temp.</b>	70 °F (21 °C)
<b>Vapor density</b>	< 1 (Air = 1)
<b>Relative density</b>	1.15
<b>Relative density temperature</b>	70 °F (21 °C)
<b>Solubility(ies)</b>	
<b>Solubility (water)</b>	100 %
<b>Partition coefficient (n-octanol/water)</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Viscosity</b>	7 cps
<b>Viscosity temperature</b>	70 °F (21 °C)



**Other information**

Percent volatile	0 (Calculated)
Pour point	33 °F (1 °C)
Specific gravity	1.15

**10. Stability and reactivity**

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Contact with water reactive compounds may cause fire or explosion. Hazardous polymerization does not occur.
Conditions to avoid	Protect from freezing.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	Oxides of carbon, sulphur, and phosphorus evolved in fire.

**11. Toxicological information****Information on likely routes of exposure**

Inhalation	Prolonged inhalation may be harmful. May cause irritation to respiratory organs.
Skin contact	Prolonged or repeated contact may cause irritation.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Expected to be a low ingestion hazard. May cause slight gastrointestinal irritation.

Symptoms related to the physical, chemical and toxicological characteristics	Prolonged and repetitive exposure, depending on the route(s), may develop transient irritation on skin, eyes, ingestion tract, and/or respiratory tract.
--	--

**Information on toxicological effects****Acute toxicity**

Product	Species	Test Results
SCALETROL PDC9333 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg, (Calculated according to GHS additivity formula)
<i>Inhalation</i>		
LC50	Rat	> 5 mg/l, 4 Hour, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg, (Calculated according to GHS additivity formula)

\* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.
<b>Respiratory or skin sensitization</b>	
Respiratory sensitization	Not available.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	
Not listed.	
Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not available.

<b>Specific target organ toxicity - repeated exposure</b>	Not available.
<b>Aspiration hazard</b>	Based on available data, the classification criteria are not met.
<b>Further information</b>	This product has no known adverse effect on human health.

## 12. Ecological information

### Ecotoxicity

Product		Species	Test Results
SCALETROL PDC9333 (CAS Mixture)			
	20% Mortality	Mysid Shrimp	8000 mg/l, Static Renewal Bioassay, 48 hour, (pH adjusted)
	LC50	Fathead Minnow	1830.1 mg/l, Static Renewal Bioassay, 96 hour, (pH adjusted)
	NOEL	Fathead Minnow	1250 mg/l, Static Renewal Bioassay, 96 hour, (pH adjusted)
		Mysid Shrimp	1000 mg/l, Static Renewal Bioassay, 48 hour, (pH adjusted)
<b>Aquatic</b>			
Crustacea	LC50	Daphnia magna	2639 mg/l, Static Renewal Bioassay, 48 hour, (pH adjusted)
	NOEL	Daphnia magna	2000 mg/l, Static Renewal Bioassay, 48 hour, (pH adjusted)
Fish	LC50	Rainbow Trout	3249 mg/l, Static Renewal Bioassay, 96 hour, (pH adjusted)
	NOEL	Rainbow Trout	2000 mg/l, Static Renewal Bioassay, 96 hour, (pH adjusted)

\* Estimates for product may be based on additional component data not shown.

<b>Bioaccumulative potential</b>	No data available.
<b>Mobility in soil</b>	No data available.
<b>Other adverse effects</b>	Nutrients: P : 13,5 mg/g (calculated data)
<b>Environmental fate</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
<b>Persistence and degradability</b>	No data is available on the degradability of this product.
- COD (mgO2/g)	315 (calculated data)
- BOD 5 (mgO2/g)	11 (calculated data)
- BOD 28 (mgO2/g)	24 (calculated data)
- Closed Bottle Test (% Degradation in 28 days)	14 (calculated data)
- Zahn-Wellens Test (% Degradation in 28 days)	38 (calculated data)
- TOC (mg C/g)	123 (calculated data)

## 13. Disposal considerations

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions). Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner.
<b>Contaminated packaging</b>	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

## 14. Transport information

### DOT

Not regulated as dangerous goods.

Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

### IATA

Not regulated as dangerous goods.

### IMDG

Not regulated as dangerous goods.

## 15. Regulatory information

### US federal regulations

This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

All components are on the U.S. EPA TSCA Inventory List.

#### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

#### CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

#### SARA 304 Emergency release notification

Not regulated.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

### Superfund Amendments and Reauthorization Act of 1986 (SARA)

#### Hazard categories

Immediate Hazard - No

Delayed Hazard - No

Fire Hazard - No

Pressure Hazard - No

Reactivity Hazard - No

#### SARA 302 Extremely hazardous substance

Not listed.

#### SARA 311/312 Hazardous chemical

No

#### SARA 313 (TRI reporting)

Not regulated.

### Other federal regulations

#### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

#### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

#### Safe Drinking Water Act (SDWA)

Not regulated.

### Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

### Food and drug administration

No FDA approval for paper or paperboard having food contact.

### NSF Registered and/or meets

Registration No. – 142607

### USDA (according to 1998

Category Code(s):

### guidelines):

G5 Cooling and retort water treatment products

### US state regulations

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - Massachusetts RTK - Substance List**

Not regulated.

**US - Pennsylvania RTK - Hazardous Substances**

Not regulated.

**US - Rhode Island RTK**

Not regulated.

**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

**US. New Jersey Worker and Community Right-to-Know Act**

Not listed.

**US. Pennsylvania Worker and Community Right-to-Know Law**

Not listed.

**US. California Proposition 65**

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Female reproductive toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Male reproductive toxin**

No ingredient listed.

**16. Other information, including date of preparation or last revision**

**Issue date** Nov-15-2014

**Revision date** Jun-09-2015

**Version #** 2.0

**References:** No data available

**Disclaimer** The information in the sheet was written based on the best knowledge and experience currently available.

**Revision Information** Hazard(s) identification: Prevention  
Composition / Information on Ingredients: Disclosure Overrides  
Composition/information on ingredients: Composition comments  
First-aid measures: Ingestion  
First-aid measures: Inhalation  
First-aid measures: Most important symptoms/effects, acute and delayed  
Handling and storage: Precautions for safe handling  
Physical & Chemical Properties: Multiple Properties  
Toxicological information: Reproductive toxicity  
Toxicological information: Inhalation  
Toxicological information: Specific target organ toxicity - single exposure  
Toxicological information: Symptoms related to the physical, chemical and toxicological characteristics  
Other information, including date of preparation or last revision: Prepared by

\* Trademark of General Electric Company. May be registered in one or more countries.



**Sodium Bisulfite, Solution**
**1. PRODUCT AND COMPANY IDENTIFICATION**

**Product Name:** Sodium Bisulfite Solution    **Formula:** NaHSO<sub>3</sub>    **Molecular Weight:** 104.06  
**Chemical Name:** Sodium Bisulfite    **Chemical Family:** Bisulfite, sodium salt  
**Synonyms:** Sodium Bisulphite, Aqueous Solution; Sodium Hydrogen Sulfite; Sodium disulfite; Sulfurous acid, monosodium salt; Sodium acid sulfite  
**Product Use:** For the manufacture of perfume, pharmaceuticals, photochemicals, bleaching agent, and papermaking.

**Chemtrade Logistics**  
 111 Gordon Baker Road  
 Suite 301  
 North York, ONT  
 M2H 3R1  
 (416) 496-5856  
 1-866-887-8805

**Chemtrade Logistics**  
 11450 Cherrier Street  
 Montreal East, PQ  
 H1B 1A6  
 1-888-840-4720

**Emergency Telephone Number**

Chemtrec 1-800-424-9300  
 Canutec (613) 996-6666

**2. COMPOSITION/INFORMATION ON INGREDIENTS**

<u>Hazardous Ingredients</u>	% by Wt.	CAS Number
Sodium Bisulfite	35 - 44%	7631-90-5
 <u>Non-Hazardous Ingredients</u>		
Water	56 – 65%	7732-18-5

**3. HAZARD INFORMATION**
**EMERGENCY OVERVIEW:**

Δ **Danger!** Contains material, which causes damage to the following organs: mucous membranes, respiratory tract, skin, eye, lens or cornea. Incompatible with acids and oxidizers (acidification will liberate sulfur dioxide gas). Thermal decomposition products are corrosive and/or toxic and include oxides of sulfur.

Sodium Bisulfite is a clear, colorless to light yellow liquid with distinctive odor. Pungent odor of Sulfur Dioxide.

Hazardous  
 Information  
 (U.S.A.)

Material  
 System

Health	*	2
Fire Hazard		0
Reactivity		0
Personal Protection		C

National Fire Protection  
 Association (U.S.A.)

2	0	0
<b>Fire Hazard</b> <b>Reactivity</b> <b>Specific Hazard</b>		

**Sodium Bisulfite, Solution****3. HAZARD INFORMATION (continued)**

---

**POTENTIAL HEALTH EFFECTS:**

	<b>ACGIH (TLV)(2003)</b>	<b>NIOSH REL (2001)</b>	<b>OSHA PEL (1989)</b>
Sodium Bisulfite	5 mg/m <sup>3</sup> (TWA)	5 mg/m <sup>3</sup> (TWA -10 hrs)	Δ 5 mg/m <sup>3</sup> (TWA)

**In contact with the skin:** Sodium Bisulfite may cause symptoms of skin irritation such as reddening, swelling, rash, scaling or blistering.

**In contact with the eyes:** Vapors from this product are irritating to the eyes. This product causes irritation, redness, and pain. May cause burns if left untreated.

**Inhaled:** Product is irritating to the nose, throat and respiratory tract.

**Ingested:** May cause allergic reaction in some asthmatics. Ingestion of large amounts may cause nausea, gastrointestinal upset and abdominal pain. May cause central nervous system(CNS) depression, nausea and vomiting, diarrhea, violent colic and death.

**Long Term Exposure:**

**Existing Medical Conditions Possibly Aggravated By Exposure:** Breathing of fumes may aggravate acute or chronic asthma and chronic pulmonary disease such as emphysema and bronchitis. May cause allergic reactions in sulfide sensitive individuals.

**Carcinogenicity Data:**

Sodium bisulfite is not classified by NTP (National Toxicology Program), not regulated as carcinogenic by OSHA (Occupational Safety and Health Administration), and has been evaluated by IARC (International Agency for Research on Cancer) as a Group 3 (are not classifiable as to their carcinogenicity to humans). ACGIH (American Conference of Governmental Industrial Hygienists) classifies it as an A4= Not classifiable as a human carcinogen.

**4. FIRST AID MEASURES**

---

**Precaution:** Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.

**Skin contact:** Flush skin with running water for a **minimum** of 20 minutes. Start flushing while removing contaminated clothing. If irritation persists, repeat flushing. Obtain medical attention **IMMEDIATELY**. Do not transport victim unless the recommended flushing period is completed or flushing can be continued during transport.

---

**Sodium Bisulfite, Solution****4. FIRST AID MEASURES (continued)**

---

For minor skin contact, avoid spreading material on unaffected skin. Discard heavily contaminated clothing and shoes in a manner which limits further exposure. Otherwise, wash clothing separately before reuse.

**Eye contact:** Immediately flush eyes with running water for a **minimum** of 20 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Obtain medical attention **IMMEDIATELY**. Do not transport victim until the recommended flushing period is completed unless flushing can be continued during transport.

**Inhalation:** Move victim to fresh air. Give artificial respiration **ONLY** if breathing has stopped. Give Cardiopulmonary Resuscitation (CPR) if there is no breathing **AND** no pulse. Obtain medical attention **IMMEDIATELY**.

**Ingestion:** **DO NOT INDUCE VOMITING**. If victim is alert and not convulsing, rinse mouth and give ½ to 1 glass of water to dilute material. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. **IMMEDIATELY** contact local poison control centre. Vomiting may need to be induced but should be directed by a physician or a poison control centre. **IMMEDIATELY** transport victim to an emergency facility.

---

**5. FIRE FIGHTING MEASURES**

---

**Flash Point (method):** Not applicable, product is non-flammable

**Autoignition Temperature:** Not combustible

**Flammability Limits in air(%):** UEL: Not applicable LEL: Not applicable

**Fire Extinguishing Media:** For small fires use dry chemical, carbon dioxide or water spray. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam or flood fire area with water. Do not get solid stream of water on spilled material.

**Special Fire Fighting Procedures:** Oxides of Sulfur may be present during a fire. Use self-contained breathing apparatus and full protective clothing are recommended. Gas tight suits are required in extreme (>1000 ppm) concentrations of Sulfur dioxide. Evacuate residents who are downwind of fire. Prevent unauthorized entry to fire area. Dike area to contain runoff and prevent contamination of water sources. Neutralize runoff with lime, soda ash or other suitable neutralizing agents (see Deactivating Chemicals, Section 6). Cool containers that are exposed to flame with streams of water until fire is out.

**Other Fire or Explosion Hazards:** Thermal decomposition products are toxic and include oxides of Sulfur. Sodium sulfide may be formed after dried solution residues are heated. This is an explosive hazard and strongly alkaline in contact with water.

**Sodium Bisulfite, Solution**

---

**6. ACCIDENTAL RELEASE MEASURES**

---

**Steps to be taken in the event of a spill or leak:** Remove all ignition sources. Ventilate area. Use appropriate Personal Protection Equipment. Prevent liquid from entering sewers or waterways. Dike with inert material (sand, earth, etc.). Stop or reduce leak if safe to do so. Collect into containers for reclamation or disposal only if container is suitable to withstand the material. Consider insitu neutralization and disposal. Ensure adequate decontamination of tools and equipment following clean up. Comply with Federal, Provincial/State and local regulations on reporting releases.

**Deactivating Chemicals:** Alkali materials such as dilute sodium hydroxide, Lime, limestone, sodium carbonate (soda ash), sodium bicarbonate, dilute aqua ammonia. Sulfur dioxide may be released during neutralization.

**Waste Disposal Methods:** Dispose of waste material at an approved waste treatment/disposal facility, in accordance with applicable regulations. Do not dispose of waste with normal garbage or to sewer systems.

Note - Clean-up material may be a RCRA Hazardous Waste on disposal.

- Spills are subject to CERCLA reporting requirements: RQ = 5000 lbs (2270 kg)

---

**7. HANDLING AND STORAGE**

---

**Precautions:** Wear appropriate Personal Protection Equipment. Keep ignition sources away from Sodium Bisulfite storage, handling and transportation equipment. Keep containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled. **Do not expose to strong acids as this will liberate sulfur dioxide gas.**

**Handling Procedures and Equipment:** Rubber lined carbon steel or certain stainless steel materials are suitable for use. Contact CHEMTRADE LOGISTICS for specific recommendations when handling Sodium Bisulfite.

**Storage Temperature:** Store above freezing point (Section 9). Ideal storage temperatures are between and 20 and 27 degrees Centigrade.

**Storage Requirements:** Store in corrosion-proof area away from incompatible substances. Store in tightly closed container, preferably the supplier container. Store in a cool, well, ventilated location away from heat, sparks and flames. Storage tanks should be constructed from polyethylene, polypropylene, fiberglass-reinforced plastic (FRP), cross-linked polyethylene (XLPE), or 316 stainless steel to avoid corrosion problems. Tanks should be vented into an alkaline fume recovery system or scrubber. Storage tanks should be protected from water ingress, and maintained structurally in a safe and reliable condition.

**Other Precautions:** On exposure to air the product will lose some sulfur dioxide and gradually oxidize to sulfate. Both acidification and heating accelerate the release of sulfur dioxide fumes.

**Sodium Bisulfite, Solution****8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

---

Recommendations listed in this section indicate the type of equipment which will provide protection against over exposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

**Δ Engineering Controls:** Provide exhaust ventilation or other controls to keep the airborne concentrations of vapors below their respective occupational exposure limits. Ensure the eyewash stations and safety showers are proximal to the workstation location.

**Respiratory Protection:** A NIOSH/MSHA approved air-purifying respirator equipped with acid gas/fume, dust, mist cartridges for concentrations up to 50mg/m<sup>3</sup> or 20 ppm as sulfur dioxide. A powered air-purifying respirator with acid gas cartridges for up to 50 ppm sulfur dioxide. A full-facepiece air-supplied respirator if concentrations are for up to and higher than 100 ppm sulfur dioxide.

**Skin Protection:** Impervious (i.e., neoprene, PVC, rubber) gloves, coveralls, boots and/or other acid resistant protective clothing.

**Eye Protection:** Tight-fitting chemical goggles and face shield.

**Other Personal Protective Equipment:** Where there is a danger of spilling or splashing, acid resistant aprons or suits should be worn. Trouser legs should be worn outside (not tucked in) rubber boots. Safety showers and eyewash fountains should be installed in storage and handling areas.

---

**9. PHYSICAL AND CHEMICAL PROPERTIES**

---

**Physical State:** Liquid

**Appearance and Odour:** Clear, colourless to light yellow liquid with distinctive odour. Pungent odour of Sulfur dioxide.

**Odour Threshold:** No data

**Boiling Point:** 104°C (220°F)

**Melting/Freezing Point:** Approximately 6°C (43°F)

**Vapour Pressure:** 32 mmHg at 20°C, 78 mm Hg (10.4 kPa) at 37.7°C

**Specific Gravity at 25°C (77°F)** 1.33 for 38%

**Δ Vapour Density: (Air=1):** Highest known value is 0.62 (Air=1) (Water)

**Bulk Density:** Not applicable (see specific gravity)

**Evaporation Rate:** Not applicable

**Solubility:** Miscible in all proportions in water.

**pH:** 3.8 to 5.2



**Sodium Bisulfite, Solution**

---

**10. STABILITY AND REACTIVITY**

---

**Stability:** Under Normal Conditions: On exposure to air the product will lose some sulfur dioxide and gradually oxidize to sulfate. Under Fire Conditions: Decomposes to form oxides of sulfur.

**Conditions to Avoid:** High temperatures, sparks, open flames and all other sources of ignition. Temperatures at or near boiling point causes evolution of Sulfur dioxide.

**Materials to Avoid:** Strong oxidizers, may cause strong exothermic reaction. Lewis or mineral acids (acidification will liberate sulfur dioxide gas).

**Hazardous Decomposition or Combustion Products:** Thermal decomposition products are toxic and include oxides of Sulfur.

**Hazardous Polymerization:** Will not occur

---

**11. TOXICOLOGICAL INFORMATION**

---

<u><b>Ingredient Name</b></u>	<u><b>Test</b></u>	<u><b>Result</b></u>	<u><b>Route</b></u>	<u><b>Species</b></u>
Δ Sodium Bisulfite Solution	LD50	2000 mg/kg	Oral	Rat

**Carcinogenicity Data:** Sodium bisulfite is not classified by NTP (National Toxicology Program), not regulated as carcinogenic by OSHA (Occupational Safety and Health Administration), and has been evaluated by IARC (International Agency for Research on Cancer) as a Group 3 (are not classifiable as to their carcinogenicity to humans). ACGIH (American Conference of Governmental Industrial Hygienists) classifies it as an A4 = Not classifiable as a human carcinogen.

**Reproductive Effects:** Not available

**Mutagenicity Data:** Evidence of mutagenic activity in bacteria, microorganisms, and DNA.

**Teratogenicity Data:** Not available

**Synergistic Materials:** None known

**Sodium Bisulfite, Solution**

---

**12. ECOLOGICAL INFORMATION**

---

<b>Ingredient Name</b>	<b>Species</b>	<b>Period</b>	<b>Result</b>
Sodium Bisulfite Solution	Mosquito fish. (LC50)	96 hour(s)	240 ppm

**Products of** : These products are sulfur oxides (SO<sub>2</sub>, SO<sub>3</sub>). Some metallic oxides.

**Toxicity of the Products** : The products of degradation are toxic.

**of Biodegradation**

---

**13. DISPOSAL CONSIDERATIONS**

---

- Responsibility for proper waste disposal is with the owner of the waste. Work with the appropriate regulatory bodies to ensure compliance with regulations.
- Consider the collection of residual Sodium Bisulfite into containers for reclamation or disposal only if the container is suitable to withstand the material.
- Consider insitu neutralization and disposal.
- Clean-up material may be a RCRA Hazardous Waste on disposal.
- Provincial/State or local regulations or restrictions are complex and may differ from Federal regulations.
- The information applies to the material as manufactured; processing, neutralizing, use or contamination may make the information inappropriate, inaccurate or incomplete.

---

**14. TRANSPORT INFORMATION**

---

**U.S. (Under DOT)**

**Shipping Name:** RQ, Bisulfites, aqueous solutions, n.o.s.

**Hazard Class or Division:** 8

**Product Identification No. (PIN):** UN 2693

**Packing Group:** III

Reportable Quantity (RQ) = 5000 lbs (2270kg)

**Canada (Under TC)**

**Shipping Name:** Bisulfite, aqueous solution, n.o.s. (sodium bisulfite)

**Classification(s):** 8

**Product Identification No. (PIN):** UN 2693

**Packing Group:** III

Δ **ERG 154**

**Sodium Bisulfite, Solution**

---

**15. REGULATORY INFORMATION**

---

**U.S.A.****SARA Title III HAZARD CATEGORIES AND LISTS****Product Hazard Categories**

Acute (Immediate) Health: Yes  
Chronic (Delayed) Health: No  
Fire: No  
Reactivity: No  
Sudden Release of Pressure: No

**Lists**

Extremely Hazardous Substance n/a  
(40 CFR 355, SARA Title III Section 302)  
CERCLA Hazardous Substance Yes  
(40 CFR 302.4)  
Toxic Chemical Yes  
(40 CFR 372.65, SARA Title III Section 313)

**Reportable Quantity (RQ) under U.S. EPA CERCLA:** RQ=5000 lb

**TSCA Inventory Status:** Reported/Included

**Right-To-Know:** Illinois, Massachusetts, New Jersey, Pennsylvania

Δ **California prop. 65:** No products were found.

**CANADA****Workplace Hazardous Materials Information System (WHMIS)**

Δ **WHMIS Classification(s):** Class D-2B Material causing other toxic effects (TOXIC)  
Class E – Corrosive

CEPA DSL: All components listed.

Δ **WHMIS Health Effects Index:** Corrosive Material  
Sensitizing Material

**WHMIS Ingredient Disclosure List:** Confirmed A; Meets criteria for disclosure at 1% or greater.

EINECS Number: 231-548-0

**Sodium Bisulfite, Solution****16. OTHER INFORMATION**

---

**Additional Information and References**

1. "CHEMINFO" through "CCINFOdisc", Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada, Aug 1999.
2. CHEMLIST, American Chemical Society, Nov 1999.
3. DOSE, Royal Society of Chemistry, Aug 1999
4. **HSDB-Hazardous Substances Data Bank**, through "CCINFO disc", Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada, (November, 1999).
5. RTECS- Registry of Toxic Effects of Chemical Substances, On-line search, Canadian Centre for Occupational Health and Safety RTECS database, Aug 1999.
6. Transportation of Dangerous Goods Act and Regulations, Canadian Centre for Occupational Health and Safety, Aug 1999.
7. Threshold Limit Values for Chemical Substances and Physical Agents, Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, 1999.

**Revision Indicators:**

Δ in the left margin indicates a revision or addition of information since the previous issue.

**Sodium Bisulfite, Solution****16. OTHER INFORMATION (continued)**

---

**Legend:**

CAS #	- Chemical Abstracts Service Registry Number
CERCLA	- Comprehensive Environmental Response, Compensation, and Liability Act
CFR	- Code of Federal Regulations
DOT	- Department of Transportation
EPA	- Environmental Protection Agency
LC <sub>50</sub>	- The concentration of material in air expected to kill 50% of a group of test animals
LD <sub>50</sub>	- Lethal Dose expected to kill 50% of a group of test animals
LEL	- Lower Explosive Limit
MSHA	- Mine Safety and Health Administration
NIOSH	- National Institute for Occupational Safety and Health
PEL	- Permissible Exposure Limit
PVC	- Polyvinyl chloride
RCRA	- Resource Conservation and Recovery Act
SARA	- Superfund Amendments and Reauthorization Act of the U.S. EPA
STEL	- Short Term Exposure Limit
TC	- Transport Canada
TDG	- Transportation of Dangerous Goods Act/Regulations
TLV	- Threshold Limit Value
TSCA	- Toxic Substances Control Act
TWA	- Time-Weighted Average
UEL	- Upper Explosive Limit

---

Prepared by Chemtrade Logistics 1-866-887-8805

The information contained herein has been prepared by CHEMTRADE LOGISTICS Inc. and is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and CHEMTRADE LOGISTICS Inc. will not be liable for any damages, losses, injuries or consequential damages that may result from the use or reliance of any information contained herein.





## SODA ASH

### PRODUCT INFORMATION

CHEMICAL NAME: Sodium carbonate, anhydrous.

SYNONYMS: Disodium carbonate, Calcined soda, Soda ash, lite soda ash, dense soda ash, carbonic acid, disodiumsalt

CHEMICAL FAMILY: Carbonate.

MOLECULAR FORMULA:  $\text{Na}_2\text{CO}_3$

SHIPPING NAME: Sodium carbonate

PIN - (UN/NA): Not controlled.

WHMIS: D.2B

PRODUCT USE:

Soda salts, Glass, Soap, Cleaners and water softeners, Pulp and paper, Photographic agent.

MANUFACTURER: OCI Chemical Corp. Two Corporate Drive Shelton, Ct. 06484

SUPPLIER: Panther Industries Inc. Box 698 Davidson, SK S0G 1A0

EMERGENCY TELEPHONE NUMBER: (306) 567-2814

### HAZARDOUS INGREDIENTS

INGREDIENTS:

WEIGHT %

C.A.S. REGISTRY NUMBER:

Sodium carbonate

99.8

497-19-8

### PHYSICAL DATA

PHYSICAL STATE: Solid. ODOUR AND APPEARANCE: Odourless, white powder.

ODOUR THRESHOLD: Not applicable.

VAPOUR PRESSURE: Not applicable.

VAPOUR DENSITY: Not available.

EVAPORATION RATE: Not applicable.

pH: 11.3 at 1 wt/wt%

BOILING POINT: Not available.

MELTING POINT: 851°C

BULK DENSITY: 48-65 lbs./cu.ft.

SPECIFIC GRAVITY: 2.53 @ 20°C

SOLUBILITY IN WATER: 7 Wt/wt% at 25°C MOLECULAR WEIGHT: 105.99

DECOMPOSITION POINT: 400°C begins to evolve  $\text{CO}_2$

% VOLATILE BY VOLUME: Not applicable.

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available.

### FIRE AND EXPLOSION DATA

CONDITIONS OF FLAMMABILITY: Non-flammable. Avoid extreme heat

MEANS OF EXTINGUISHING: Use extinguishing media appropriate for surrounding fire.

FLASH POINT: Not applicable.

LOWER & UPPER FLAMMABLE LIMIT: Not applicable.

AUTO IGNITION TEMPERATURE: Not applicable.

HAZARDOUS COMBUSTION PRODUCTS: Heating Soda ash liberates  $\text{CO}_2$

SPECIAL FIRE FIGHTING PROCEDURES: Firefighters should wear NIOSH/MSHA approved self contained breathing apparatus and full protective clothing. Dike area to prevent runoff & contamination of water sources. Dispose of fire control water later.

EXPLOSION HAZARDS: None known.

### REACTIVITY DATA

STABILITY: Stable. HAZARDOUS POLYMERIZATION: Will not occur.

INCOMPATIBILITY: Contact with acids will release carbon dioxide gas. Can react violently with red hot aluminum metal, Fluorine gas, Lithium, and 2,4,6-trinitrotoluene.



## SODA ASH

This material upon contact with certain food products or their residues which contain reducing sugars, may react to form deadly carbon monoxide gas.

Proper tank entry and occupancy procedures should be observed. Monitor the tank atmosphere for the presence of carbon monoxide gas.

HAZARDOUS REACTIONS/DECOMPOSITIONS: Heating soda ash liberates CO<sub>2</sub>.

CONDITIONS TO AVOID: Simultaneous exposure of Soda ash and Lime dusts(CaO) in the presence of moisture can result in the formation of corrosive Caustic soda which may cause burns. Hygroscopic; protect from moisture. Remixing of separated acid and sodium carbonate solutions could cause CO<sub>2</sub> evolution and severe splattering.

### HEALTH HAZARD DATA

INHALATION: Inhalation of product may irritate nose, throat and lungs.

SKIN CONTACT: May cause skin irritation from prolonged contact, especially in hot weather. In acute skin irritation may cause redness & swelling

EYE CONTACT: May irritate or burn eyes.

INGESTION: Ingestion may be harmful. May cause nausea, vomiting, diarrhea, irritation, corrosion

CHRONIC EXPOSURE EFFECTS:

Excessive contact may produce "soda ulcers" on hands and perforation of the nasal septum. Sensitivity reactions may occur from prolonged and repeated exposure.

EXPOSURE LIMITS: Nuisance particulate 10 mg/m<sup>3</sup>.

IRRITANCY: Mild.

MUTAGENICITY: Not a known mutagen.

TERATOGENICITY DATA: Not a known teratogen.

CARCINOGENICITY: Not a known carcinogen.

SENSITIZATION TO PRODUCT: Not available.

REPRODUCTIVE TOXICITY: Not available.

ANIMAL TOXICITY DATA: Oral LD<sub>50</sub> (rat): 3160 mg/kg (2), 4090 mg/kg (3)

Inhalation LC<sub>50</sub> (rats): 2300 mg/m<sup>3</sup>/2H (3)

Skin Effects (rabbits): Non-irritant 4 hr. exposure (2)

Mild irritant 24 hr. exposure (3)

Eye Effects (rabbits): Severe irritant (2)

Mild irritant (100 mg with 30 sec rinse) (3)

OTHER HEALTH EFFECTS: None known.

### FIRST AID MEASURES

INHALATION: Remove to fresh air & if difficulty breathing administer oxygen if available. If victim is not breathing give artificial respiration. Obtain immediate medical attention.

SKIN CONTACT: Wash area of contact with copious amounts of soap and water. Remove contaminated clothing and wash before reuse. If irritation persists seek medical attention.

EYE CONTACT: Hold eyelids open & flush eyes with running water for minimum of 15 minutes. If irritation persists seek medical attention.

INGESTION: If conscious, give 2 to 3 glasses of water to drink to dilute chemical. Seek immediate medical attention. Do not leave victim alone. DO NOT INDUCE VOMITING. If vomiting occurs spontaneously & victim is conscious give water to further dilute the chemical. If victim unconscious do not give anything by mouth. Lay victim on his side to prevent aspiration of swallowed product.

EFFECTS OF REPEATED OVEREXPOSURE: Repeated exposure may lead to irritation and/or sensitivity of the skin.

OTHER EFFECTS OF OVEREXPOSURE: Concentrated solutions in contact with skin and eyes may cause chemical burns. EXISTING MEDICAL CONDITIONS POSSIBLY AGGRAVATED BY EXPOSURE: Skin contact may aggravate existing skin diseases.





## SODA ASH

Breathing dust may aggravate acute or chronic asthma and other chronic pulmonary diseases.

NOTES TO PHYSICIANS: All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred. If burns result from overexposure, treat in the following manner:

Ingestion- Treat asphyxia from glottal edema by maintaining an adequate airway. Treat shock. Maintain normal blood pressure by transfusion and by the administration of 5% dextrose in saline. If symptoms are severe and perforation of the stomach or esophagus is suspected, give nothing by mouth until endoscopic examination has been done. Maintain nutrition, give carbohydrate or hyperalimentary fluid intravenously. Give prednisolone, 2 mg/kg/d in divided doses for 10 days, to reduce progression of fibrocystic and hyaline lung disease. Esophageal stricture may require dilation.

### PREVENTATIVE MEASURES

**RESPIRATORY PROTECTION:** Use NIOSH/MSHA approved dust and mist respirator if dust concentration exceeds exposure limit.

**SKIN PROTECTION:** Wear a long sleeve shirt, trousers, and gloves when handling the product. Wash clothes after working with product.

**EYE/FACE PROTECTION:** Wear chemical safety goggles or safety glasses. Do not wear contact lenses.

**SPECIAL HANDLING PROCEDURES:** Wash thoroughly after handling. Do not get in eyes, on skin or on clothing.

**STORAGE REQUIREMENTS:** Store in a cool, dry, well ventilated area away from acids. Prolonged storage may cause product to cake and become wet from atmospheric moisture.

**ENGINEERING CONTROLS:** Use local exhaust in areas where dust may be a problem.

**SPECIAL SHIPPING REQUIREMENTS:** None known.

#### ENVIRONMENTAL PROTECTION DATA

**STEPS IN THE EVENT OF A LEAK OR SPILL:** If air born particles exist wear protective clothing to minimize contact and wear an approved respiratory mask if necessary. Sweep and shovel up spilled material and dispose of in DOT approved waste containers. Keep out of sewers, storm drains, surface waters and soil.

**DEACTIVATING CHEMICALS:** Use an acid to neutralize after the soda ash has been made into a solution.

**WASTE DISPOSAL METHODS:** If permitted by applicable disposal regulations, bury in a solid waste landfill or dissolve and neutralize as follows: Dissolve in water using caution as solution can get hot. Neutralize with acid and flush to sewer with plenty of water. Use good ventilation due to release of CO<sub>2</sub> gas. Consult federal, provincial and local regulations on chemical waste disposal.

### PREPARATION INFORMATION

MSDS PREPARED BY: Technical Department  
Panther Industries Inc.

TELEPHONE NUMBER: (306) 567-2814

DATE PREPARED/REVISED: July 11 2012

DATE PRINTED: July 11 2012

#### REFERENCES:

1. Various Manufacturers MSDS

# MATERIAL SAFETY DATA SHEET

SODIUM HYPOCHLORITE, 1 - 15 % (8318, 8378, 8389, 8555, 8619)

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Brenntag Canada Inc.  
43 Jutland Rd.  
Toronto, ON  
M8Z 2G6  
(416) 259-8231

WHMIS#: 00060708  
Index: GCD0044/16A  
Effective Date: 2016 January 28  
Date of Revision: 2016 January 28

Website: <http://www.brenntag.ca>

### EMERGENCY TELEPHONE NUMBER (For Emergencies Involving Chemical Spills or Releases)

1 855 273 6824

### PRODUCT IDENTIFICATION

Product Name: Sodium Hypochlorite, 1 - 15 % (8318, 8378, 8389, 8555, 8619).

Chemical Name: Hypochlorous acid, sodium salt.

Synonyms: Sodium Hypo 1.5 %, 4 %, 5.4 % (6 % Trade), 6 %, 10.8 % (12 % Trade), 13.06 % (15 % Trade), 15.21 % (18 % Trade), 19 %; Superchlor; Sodium Hypo Basic 12; Sodium Hypo (Brite n White), (Sanitizer LT150), (Riverside Blend), (Riverside Blend #2); RM Weak Sodium Hypo Sol'n; Exolab XY-12 (58530); EC Sodium Hypo 12 % Atlantic, Lavo; Superchlor; Soda bleach liquor; Javel water; Sodium oxychloride; Clorox; Javex; Sodium Hypo High Alkalinity; Brenntag 307 Bleach Agent.

Chemical Family: Aqueous mixture of Hypochlorous acid salt.

Molecular Formula: NaOCl.

Product Use: Industrial laundry bleach. Chemical intermediate. Laboratory reagent. Oxidizing agent. Bleaching agent. Water treatment. Fungicide.

### WHMIS Classification / Symbol:

D-2B: Toxic (skin sensitizer)  
E: Corrosive



READ THE ENTIRE MSDS FOR THE COMPLETE HAZARD EVALUATION OF THIS PRODUCT.

## 2. COMPOSITION, INFORMATION ON INGREDIENTS (Not Intended As Specifications)

<i>Ingredient</i>	<i>CAS#</i>	<i>ACGIH TLV (TWA)</i>	<i>% Concentration</i>
Sodium Hypochlorite	7681-52-9	---	1 - 15

## 3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Corrosive! Toxic effects are principally related to its corrosive properties. May be fatal if swallowed. Causes severe skin and eye burns. Mists or sprays are extremely irritating to eyes and respiratory tract. May cause corneal damage and conjunctivitis. May cause skin sensitization or other allergic responses. See "Other Health Effects" Section. Can decompose at high temperatures forming toxic gases. Contents may develop pressure on prolonged exposure to heat.

POTENTIAL HEALTH EFFECTS

---

Inhalation:	Corrosive! Product may cause severe irritation of the nose, throat and respiratory tract. Repeated and/or prolonged exposures may cause productive cough, running nose, bronchopneumonia, pulmonary edema (fluid build-up in lungs), and reduction of pulmonary function. If mixed with acids or warmed to temperatures greater than 40 °C Sodium Hypochlorite solutions release Chlorine gas. This gas can cause severe irritation of the nose and throat. Exposure to high levels of Chlorine gas may result in severe lung damage. (4) See "Other Health Effects" Section.
Skin Contact:	Corrosive! Burns (chemical) can occur if not promptly removed. Concentrated solutions may cause pain and deep and severe burns to the skin. Prolonged and repeated exposure to dilute solutions often causes irritation, redness, pain and drying and cracking of the skin. Prolonged and repeated contact may lead to dermatitis. Toxic effects may be delayed. Avoid handling when the skin is moist, wet or abraded.
Skin Absorption:	Skin absorption is a secondary concern to the continual destruction of tissue while the product is in contact with the skin.
Eye Contact:	Extremely corrosive! This product causes corneal scarring and clouding. Glaucoma, cataracts and permanent blindness may occur.
Ingestion:	Corrosive! This product causes severe burning and pain in the mouth, throat and abdomen. Vomiting, diarrhea and perforation of the esophagus and stomach lining may occur.
Other Health Effects:	<p>Corrosive effects on the skin and eyes may be delayed, and damage may occur without the sensation or onset of pain. Strict adherence to first aid measures following any exposure is essential.</p> <p>May cause skin sensitization or other allergic responses. See Section 11, "Other Studies Relevant to Material".</p> <p>Ingestion of very high levels may cause shock, coma or death. May cause pulmonary edema or central nervous system (CNS) depression. Pulmonary edema is the build-up of fluid in the lungs that might be fatal. Symptoms of pulmonary edema, such as shortness of breath, may not appear until several hours after exposure and are aggravated by physical exertion. (4) CNS depression is characterized by headache, dizziness, drowsiness, nausea, vomiting and incoordination. Severe overexposures may lead to coma and possible death due to respiratory failure.</p>

---

## 4. FIRST AID MEASURES

---

### FIRST AID PROCEDURES

General Guidelines:	Prompt removal of the material and obtaining medical attention are essential for all contact. Remove all contaminated clothing and immediately wash the exposed areas with copious amounts of water. Continue the flushing during transportation to the emergency department. Corrosive effects may be delayed (up to 72 hours), and damage may occur without the sensation or onset of pain. Contact local poison control centre for further guidance.
Inhalation:	Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Oxygen administration may be beneficial in this situation but should only be administered by personnel trained in its use. Obtain medical attention IMMEDIATELY.
Skin Contact:	Prompt removal of the material from the skin is essential. Remove all contaminated clothing and immediately wash the exposed areas with copious amounts of soap and water for a minimum of 30 minutes or up to 60 minutes for critical body areas. Immerse the exposed part immediately in ice water to relieve pain and to prevent swelling and blistering. Place cold packs, ice or wet cloths on the burned area if immersion is not possible. Cover the exposed part with a clean, preferably sterile, lint-free dressing. Obtain medical attention IMMEDIATELY and monitor breathing and treat for shock for severe exposure. See "Note to Physicians" below.
Eye Contact:	Immediately flush eyes with running water for a minimum of 30 minutes, preferably up to 60 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Do not transport victim until the recommended flushing period is completed unless flushing can be continued during transport. Where possible, consult an ophthalmologist.
Ingestion:	Do not attempt to give anything by mouth to an unconscious person. IMMEDIATELY contact local Poison Control Centre. If victim is alert and not convulsing, rinse mouth out and give 1 to 2 glasses of milk. Water may be used if milk is not available but it is not as effective. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more milk or water. IMMEDIATELY transport victim to an emergency facility. Do not attempt to neutralize the acid with weak bases since the exothermic reaction may extend the corrosive injury. Do not use buffering agents (e.g., antacids) they produce significant exothermic reactions without significantly altering the pH. Since reexposure of the mucosa to acid is harmful, be careful to avoid further vomiting and limit fluid to one to two glasses for an adult. (3)



## Note to Physicians:

Treatment for corrosive chemical contact with skin after initial flushing procedures:

1. Immerse the exposed part immediately in ice water to relieve pain and to prevent swelling and blistering. Place cold packs, ice or wet cloths on the burned area if immersion is not possible.
2. Remove anything that is constrictive, such as rings, bracelets or footwear, before swelling begins.
3. Cover the exposed part with a clean, preferably sterile, lint-free dressing.
4. For severe exposure, immediately seek medical attention and monitor breathing and treat for shock.

Immediate consultation with the local Poison Control Centre should be initiated. Severe and sometimes delayed (up to 72 hours) local and systemic reactions can occur.

Due to the severely irritating or corrosive nature of the material, swallowing may lead to ulceration and inflammation of the upper alimentary tract with hemorrhage and fluid loss. Also, perforation of the esophagus or stomach may occur, leading to mediastinitis or peritonitis and the resultant complications. Mucosal injury following ingestion of this corrosive material may contraindicate the induction of vomiting in the treatment of possible intoxication. Similarly, if gastric lavage is performed, intubation should be done with great care. If oral burns are present or a corrosive ingestion is suspected by the patient's history, perform esophagoscopy as soon as possible. Scope should not be passed beyond the first burn because of the risk of perforation.

This product contains materials that may cause severe pneumonitis if aspirated. If ingestion has occurred less than 2 hours earlier, carry out careful gastric lavage; use endotracheal cuff if available, to prevent aspiration. Observe patient for respiratory difficulty from aspiration pneumonitis. Give artificial resuscitation and appropriate chemotherapy if respiration is depressed.

Medical conditions that may be aggravated by exposure to this product include diseases of the skin, eyes or respiratory tract.

## 5. FIRE-FIGHTING MEASURES

<i>Flashpoint (°C)</i>	<i>Autolgnition Temperature (°C)</i>	<i>Flammability Limits in Air (%):</i>	
		<i>LEL</i>	<i>UEL</i>
Non-combustible (does not burn).	Not applicable.	Not applicable.	Not applicable.
Flammability Class (WHMIS):	Not regulated.		
Hazardous Combustion Products:	Thermal decomposition products are toxic and may include oxygen, chlorine gas, oxides of chlorine and sodium. Sodium Hypochlorite solutions decompose slowly. Decomposition is accelerated by heat (temperatures above 40 °C) and light. (4)		
Unusual Fire or Explosion Hazards:	Solutions are non-flammable by themselves, but are strong oxidizers which can cause ignition of combustible or oxidizable materials. May decompose violently on contact with metals, or their salts, dusts or other contaminants. Sodium Hypochlorite is a strong oxidant, but solutions do not support combustion.		
	If mixed with acids or warmed to temperatures greater than 40 degrees Celsius, Sodium Hypochlorite solutions release Chlorine gas. Hypochlorites may react with primary amines to form nitrogen trichloride which explodes spontaneously in air. Damp material may decompose exothermically and may cause combustion of organic material. (4) Closed containers exposed to heat may explode.		
Sensitivity to Mechanical Impact:	Not expected to be sensitive to mechanical impact.		
Rate of Burning:	Not available.		
Explosive Power:	Not available.		
Sensitivity to Static Discharge:	Not expected to be sensitive to static discharge.		
EXTINGUISHING MEDIA			
Fire Extinguishing Media:	Sodium hypochlorite solutions do not burn. Extinguish fire using extinguishing agents suitable for the surrounding fire and not contraindicated for use with sodium hypochlorite.		
	DO NOT use dry chemical fire extinguishing agents containing ammonium compounds (such as some A:B:C agents), since an explosive compound can be formed.		

### FIRE FIGHTING INSTRUCTIONS

**Instructions to the Fire Fighters:** Fire-exposed containers should be kept cool by spraying with water to reduce pressure. This should be done from a safe distance since containers may rupture. Spilled material may cause floors and contact surfaces to become slippery.

**Fire Fighting Protective Equipment:** Use self-contained breathing apparatus and protective clothing. Protective clothing for skin and eye protection should be worn to protect against highly alkaline materials.

---

## 6. ACCIDENTAL RELEASE MEASURES

---

Information in this section is for responding to spills, leaks or releases in order to prevent or minimize the adverse effects on persons, property and the environment. There may be specific reporting requirements associated with spills, leaks or releases, which change from region to region.

**Containment and Clean-Up Procedures:** In all cases of leak or spill contact vendor at Emergency Number shown on the front page of this MSDS. See Section 13, "Deactivating Chemicals".

Wear respirator, protective clothing and gloves. Spilled material may cause floors and contact surfaces to become slippery. Do not use combustible materials such as sawdust as an absorbent. For small spill, absorb with an inert dry material. For large spill, absorb with dry earth, sand or other non-combustible material. Replace damaged containers immediately to avoid loss of material and contamination of surrounding atmosphere. Use spark-resistant tools. Eliminate all sources of ignition. Collect product for recovery or disposal. For release to land, or storm water runoff, contain discharge by constructing dikes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Ventilate enclosed spaces. Notify applicable government authority if release is reportable or could adversely affect the environment.

---

## 7. HANDLING AND STORAGE

---

### HANDLING

**Handling Practices:** Use normal "good" industrial hygiene and housekeeping practices. Containers exposed to heat may be under internal pressure. These should be cooled and carefully vented before opening. A face shield and apron should be worn.

When diluting, add this material/product to water in small amounts to avoid splattering. Never add water to this material/product. Clean all containers of residues before adding the product. This will avoid potential violent reaction with unknown residues. (4) Add small quantities of this material slowly to large quantities of water, stirring constantly all the while. Constant stirring is necessary to avoid concentration of the product at the bottom of the mix vessel. Such concentration of the product may result in a violent exotherm with boiling of the liquid resulting in splashing, spattering or a violent eruption of a highly corrosive solution if the addition is too rapid or without sufficient stirring.

**Ventilation Requirements:** Do not use in poorly ventilated or confined areas without proper respiratory protection. See Section 8, "Engineering Controls".

**Other Precautions:** Use only with adequate ventilation and avoid breathing aerosols ( vapours or mists ). Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Wash contaminated clothing thoroughly before re-use.

Corrosive residue is most likely to be deposited at process vents or storage tanks, especially during filling operations. The use of compressed air to force corrosive materials from delivery trucks is of special concern. Scrubbing the exhaust of these vents is highly recommended. Jurisdictional regulations should be consulted to determine required practices.

### STORAGE

**Storage Temperature (°C):** Store below 29 °C. Do not freeze.

**Ventilation Requirements:** Ventilation should be corrosion proof. Strong solutions (greater than 10% available Chlorine) may slowly give off oxygen during storage, especially when warm (above 18 degrees Celsius). Vent caps may be required to prevent a build-up of pressure that could cause containers to burst.

**Storage Requirements:** Store in a clean, cool well ventilated area, away from organic chemicals, strong bases, strong acids, metal powders, carbides, sulfides, and any readily oxidizable material. Protect from direct sunlight. Protect against physical damage. Storage area should be equipped with corrosion-resistant floors, sumps and should have controlled drainage to a recovery tank. Storage tanks should be in a contained area to control any spills or leaks. Protect from direct sunlight. Protect against physical damage.

**Special Materials to be Used for Packaging or Containers:** Materials of construction for storing the product include: polyethylene, polypropylene, PVC, Teflon, ceramic or Rubber lined steel. Equipment for storage, handling or transport should NOT be made from the following material, or, where applicable, its alloys: aluminum, stainless steel, cast iron, brass, bronze, nylon or phenolic resin. Some metals accelerate the decomposition of Sodium Hypochlorite. Confirm suitability of any material before using.

---

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

---

Recommendations listed in this section indicate the type of equipment, which will provide protection against overexposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

### ENGINEERING CONTROLS

Engineering Controls: Local exhaust ventilation required. Ventilation should be corrosion proof. Make up air should be supplied to balance air that is removed by local or general exhaust ventilation. Ventilate low lying areas such as sumps or pits where dense vapours may collect.

For personnel entry into confined spaces (i.e. bulk storage tanks) a proper procedure must be followed. It must include consideration of, among other things, ventilation, testing of tank atmosphere, provision and maintenance of SCBA, and emergency rescue. Use the "buddy" system. The second person should be in view and trained and equipped to execute a rescue. (6)

### PERSONAL PROTECTIVE EQUIPMENT (PPE)

Eye Protection: Safety glasses with side shields are recommended to prevent eye contact. Use full face-shield and chemical safety goggles when there is potential for contact. Contact lenses should not be worn when working with this material.

Skin Protection: Gloves and protective clothing made from butyl rubber, neoprene, natural rubber, nitrile rubber, polyethylene, viton or PVC should be impervious under conditions of use. Prior to use, user should confirm impermeability. Discard contaminated gloves.

Respiratory Protection: No specific guidelines available. A NIOSH/MSHA-approved full facepiece air-purifying respirator equipped with chlorine cartridges for concentrations up to 5 ppm for Chlorine vapours. An air-supplied respirator if concentrations are higher or unknown.

Other Personal Protective Equipment: Wear an impermeable apron and boots. Locate safety shower and eyewash station close to chemical handling area. Take all precautions to avoid personal contact.

### EXPOSURE GUIDELINES

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES (Not intended as Specifications)

---

Physical State:	Liquid.
Appearance:	Green to yellow, watery liquid with a chlorine (bleach) odour.
Odour:	Characteristic odour.
Odour Threshold (ppm):	Not available.
Boiling Range (°C):	40 (decompose). (3)
Melting/Freezing Point (°C):	-25 (12%). (3)
Vapour Pressure (mm Hg at 20° C):	17.5. (3)
Vapour Density (Air = 1.0):	Not available.
Relative Density (g/cc):	1.1 - 1.2. (4)
Bulk Density:	1 100 - 1 200 kg/m³.
Viscosity:	Similar to water.
Evaporation Rate (Butyl Acetate = 1.0):	Not available.
Solubility:	Miscible in water.
% Volatile by Volume:	Not available.
pH:	11- 14. (3)
Coefficient of Water/Oil Distribution:	Not available.
Volatile Organic Compounds (VOC):	Not available.
Flashpoint (°C):	Non-combustible (does not burn).

---

## 10. STABILITY AND REACTIVITY

---

**CHEMICAL STABILITY**

Under Normal Conditions:	Unstable. Sodium Hypochlorite solutions decompose slowly. Decomposition is accelerated by heat (temperatures above 40 °C) and light. Some metals accelerate the decomposition of Sodium Hypochlorite.
Under Fire Conditions:	Not flammable.
Hazardous Polymerization:	Will not occur.
Conditions to Avoid:	High temperatures, sparks, open flames and all other sources of ignition. Temperatures above 40 °C (104 °F). Avoid direct sunlight. The heat of sunlight can contribute to instability. Avoid a decrease in pH.
Materials to Avoid:	Strong oxidizers. Strong acids. ( hydrochloric acid ) Contact with acids will liberate. corrosive chlorine gas. Reducing agents. Strong bases. Combustibles. Organic materials. Alcohols. Amines. Ethylene Glycol. Lewis or mineral acids. Methanol. Some metals accelerate the decomposition of Sodium Hypochlorite. Nickel. Copper. Cobalt. Tin.. Iron and its alloys. Manganese.  Nitrogen containing compounds. Ammonium hydroxide and ammonium salts. Contact with nitrogen compounds (ammonia, urea, primary amines and isocyanurates) can form toxic, reactive chloramines. Contact with Ammonium salts can form explosive nitrogen trichloride if acid is present. (4) Incompatible materials for storage include aluminum, cast bronze, cast iron, stainless steel, brass, nylon and phenolic resin. (3)
Decomposition or Combustion Products:	Thermal decomposition products are toxic and may include oxygen, chlorine gas, oxides of chlorine and sodium. Sodium Hypochlorite solutions decompose slowly. Decomposition is accelerated by heat (temperatures above 40 °C) and light. (4)

**11. TOXICOLOGICAL INFORMATION****TOXICOLOGICAL DATA:**

<b>SUBSTANCE</b>	<b>LD50 (Oral, Rat)</b>	<b>LD50 (Dermal, Rabbit)</b>	<b>LC50 (Inhalation, Rat, 4h)</b>
Sodium Hypochlorite	8910 mg/kg (3)	> 10 000 (1)	5250 mg/m3 (3)
Carcinogenicity Data:	The ingredient(s) of this product is (are) not classed as carcinogenic by ACGIH, IARC, OSHA or NTP.		
Reproductive Data:	Reproductivity tests in animals have been negative.		
Mutagenicity Data:	Mutagenicity tests in animals have been negative.		
Teratogenicity Data:	No adverse teratogenic effects are anticipated.		
Respiratory / Skin Sensitization Data:	Sodium Hypochlorite may cause skin sensitization or other allergic responses. Sensitization is the process whereby a biological change occurs in the individual because of previous exposure to a substance and, as a result, the individual reacts more strongly when subsequently exposed to the substance. Once sensitized, an individual can react to extremely low airborne levels, even below the TLV, or to skin contact.		
Synergistic Materials:	None known.		
Other Studies Relevant to Material:	Rats were fed drinking water containing 0, 0.025, 0.05, 0.1, 0.2 and 0.4% Sodium Hypochlorite for 13 weeks. Slight damage to the liver was observed in the 0.2 and 0.4% groups. Some organ weights (lungs, liver and spleen in males; salivary glands, lungs, heart and brain in females) were significantly lower in the high-dose group. (4)  High doses of Sodium Hypochlorite in drinking water caused a small but significant increase in abnormal sperm in mice. (4)  Sodium Hypochlorite caused mutations in several short-term studies using bacteria and cultured mammalian cells. The significance of these tests is unclear. It was not mutagenic in tests (chromosome aberration and micronucleus) on live animals. (4)		

**12. ECOLOGICAL INFORMATION**

Ecotoxicity:	Sodium Hypochlorite: 96-hour LC50 (Fathead minnows) = 5.9 mg/l (3) 48-hour LC50 (Rainbow Trout) = 0.07 mg/L (3)
Environmental Fate:	Not available. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers. Can be dangerous if allowed to enter drinking water intakes.



---

### 13. DISPOSAL CONSIDERATIONS

---

Deactivating Chemicals:	Apply cautiously a dilute solution of a reducing agent such as sodium sulphite or sodium bisulphite to the contained spill. Confirm pH using pH paper. Neutralization is expected to be exothermic. Effervescence may result. Flush spill area with water.
Waste Disposal Methods:	This information applies to the material as manufactured. Reevaluation of the product may be required by the user at the time of disposal since the product uses, transformations, mixtures and processes may influence waste classification. Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in accordance with applicable local, provincial and federal regulations. Do not dispose of waste with normal garbage, or to sewer systems.
Safe Handling of Residues:	See Section 13, "Deactivating Chemicals".
Disposal of Packaging:	Empty containers retain product residue (liquid and/or vapour) and can be dangerous. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. Treat package in the same manner as the product.

---

### 14. TRANSPORTATION INFORMATION

---

#### CANADIAN TDG ACT SHIPPING DESCRIPTION:

UN1791, HYPOCHLORITE SOLUTION, Class 8, PG II.

Label(s): Corrosives. Placard: Corrosives.

ERAP Index: ----- Exemptions:

This product is NOT REGULATED BY TRANSPORT at a concentration below 7%.

#### US DOT CLASSIFICATION (49CFR 172.101, 172.102):

UN1791, HYPOCHLORITE SOLUTION, Class 8, PG II.

Label(s): Corrosive. Placard: Corrosive.

CERCLA-RQ: 100 lb/45.4 kg. Exemptions:

This product is NOT REGULATED BY TRANSPORT at a concentration below 7%.

---

### 15. REGULATORY INFORMATION

---

#### CANADA

CEPA - NSNR: All components of this product are included on the DSL.

CEPA - NPRI: Not included.

Controlled Products Regulations Classification (WHMIS):

D-2B: Toxic (skin sensitizer)

E: Corrosive

#### USA

Environmental Protection Act: All components of this product are included on the TSCA inventory.

OSHA HCS (29CFR 1910.1200): Skin Sensitizer. Corrosive.

NFPA: 3 Health, 0 Fire, 1 Reactivity (6)

HMIS: 3 Health, 0 Fire, 1 Reactivity (3)

#### INTERNATIONAL

All components of this product are found on the following inventories: Australia (ACQIN), China Inventory (IECS), EINECS (European Inventory of Existing Commercial Chemical Substances), Japan (MITI), Korea (ECL), New Zealand (NZIoC) and Philippines Inventory of Chemicals and Chemical Substances (PICCS).

---

### 16. OTHER INFORMATION

---

#### REFERENCES

1. RTECS-Registry of Toxic Effects of Chemical Substances, Canadian Centre for Occupational Health and Safety RTECS

---

database.

2. Clayton, G.D. and Clayton, F.E., Eds., Patty's Industrial Hygiene and Toxicology, 3rd ed., Vol. IIA,B,C, John Wiley and Sons, New York, 1981.
3. Supplier's Material Safety Data Sheet(s).
4. CHEMINFO chemical profile, Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada.
5. Guide to Occupational Exposure Values, 2011, American Conference of Governmental Industrial Hygienists, Cincinnati, 2011.
6. Regulatory Affairs Group, Brenntag Canada Inc.
7. The British Columbia Drug and Poison Information Centre, Poison Managements Manual, Canadian Pharmaceutical Association, Ottawa, 1981.
8. NFPA 325M Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids, 1994 Edition, Quincy, MA, 1994.

---

The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Brenntag Canada Inc. will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein. This Material Safety Data Sheet is valid for three years.

---

To obtain revised copies of this or other Material Safety Data Sheets, contact your nearest Brenntag Canada Regional office.

British Columbia: 20333-102B Avenue, Langley, BC, V1M 3H1  
Phone: (604) 513-9009 Facsimile: (604) 513-9010

Alberta: 6628 - 45 th. Street, Leduc, AB, T9E 7C9  
Phone: (780) 986-4544 Facsimile: (780) 986-1070

Manitoba: 681 Plinquet Street, Winnipeg, MB, R2J 2X2  
Phone: (204) 233-3416 Facsimile: (204) 233-7005

Ontario: 43 Jutland Road, Toronto, ON, M8Z 2G6  
Phone: (416) 259-8231 Facsimile: (416) 259-5333

Quebec: 2900 Jean Baptiste Des., Lachine, PQ, H8T 1C8  
Phone: (514) 636-9230 Facsimile: (514) 636-0877

Atlantic: A-105 Akerley Boulevard, Dartmouth, NS, B3B 1R7  
Phone: (902) 468-9690 Facsimile: (902) 468-3085

---

Prepared By: Regulatory Affairs Group, Brenntag Canada Inc., (416) 259-8231.



## SAFETY DATA SHEET

### SPECTRUS\* CT1300

#### 1. Identification

Product identifier	SPECTRUS CT1300
Other means of identification	None.
Recommended use	Water-based microbial control agent.
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Flammable liquids	Category 3
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 1B
	Serious eye damage/eye irritation	Category 1
	Reproductive toxicity	Category 1A
	Reproductive toxicity	Effects on or via lactation
	Specific target organ toxicity, single exposure	Category 3 narcotic effects
	Specific target organ toxicity, repeated exposure (oral)	Category 1 (liver)
OSHA defined hazards	Not classified.	

#### Label elements



#### Signal word

Danger

#### Hazard statement

Flammable liquid and vapor. Harmful if swallowed. Causes severe skin burns and eye damage. Causes serious eye damage. May cause drowsiness or dizziness. May damage fertility or the unborn child. May cause harm to breast-fed children. Causes damage to organs (liver) through prolonged or repeated exposure by ingestion.

## Precautionary statement

### Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting// equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Do not breathe mist or vapor. Avoid contact during pregnancy/while nursing. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection.

### Response

If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor/. Specific treatment (see on this label). Wash contaminated clothing before reuse. In case of fire: Use to extinguish.

### Storage

Store in a well-ventilated place. Keep container tightly closed. Store in a well-ventilated place. Keep cool. Store locked up.

### Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations. Dispose of contents/container to an approved facility.

### Hazard(s) not otherwise classified (HNOC)

None known.

### Supplemental information

None.

## 3. Composition/information on ingredients

### Mixtures

Components	CAS #	Percent
Alkyl dimethyl benzyl ammonium chloride	68424-85-1	40 - 60
Ethanol	64-17-5	10 - 20

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

### Composition comments

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

## 4. First-aid measures

### Inhalation

Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

### Skin contact

Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.

### Eye contact

Immediately flush eyes with plenty of low-pressure water for at least 30 minutes while removing contact lenses. Continue rinsing. Call a physician or poison control center immediately.

### Ingestion

Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

### Most important symptoms/effects, acute and delayed

Burning pain and severe corrosive skin damage. Jaundice. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Vapors have a narcotic effect and may cause headache, fatigue, dizziness and nausea. Prolonged exposure may cause chronic effects.

### Indication of immediate medical attention and special treatment needed

Corrosive material It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage.

### General information

Take off all contaminated clothing immediately. IF exposed or concerned: Get medical advice/attention. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

## 5. Fire-fighting measures

### Suitable extinguishing media

Alcohol resistant foam. Dry chemical powder. Carbon dioxide (CO2). Avoid water if possible.

### Unsuitable extinguishing media

Water.

### Specific hazards arising from the chemical

Vapors may form explosive mixtures with air. Vapors may travel considerable distance to a source of ignition and flash back. During fire, gases hazardous to health may be formed.

### Special protective equipment and precautions for firefighters

Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.



**Fire fighting equipment/instructions**

In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials. Move containers from fire area if you can do so without risk. Cool containers / tanks with water spray.

**General fire hazards**

Flammable liquid and vapor.

**6. Accidental release measures****Personal precautions, protective equipment and emergency procedures**

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

**Methods and materials for containment and cleaning up**

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Take precautionary measures against static discharge. Use only non-sparking tools. Keep combustibles (wood, paper, oil, etc.) away from spilled material.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

**Environmental precautions**

Avoid discharge into drains, water courses or onto the ground. Do not empty into drains, dispose of this material and its container to hazardous or special waste collection point.

**7. Handling and storage****Precautions for safe handling**

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Vapors may form explosive mixtures with air. Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. Do not breathe mist or vapor. Do not get this material in contact with eyes. Do not get this material in contact with skin. Avoid contact during pregnancy/while nursing. Avoid prolonged exposure. Do not get this material on clothing. Do not taste or swallow. When using, do not eat, drink or smoke. Provide adequate ventilation. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Observe good industrial hygiene practices.

**Conditions for safe storage, including any incompatibilities**

Store locked up. Keep away from heat, sparks and open flame. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Store in a cool, dry place out of direct sunlight. Store in original tightly closed container. Store in a well-ventilated place. Refrigeration recommended. Keep in an area equipped with sprinklers. Store away from incompatible materials (see Section 10 of the SDS).

**8. Exposure controls/personal protection****Occupational exposure limits****US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)**

Components	Type	Value
Ethanol (CAS 64-17-5)	PEL	1900 mg/m <sup>3</sup> 1000 ppm

**US. ACGIH Threshold Limit Values**

Components	Type	Value
Ethanol (CAS 64-17-5)	STEL	1000 ppm

**US. NIOSH: Pocket Guide to Chemical Hazards**

Components	Type	Value
Ethanol (CAS 64-17-5)	TWA	1900 mg/m <sup>3</sup> 1000 ppm

**Biological limit values**

No biological exposure limits noted for the ingredient(s).

**Appropriate engineering controls**

Explosion-proof general and local exhaust ventilation. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

**Individual protection measures, such as personal protective equipment**

<b>Eye/face protection</b>	Wear safety glasses with side shields (or goggles) and a face shield.
<b>Skin protection</b>	
<b>Hand protection</b>	Chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.
<b>Other</b>	Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.
<b>Respiratory protection</b>	Chemical respirator with organic vapor cartridge and full facepiece. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
<b>Thermal hazards</b>	Wear appropriate thermal protective clothing, when necessary.
<b>General hygiene considerations</b>	When using, do not eat, drink or smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

**9. Physical and chemical properties****Appearance**

<b>Color</b>	Colorless to yellow
<b>Physical state</b>	Liquid
<b>Odor</b>	Mild
<b>Odor threshold</b>	Not available.
<b>pH (concentrated product)</b>	7.5
<b>pH in aqueous solution</b>	6.3 (10% SOL.)
<b>Melting point/freezing point</b>	-7 °F (-22 °C)
<b>Initial boiling point and boiling range</b>	Not available.
<b>Flash point</b>	130 °F (54 °C) P-M(CC)
<b>Evaporation rate</b>	< 1 (Ether = 1)
<b>Flammability (solid, gas)</b>	Not available.

**Upper/lower flammability or explosive limits**

<b>Flammability limit - lower (%)</b>	Not available.
<b>Flammability limit - upper (%)</b>	Not available.
<b>Explosive limit - lower (%)</b>	Not available.
<b>Explosive limit - upper (%)</b>	Not available.

<b>Vapor pressure</b>	44 mm Hg
<b>Vapor pressure temp.</b>	70 °F (21 °C)
<b>Vapor density</b>	< 1 (Air = 1)
<b>Relative density</b>	0.96
<b>Relative density temperature</b>	70 °F (21 °C)
<b>Solubility(ies)</b>	
<b>Solubility (water)</b>	100 %
<b>Partition coefficient (n-octanol/water)</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Viscosity</b>	50 cps
<b>Viscosity temperature</b>	70 °F (21 °C)
<b>Other information</b>	
<b>Pour point</b>	-2 °F (-19 °C)
<b>Specific gravity</b>	0.96

## 10. Stability and reactivity

<b>Reactivity</b>	The product is stable and non-reactive under normal conditions of use, storage and transport.
<b>Chemical stability</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions</b>	Hazardous polymerization does not occur.
<b>Conditions to avoid</b>	Avoid heat, sparks, open flames and other ignition sources. Avoid temperatures exceeding the flash point. Contact with incompatible materials.
<b>Incompatible materials</b>	Strong oxidizing agents.
<b>Hazardous decomposition products</b>	Thermal decomposition or combustion may produce oxides of carbon, ammonia, oxides of nitrogen and/or hydrogen chloride.

## 11. Toxicological information

### Information on likely routes of exposure

<b>Inhalation</b>	May cause damage to organs by inhalation. May cause irritation to the respiratory system. Vapors have a narcotic effect and may cause headache, fatigue, dizziness and nausea. Prolonged inhalation may be harmful.
<b>Skin contact</b>	Causes severe skin burns.
<b>Eye contact</b>	Causes serious eye damage.
<b>Ingestion</b>	Causes digestive tract burns. Harmful if swallowed.
<b>Symptoms related to the physical, chemical and toxicological characteristics</b>	Burning pain and severe corrosive skin damage. Jaundice. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

### Information on toxicological effects

<b>Acute toxicity</b>	Narcotic effects.
-----------------------	-------------------

Product	Species	Test Results
SPECTRUS CT1300 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	Rat	688 mg/kg, (Calculated according to GHS additivity formula)
Components	Species	Test Results
Alkyl dimethyl benzyl ammonium chloride (CAS 68424-85-1)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	3340 mg/kg
<i>Oral</i>		
LD50	Rat	344 mg/kg
Ethanol (CAS 64-17-5)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg
<i>Inhalation</i>		
LC50	Rat	124.7 mg/l/4h
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg

\* Estimates for product may be based on additional component data not shown.

<b>Skin corrosion/irritation</b>	Causes severe skin burns.
<b>Serious eye damage/eye irritation</b>	Causes serious eye damage.

**Respiratory or skin sensitization****Respiratory sensitization**

This product is not expected to cause respiratory sensitization.

**Skin sensitization**

This product is not expected to cause skin sensitization.

**Germ cell mutagenicity**

No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

**Carcinogenicity**

This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

**OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)**

Not listed.

**Reproductive toxicity**

Possible reproductive hazard. May cause harm to breastfed babies. May damage fertility or the unborn child.

**Specific target organ toxicity - single exposure**

Narcotic effects.

**Specific target organ toxicity - repeated exposure**

Causes damage to organs (Liver) through prolonged or repeated exposure by ingestion.

**Aspiration hazard**

May be harmful if swallowed and enters airways. Based on available data, the classification criteria are not met.

**Chronic effects**

Prolonged or repeated exposures may cause CNS depression, tissue necrosis, and/or toxicity to the liver and kidney. Causes damage to organs through prolonged or repeated exposure.

**12. Ecological information****Ecotoxicity**

Product		Species	Test Results
SPECTRUS CT1300 (CAS Mixture)	IC25	Ceriodaphnia	0.098 mg/L, Chronic Bioassay, 7 day
		Fathead Minnow	0.259 mg/L, Chronic Bioassay, 7 day
	LC10	Annelida(Lumbriculus variegatus)	0.37 mg/L, Acute Toxicity, 96 hour
		LC50	1.47 mg/L, Acute Toxicity, 96 hour
	LC50	Benthic Crustacean(Gammarus pseudolimnaeus)	0.07 mg/L, Acute Toxicity, 96 hour
		Ceriodaphnia	0.35 mg/L, Static Renewal Bioassay, 48 hour
		Channel Catfish	0.86 mg/L, Acute Toxicity, 96 hour
		Fathead Minnow	0.72 mg/L, Flow-Thru Bioassay, 96 hour
		Freshwater Snail(Physa sp.)	0.46 mg/L, Acute Toxicity, 96 hour
		Menidia beryllina (Silversides)	0.62 mg/L, Flow-Thru Bioassay, 96 hour
		Midge larvae (Chironomus tentans)	0.5 mg/L, Acute Toxicity, 96 hour
		Mysid Shrimp	0.16 mg/L, Flow-Thru Bioassay, 96 hour
		Sheepshead Minnow	1.76 mg/L, Flow-Thru Bioassay, 96 hour
	NOEL	Ceriodaphnia	0.15 mg/L, Static Renewal Bioassay, 48 hour
		Channel Catfish	0.54 mg/L, Acute Toxicity, 96 hour
		Fathead Minnow	0.41 mg/L, Flow-Thru Bioassay, 96 hour
		Freshwater Snail(Physa sp.)	0.36 mg/L, Acute Toxicity, 96 hour
		Menidia beryllina (Silversides)	0.35 mg/L, Flow-Thru Bioassay, 96 hour
		Midge larvae (Chironomus tentans)	0.13 mg/L, Acute Toxicity, 96 hour
		Mysid Shrimp	0.03 mg/L, Flow-Thru Bioassay, 96 hour
		Sheepshead Minnow	1 mg/L, Flow-Thru Bioassay, 96 hour
<b>Aquatic</b> Crustacea	LC50	Daphnia magna	0.11 mg/L, Static Acute Bioassay, 48 hour
			0.04 mg/L, Flow-Thru Bioassay, 48 hour
		Daphnia pulex	0.05 mg/L, Static Renewal Bioassay, 48 hour

Product		Species	Test Results
	NOEL	Daphnia magna	0.06 mg/L, Static Acute Bioassay, 48 hour
			0.026 mg/L, Flow-Thru Bioassay, 48 hour
		Daphnia pulex	0.031 mg/L, Static Renewal Bioassay, 48 hour
Fish	LC50	Rainbow Trout	2 mg/L, Flow-Thru Bioassay, 96 hour
	NOEL	Rainbow Trout	1.2 mg/L, Flow-Thru Bioassay, 96 hour
Components		Species	Test Results
Alkyl dimethyl benzyl ammonium chloride (CAS 68424-85-1)			
	EC50	Active Sludge	10 mg/l
		Daphnia Magna	0.016 mg/l, 48 hour
<b>Aquatic</b>			
Fish	LC50	Rainbow Trout	0.93 mg/l, 96 hour

\* Estimates for product may be based on additional component data not shown.

**Bioaccumulative potential** No data available.

**Partition coefficient n-octanol / water (log Kow)**

Ethanol -0.31

**Mobility in soil** No data available.

**Other adverse effects** Not available.

**Persistence and degradability**

66% CO2 Evolution (Modified Sturm Test) (OECD 301B)

- COD (mgO2/g) 1470

- BOD 5 (mgO2/g) 43

- BOD 28 (mgO2/g) 156

- Closed Bottle Test (%  
Degradation in 28 days) 14

- Zahn-Wellens Test (%  
Degradation in 28 days) 0

- TOC (mg C/g) 380

### 13. Disposal considerations

**Disposal instructions** Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Do not incinerate sealed containers. If discarded, this product is considered a RCRA ignitable waste, D001. Dispose of contents/container in accordance with local/regional/national/international regulations.

**Hazardous waste code** D001: Waste Flammable material with a flash point <140 F  
The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

**Waste from residues / unused products** Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

**Contaminated packaging** Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

### 14. Transport information

**DOT**

**UN number** UN2920

**UN proper shipping name** CORROSIVE LIQUIDS, FLAMMABLE, N.O.S. (QUATERNARY AMMONIUM COMPOUNDS, ETHYL ALCOHOL)

**Transport hazard class(es)**

**Class** 8

**Subsidiary risk** 3

**Packing group** II



**Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.  
**ERG number** 132  
 Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

**IATA**

**UN number** UN2920  
**UN proper shipping name** CORROSIVE LIQUID, FLAMMABLE, N.O.S. (QUATERNARY AMMONIUM COMPOUNDS, ETHYL ALCOHOL)  
**Transport hazard class(es)**  
     **Class** 8  
     **Subsidiary risk** 3  
**Packing group** II  
**Environmental hazards** Yes  
**Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.

**IMDG**

**UN number** UN2920  
**UN proper shipping name** CORROSIVE LIQUID, FLAMMABLE, N.O.S. (QUATERNARY AMMONIUM COMPOUNDS, ETHYL ALCOHOL), MARINE POLLUTANT  
**Transport hazard class(es)**  
     **Class** 8  
     **Subsidiary risk** 3  
**Packing group** II  
**Environmental hazards**  
     **Marine pollutant** Yes  
**EmS** Not available.  
**Special precautions for user** Read safety instructions, SDS and emergency procedures before handling.

**DOT**



**IATA; IMDG**



**Marine pollutant**



**General information**

IMDG Regulated Marine Pollutant.

## 15. Regulatory information

### US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

#### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

#### CERCLA Hazardous Substance List (40 CFR 302.4)

Ethanol (CAS 64-17-5)

Listed.

#### SARA 304 Emergency release notification

Not regulated.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

### Superfund Amendments and Reauthorization Act of 1986 (SARA)

#### Hazard categories

Immediate Hazard - Yes  
Delayed Hazard - Yes  
Fire Hazard - Yes  
Pressure Hazard - No  
Reactivity Hazard - No

#### SARA 302 Extremely hazardous substance

Not listed.

#### SARA 311/312 Hazardous chemical

Yes

#### SARA 313 (TRI reporting)

Not regulated.

### Other federal regulations

#### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

#### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

#### Safe Drinking Water Act (SDWA)

Not regulated.

### Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

#### FIFRA registration number

3876-149

#### TSCA

This is an EPA registered biocide and is exempt from TSCA inventory requirements.

#### FIFRA hazard statement

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label:

DANGER

Corrosive

Causes irreversible eye damage and skin burns

May be fatal if swallowed, absorbed through the skin, or inhaled

This pesticide is toxic to fish

#### Food and drug administration

21 CFR 176.300 (slimicides for wet end use)

### US state regulations

#### US - Massachusetts RTK - Substance List

Ethanol (CAS 64-17-5)

#### US - Pennsylvania RTK - Hazardous Substances

Ethanol (CAS 64-17-5)

**US - Rhode Island RTK**

Not regulated.

**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

**US. New Jersey Worker and Community Right-to-Know Act**

Ethanol (CAS 64-17-5)

**US. Pennsylvania Worker and Community Right-to-Know Law**

Ethanol (CAS 64-17-5)

**US. California Proposition 65**

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

**US - California Proposition 65 - CRT: Listed date/Carcinogenic substance**

Ethanol (CAS 64-17-5)

Listed: April 29, 2011

Listed: July 1, 1988

**US - California Proposition 65 - CRT: Listed date/Developmental toxin**

Ethanol (CAS 64-17-5)

Listed: October 1, 1987

Methanol (CAS 67-56-1)

Listed: March 16, 2012

**US - California Proposition 65 - CRT: Listed date/Female reproductive toxin**

No ingredient listed.

**US - California Proposition 65 - CRT: Listed date/Male reproductive toxin**

No ingredient listed.

**16. Other information, including date of preparation or last revision**

**Issue date** Dec-18-2014

**Revision date** Jun-03-2015

**Version #** 1.0

**List of abbreviations**

CAS: Chemical Abstract Service Registration Number  
TWA: Time Weighted Average  
STEL: Short Term Exposure Limit  
LD50: Lethal Dose, 50%  
LC50: Lethal Concentration, 50%  
NOEL: No Observed Effect Level  
COD: Chemical Oxygen Demand  
BOD: Biochemical Oxygen Demand  
TOC: Total Organic Carbon  
TLV: Threshold Limit Value  
IATA: International Air Transport Association  
IMDG: International Maritime Dangerous Goods Code  
NFPA: National Fire Protection Association  
ACGIH: American Conference of Governmental Industrial Hygienists  
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.

**References:** No data available

**Disclaimer** The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**Revision Information** Physical & Chemical Properties: Multiple Properties

**Prepared by** This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.



## SAFETY DATA SHEET

### STEAMATE\* NA0160

#### 1. Identification

Product identifier	STEAMATE NA0160
Other means of identification	Not available.
Recommended use	Neutralizing amine
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Flammable liquids	Category 4
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 1A
	Serious eye damage/eye irritation	Category 1
	Sensitization, skin	Category 1B
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
OSHA defined hazards	Not classified.	

#### Label elements



Signal word Danger

Hazard statement Combustible liquid. Harmful if swallowed. Causes severe skin burns and eye damage. May cause an allergic skin reaction. Causes serious eye damage. May cause respiratory irritation.

#### Precautionary statement

##### Prevention

Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Do not breathe mist or vapor. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Contaminated work clothing must not be allowed out of the workplace. Wear protective gloves/protective clothing/eye protection/face protection.

##### Response

If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor/. Specific treatment (see on this label). If skin irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse. In case of fire: Use to extinguish.

<b>Storage</b>	Store in a well-ventilated place. Keep container tightly closed. Store in a well-ventilated place. Keep cool. Store locked up.
<b>Disposal</b>	Dispose of contents/container in accordance with local/regional/national/international regulations. Dispose of contents/container to an approved facility.
<b>Hazard(s) not otherwise classified (HNOC)</b>	None known.
<b>Supplemental information</b>	43% of the mixture consists of component(s) of unknown acute oral toxicity.

### 3. Composition/information on ingredients

#### Mixtures

Chemical name	Common name and synonyms	CAS number	%
Methoxypropylamine, 3-		5332-73-0	40 - 60

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

<b>Composition comments</b>	Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.
-----------------------------	--

### 4. First-aid measures

<b>Inhalation</b>	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
<b>Skin contact</b>	Remove contaminated clothing immediately and wash skin with soap and water. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.
<b>Eye contact</b>	URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention. Call a physician or poison control center immediately.
<b>Ingestion</b>	Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
<b>Most important symptoms/effects, acute and delayed</b>	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation.
<b>Indication of immediate medical attention and special treatment needed</b>	Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
<b>General information</b>	In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

### 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards arising from the chemical</b>	The product is combustible, and heating may generate vapors which may form explosive vapor/air mixtures. During fire, gases hazardous to health may be formed.
<b>Special protective equipment and precautions for firefighters</b>	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
<b>Fire-fighting equipment/instructions</b>	In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials. Move containers from fire area if you can do so without risk. Cool containers / tanks with water spray.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.
<b>General fire hazards</b>	Combustible liquid.

### 6. Accidental release measures

<b>Personal precautions, protective equipment and emergency procedures</b>	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
--	---



## Methods and materials for containment and cleaning up

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

## Environmental precautions

Avoid discharge into drains, water courses or onto the ground. Water contaminated with this product may be sent to a sanitary sewer treatment facility, or a permitted waste treatment facility, in accordance with any local agreements.

## 7. Handling and storage

### Precautions for safe handling

Combustible. Keep away from open flames, hot surfaces and sources of ignition. Do not breathe mist or vapor. Do not get this material in contact with eyes. Do not get this material in contact with skin. Do not taste or swallow. Avoid prolonged exposure. Do not get this material on clothing. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. When using, do not eat, drink or smoke. Wash hands thoroughly after handling. Use care in handling/storage.

### Conditions for safe storage, including any incompatibilities

Store in original tightly closed container. Keep away from heat, sparks and open flame. Store away from oxidizers. Store in a cool, dry place out of direct sunlight. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS). Keep in an area equipped with sprinklers. Store in accordance with local/regional/national/international regulation. Do not freeze. If frozen, thaw completely and mix thoroughly prior to use.

## 8. Exposure controls/personal protection

### Occupational exposure limits

#### US. Workplace Environmental Exposure Level (WEEL) Guides

Components	Type	Value
Methoxypropylamine, 3- (CAS 5332-73-0)	STEL	15 ppm
	TWA	5 ppm

### Biological limit values

No biological exposure limits noted for the ingredient(s).

### Appropriate engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

### Individual protection measures, such as personal protective equipment

#### Eye/face protection

Splash proof chemical goggles. Face shield.

#### Skin protection

##### Hand protection

Chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.

##### Other

Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

#### Respiratory protection

Chemical respirator with organic vapor cartridge and full facepiece. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

#### Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

### General hygiene considerations

When using, do not eat, drink or smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Contaminated work clothing should not be allowed out of the workplace.

## 9. Physical and chemical properties

### Appearance

#### Color

Colorless

#### Physical state

Liquid

Odor	Amine
Odor threshold	Not available.
pH (concentrated product)	13.5
pH in aqueous solution	12 (5% SOL.)
Melting point/freezing point	< -30 °F (< -34 °C)
Initial boiling point and boiling range	220 °F (104 °C)
Flash point	154 °F (68 °C) P-M(CC)
Evaporation rate	< 1 (Ether = 1)
Flammability (solid, gas)	Not available.
<b>Upper/lower flammability or explosive limits</b>	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	18 mm Hg
Vapor pressure temp.	70 °F (21 °C)
Vapor density	> 1 (Air = 1)
Relative density	0.97
Relative density temperature	70 °F (21 °C)
<b>Solubility(ies)</b>	
Solubility (water)	100 %
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	18 cps
Viscosity temperature	70 °F (21 °C)
<b>Other information</b>	
Percent volatile	57 (Estimated)
Pour point	< -30 °F (< -34 °C)
Specific gravity	0.97

## 10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Stable at normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Friction, heat or other sources of ignition may cause a violent reaction releasing heat and toxic fumes. Avoid temperatures exceeding the flash point. Contact with incompatible materials.
Incompatible materials	Avoid contact with strong acids and oxidisers.
Hazardous decomposition products	Oxides of carbon and nitrogen evolved in fire. Ammonia and volatile amines.

## 11. Toxicological information

### Information on likely routes of exposure

Ingestion	Causes digestive tract burns. Harmful if swallowed.
Inhalation	Prolonged inhalation may be harmful. May cause irritation to the respiratory system.
Skin contact	Causes severe skin burns. May cause an allergic skin reaction.
Eye contact	Causes serious eye damage.

**Symptoms related to the physical, chemical and toxicological characteristics** Burning pain and severe corrosive skin damage. Causes serious eye damage. May cause respiratory irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

#### Information on toxicological effects

**Acute toxicity** Harmful if swallowed. May cause an allergic skin reaction. May cause respiratory irritation.

Product	Species	Test Results
STEAMATE NA0160 (CAS Mixture)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 2000 mg/kg, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	Rat	1211 mg/kg, (Calculated according to GHS additivity formula)

Components	Species	Test Results
Methoxypropylamine, 3- (CAS 5332-73-0)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	> 2000 mg/kg
<i>Oral</i>		
LD50	Rat	690 mg/kg

\* Estimates for product may be based on additional component data not shown.

**Skin corrosion/irritation** Causes severe skin burns and eye damage.

**Serious eye damage/eye irritation** Causes serious eye damage.

#### Respiratory or skin sensitization

**Respiratory sensitization** This product is not expected to cause respiratory sensitization.

**Skin sensitization** May cause an allergic skin reaction.

**Germ cell mutagenicity** No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

**Carcinogenicity** This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

**Reproductive toxicity** This product is not expected to cause reproductive or developmental effects.

**Specific target organ toxicity - single exposure** May cause respiratory irritation.

**Specific target organ toxicity - repeated exposure** Not classified.

**Aspiration hazard** Based on available data, the classification criteria are not met. Aspiration of this product may cause the same toxic impacts as if it were ingested. May be harmful if swallowed and enters airways.

**Chronic effects** Prolonged inhalation may be harmful.

## 12. Ecological information

**Ecotoxicity** The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Product	Species	Test Results
STEAMATE NA0160 (CAS Mixture)		
LC50	Ceriodaphnia	32 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)
	Fathead Minnow	570 mg/L, Static Renewal Bioassay, 96 hour, (pH adjusted)
NOEL	Ceriodaphnia	21 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)

Product		Species	Test Results
Crustacea		Fathead Minnow	230 mg/L, Static Renewal Bioassay, 96 hour, (pH adjusted)
	LC50	Daphnia magna	290 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)
	NOEL	Daphnia magna	150 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)
* Estimates for product may be based on additional component data not shown.			
Bioaccumulative potential		No data available.	
Mobility in soil		No data available.	
Other adverse effects		No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.	
Environmental fate		The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.	
Persistence and degradability		No data is available on the degradability of this product.	
- COD (mgO2/g)		1060 (calculated data)	
- BOD 5 (mgO2/g)		1 (calculated data)	
- BOD 28 (mgO2/g)		44 (calculated data)	
- Closed Bottle Test (% Degradation in 28 days)		18 (calculated data)	
- Zahn-Wellens Test (% Degradation in 28 days)		16 (calculated data)	
- TOC (mg C/g)		285 (calculated data)	
13. Disposal considerations			
Disposal instructions		Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator.	
Local disposal regulations		Dispose in accordance with all applicable regulations.	
Hazardous waste code		D002: Waste Corrosive material [pH <=2 or =>12.5, or corrosive to steel] The waste code should be assigned in discussion between the user, the producer and the waste disposal company.	
Waste from residues / unused products		Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).	
Contaminated packaging		Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.	
14. Transport information			
DOT			
UN number		UN2735	
UN proper shipping name		AMINES, LIQUID, CORROSIVE, N.O.S. (METHOXYPROPYLAMINE)	
Transport hazard class(es)			
Class		8	
Subsidiary risk		-	
Packing group		III	
Special precautions for user		Read safety instructions, SDS and emergency procedures before handling.	
ERG number		153	
Some containers may be DOT exempt, please check BOL for exact container classification.			
IATA			
UN number		UN2735	
UN proper shipping name		AMINES, LIQUID, CORROSIVE, N.O.S. (METHOXYPROPYLAMINE)	
Transport hazard class(es)			
Class		8	
Subsidiary risk		-	
Packing group		III	
Environmental hazards		No.	

<b>Special precautions for user</b>	Read safety instructions, SDS and emergency procedures before handling.
<b>IMDG</b>	
<b>UN number</b>	UN2735
<b>UN proper shipping name</b>	AMINES, LIQUID, CORROSIVE, N.O.S. (METHOXYPROPYLAMINE)
<b>Transport hazard class(es)</b>	
<b>Class</b>	8
<b>Subsidiary risk</b>	-
<b>Packing group</b>	III
<b>Environmental hazards</b>	
<b>Marine pollutant</b>	No.
<b>Ems</b>	Not available.
<b>Special precautions for user</b>	Read safety instructions, SDS and emergency procedures before handling.

#### DOT



#### IATA; IMDG



## 15. Regulatory information

<b>US federal regulations</b>	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.	
<b>TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)</b>	Not regulated.	
<b>CERCLA Hazardous Substance List (40 CFR 302.4)</b>	Methoxypropylamine, 3- (CAS 5332-73-0) Listed.	
<b>SARA 304 Emergency release notification</b>	Not regulated.	
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	Not listed.	
<b>Superfund Amendments and Reauthorization Act of 1986 (SARA)</b>		
<b>Hazard categories</b>	Immediate Hazard - Yes Delayed Hazard - No Fire Hazard - Yes Pressure Hazard - No Reactivity Hazard - No	
<b>SARA 302 Extremely hazardous substance</b>	Not listed.	
<b>SARA 311/312 Hazardous chemical</b>	Yes	
<b>SARA 313 (TRI reporting)</b>	Not regulated.	



## Other federal regulations

### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

### Safe Drinking Water Act (SDWA)

Not regulated.

## Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

## Food and drug administration

This product is FDA acceptable for use under 21 CFR: 176.170 and 176.180 .

This product is FDA acceptable for use under 21 CFR: 176.170 and 176.180 .

## US state regulations

### US - Massachusetts RTK - Substance List

Methoxypropylamine, 3- (CAS 5332-73-0)

### US - Pennsylvania RTK - Hazardous Substances

Methoxypropylamine, 3- (CAS 5332-73-0)

### US - Rhode Island RTK

Not regulated.

### US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

### US. New Jersey Worker and Community Right-to-Know Act

Not regulated.

### US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

### US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

No ingredient listed.

### US - California Proposition 65 - CRT: Listed date/Developmental toxin

No ingredient listed.

### US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

No ingredient listed.

### US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

No ingredient listed.

## 16. Other information, including date of preparation or last revision

Issue date Jan-07-2015

Revision date Jan-07-2015

Version # 1.0

### List of abbreviations

CAS: Chemical Abstract Service Registration Number  
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.  
ACGIH: American Conference of Governmental Industrial Hygienists  
NOEL: No Observed Effect Level  
STEL: Short Term Exposure Limit  
LC50: Lethal Concentration, 50%  
TWA: Time Weighted Average  
BOD: Biochemical Oxygen Demand  
COD: Chemical Oxygen Demand  
TOC: Total Organic Carbon  
IATA: International Air Transport Association  
IMDG: International Maritime Dangerous Goods Code  
TLV: Threshold Limit Value  
LD50: Lethal Dose, 50%  
NFPA: National Fire Protection Association

<b>References:</b>	No data available
<b>Disclaimer</b>	The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.
<b>Revision Information</b>	Composition / Information on Ingredients: Disclosure Overrides Toxicological Information: Toxicological Data Transport Information: Material Transportation Information HazReg Data: North America GHS: Classification
<b>Prepared by</b>	This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.



GE Power & Water  
Water & Process Technologies

## SAFETY DATA SHEET

### STEAMATE\* NA2060

#### 1. Identification

Product identifier	STEAMATE NA2060
Other means of identification	Not available.
Recommended use	Neutralizing amine
Recommended restrictions	None known.

#### Company/undertaking identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355 3300, F 215 953 5524

#### Emergency telephone

(800) 877 1940

#### 2. Hazard(s) identification

Physical hazards	Flammable liquids	Category 3
Health hazards	Acute toxicity, oral	Category 3
	Acute toxicity, dermal	Category 3
	Skin corrosion/irritation	Category 1B
	Serious eye damage/eye irritation	Category 1
	Reproductive toxicity	Category 2
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
OSHA defined hazards	Not classified.	

#### Label elements



Signal word Danger

Hazard statement Flammable liquid and vapor. Toxic if swallowed. Toxic in contact with skin. Causes severe skin burns and eye damage. Causes serious eye damage. May cause respiratory irritation. Suspected of damaging fertility or the unborn child.

#### Precautionary statement

##### Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting// equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Do not breathe mist or vapor. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing. Wear protective gloves/eye protection/face protection.

<b>Response</b>	If swallowed: Immediately call a poison center/doctor/. If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor/. Specific treatment (see on this label). Take off immediately all contaminated clothing and wash it before reuse. In case of fire: Use to extinguish.
<b>Storage</b>	Store in a well-ventilated place. Keep container tightly closed. Store in a well-ventilated place. Keep cool. Store locked up.
<b>Disposal</b>	Dispose of contents/container in accordance with local/regional/national/international regulations. Dispose of contents/container to approved local facility.
<b>Hazard(s) not otherwise classified (HNOC)</b>	None known.
<b>Supplemental information</b>	None.

### 3. Composition/information on ingredients

#### Mixtures

Chemical name	Common name and synonyms	CAS number	%
Cyclohexylamine		108-91-8	40 - 60

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

**Composition comments** Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

### 4. First-aid measures

<b>Inhalation</b>	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
<b>Skin contact</b>	Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.
<b>Eye contact</b>	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.
<b>Ingestion</b>	Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Do not use mouth-to-mouth method if victim ingested the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
<b>Most important symptoms/effects, acute and delayed</b>	Burning pain and severe corrosive skin damage. Coughing. Diarrhea. Dizziness. Nausea, vomiting. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. May cause respiratory irritation.
<b>Indication of immediate medical attention and special treatment needed</b>	Provide general supportive measures and treat symptomatically. Thermal burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
<b>General information</b>	Take off immediately all contaminated clothing. IF exposed or concerned: Get medical advice/attention. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before reuse.

### 5. Fire-fighting measures

<b>Suitable extinguishing media</b>	Alcohol resistant foam. Water fog. Dry chemical powder. Carbon dioxide (CO2).
<b>Unsuitable extinguishing media</b>	Do not use water jet as an extinguisher, as this will spread the fire.
<b>Specific hazards arising from the chemical</b>	Vapors may form explosive mixtures with air. Vapors may travel considerable distance to a source of ignition and flash back. During fire, gases hazardous to health may be formed.
<b>Special protective equipment and precautions for firefighters</b>	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.
<b>Fire-fighting equipment/instructions</b>	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk.
<b>Specific methods</b>	Use standard firefighting procedures and consider the hazards of other involved materials.
<b>General fire hazards</b>	Flammable liquid and vapor.

## 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

### Methods and materials for containment and cleaning up

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Take precautionary measures against static discharge. Use only non-sparking tools. Keep combustibles (wood, paper, oil, etc.) away from spilled material.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

### Environmental precautions

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Avoid discharge into drains, water courses or onto the ground. Water contaminated with this product may be sent to a sanitary sewer treatment facility, or a permitted waste treatment facility, in accordance with any local agreements.

## 7. Handling and storage

### Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Vapors may form explosive mixtures with air. Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. Do not breathe mist or vapor. Do not get this material in contact with eyes. Do not get this material in contact with skin. Do not taste or swallow. Avoid contact during pregnancy/while nursing. Avoid prolonged exposure. Do not get this material on clothing. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. When using, do not eat, drink or smoke. Wash hands thoroughly after handling. Wash contaminated clothing before reuse.

### Conditions for safe storage, including any incompatibilities

Store locked up. Keep away from heat, sparks and open flame. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Store in original tightly closed container. Store in a cool, dry place out of direct sunlight. Store in a well-ventilated place. Refrigeration recommended. Store away from incompatible materials (see Section 10 of the SDS). Keep in an area equipped with sprinklers. Store in accordance with local/regional/national/international regulation.

## 8. Exposure controls/personal protection

### Occupational exposure limits

#### US. ACGIH Threshold Limit Values

Components	Type	Value
Cyclohexylamine (CAS 108-91-8)	TWA	10 ppm

#### US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Cyclohexylamine (CAS 108-91-8)	TWA	40 mg/m <sup>3</sup>
		10 ppm

### Biological limit values

No biological exposure limits noted for the ingredient(s).

### Appropriate engineering controls

Explosion-proof general and local exhaust ventilation. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

### Individual protection measures, such as personal protective equipment

#### Eye/face protection

Wear safety glasses with side shields (or goggles) and a face shield.



<b>Skin protection</b>	
<b>Hand protection</b>	Chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.
<b>Other</b>	Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.
<b>Respiratory protection</b>	Chemical respirator with organic vapor cartridge and full facepiece. A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
<b>Thermal hazards</b>	Wear appropriate thermal protective clothing, when necessary.
<b>General hygiene considerations</b>	When using, do not eat, drink or smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

### Appearance

<b>Color</b>	Colorless to yellow
<b>Physical state</b>	Liquid
<b>Odor</b>	Amine
<b>Odor threshold</b>	Not available.
<b>pH (concentrated product)</b>	12.9
<b>pH in aqueous solution</b>	12 (5% SOL.)
<b>Melting point/freezing point</b>	25 °F (-4 °C)
<b>Initial boiling point and boiling range</b>	205 °F (96 °C)
<b>Flash point</b>	120 °F (49 °C) P-M(CC)
<b>Evaporation rate</b>	< 1 (Water = 1)
<b>Flammability (solid, gas)</b>	Not available.

### Upper/lower flammability or explosive limits

<b>Flammability limit - lower (%)</b>	Not available.
<b>Flammability limit - upper (%)</b>	Not available.
<b>Explosive limit - lower (%)</b>	Not available.
<b>Explosive limit - upper (%)</b>	Not available.

<b>Vapor pressure</b>	18 mm Hg
<b>Vapor pressure temp.</b>	70 °F (21 °C)
<b>Vapor density</b>	< 1 (Air = 1)
<b>Relative density</b>	0.94
<b>Relative density temperature</b>	70 °F (21 °C)
<b>Solubility(ies)</b>	
<b>Solubility (water)</b>	100 %
<b>Partition coefficient (n-octanol/water)</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Viscosity</b>	11 cps
<b>Viscosity temperature</b>	70 °F (21 °C)
<b>Other information</b>	
<b>Percent volatile</b>	57 (Calculated)
<b>Pour point</b>	30 °F (-1 °C)
<b>Specific gravity</b>	0.94

## 10. Stability and reactivity

<b>Reactivity</b>	The product is stable and non-reactive under normal conditions of use, storage and transport.
<b>Chemical stability</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions</b>	Hazardous polymerization does not occur.
<b>Conditions to avoid</b>	Avoid heat, sparks, open flames and other ignition sources. Avoid temperatures exceeding the flash point. Contact with incompatible materials. None under normal conditions.
<b>Incompatible materials</b>	Aluminum.
<b>Hazardous decomposition products</b>	No hazardous decomposition products are known.

## 11. Toxicological information

### Information on likely routes of exposure

<b>Ingestion</b>	Toxic if swallowed. Causes digestive tract burns.
<b>Inhalation</b>	Prolonged inhalation may be harmful. May cause irritation to the respiratory system.
<b>Skin contact</b>	Toxic in contact with skin. Causes severe skin burns.
<b>Eye contact</b>	Causes serious eye damage.

**Symptoms related to the physical, chemical and toxicological characteristics** Burning pain and severe corrosive skin damage. Coughing. Diarrhea. Dizziness. Nausea, vomiting. Causes serious eye damage. May cause respiratory irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

### Information on toxicological effects

**Acute toxicity** Toxic in contact with skin. Toxic if swallowed. May cause respiratory irritation.

Product	Species	Test Results
STEAMATE NA2060		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	487 mg/kg, (Calculated according to GHS additivity formula)
<i>Oral</i>		
LD50	Rat	274 mg/kg, (Calculated according to GHS additivity formula)
Components	Species	Test Results
Cyclohexylamine (CAS 108-91-8)		
<b>Acute</b>		
<i>Dermal</i>		
LD50	Rabbit	277 mg/kg
<i>Oral</i>		
LD50	Rat	156 mg/kg

\* Estimates for product may be based on additional component data not shown.

<b>Skin corrosion/irritation</b>	Causes severe skin burns and eye damage.
<b>Serious eye damage/eye irritation</b>	Causes serious eye damage.
<b>Respiratory or skin sensitization</b>	
<b>Respiratory sensitization</b>	Not available.
<b>Skin sensitization</b>	This product is not expected to cause skin sensitization.
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Carcinogenicity</b>	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
<b>ACGIH Carcinogens</b>	
Cyclohexylamine (CAS 108-91-8)	A4 Not classifiable as a human carcinogen.
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)</b>	
Not listed.	
<b>Reproductive toxicity</b>	Suspected of damaging fertility or the unborn child.

<b>Specific target organ toxicity - single exposure</b>	May cause respiratory irritation.
<b>Specific target organ toxicity - repeated exposure</b>	Not classified.
<b>Aspiration hazard</b>	Based on available data, the classification criteria are not met.
<b>Chronic effects</b>	Prolonged inhalation may be harmful.

## 12. Ecological information

<b>Ecotoxicity</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
--------------------	--

Product		Species	Test Results
STEAMATE NA2060	LC50	Ceriodaphnia	40 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)
		Fathead Minnow	140 mg/L, Static Acute Bioassay, 96 hour, (pH adjusted)
		Mysid Shrimp	155 mg/L, Static Renewal Bioassay, 48 hour
		Sheepshead Minnow	240 mg/L, Static Renewal Bioassay, 96 hour
	NOEL	Ceriodaphnia	8.7 mg/L, Static Renewal Bioassay, 48 hour, (pH adjusted)
		Fathead Minnow	70 mg/L, Static Acute Bioassay, 96 hour, (pH adjusted)
		Mysid Shrimp	85 mg/L, Static Renewal Bioassay, 48 hour
		Sheepshead Minnow	85 mg/L, Static Renewal Bioassay, 96 hour
Crustacea	LC50	Daphnia magna	30 mg/L, Static Acute Bioassay, 48 hour, (pH adjusted)
	NOEL	Daphnia magna	10 mg/L, Static Acute Bioassay, 48 hour, (pH adjusted)
Other	LC50	Rainbow Trout	3400 mg/L, Static Acute Bioassay, 96 hour, (pH adjusted)
	NOEL	Rainbow Trout	1890 mg/L, Static Acute Bioassay, 96 hour, (pH adjusted)

\* Estimates for product may be based on additional component data not shown.

<b>Bioaccumulative potential</b>	No data available.
----------------------------------	--------------------

### Partition coefficient n-octanol / water (log Kow)

Cyclohexylamine	1.5
-----------------	-----

<b>Mobility in soil</b>	No data available.
-------------------------	--------------------

<b>Other adverse effects</b>	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.
------------------------------	---

<b>Environmental fate</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
---------------------------	--

<b>Persistence and degradability</b>	No data is available on the degradability of this product.
--------------------------------------	--

- COD (mgO2/g)	1699 (calculated data)
- BOD 5 (mgO2/g)	2 (calculated data)
- BOD 28 (mgO2/g)	46 (calculated data)
- Closed Bottle Test (% Degradation in 28 days)	3 (calculated data)
- Zahn-Wellens Test (% Degradation in 28 days)	85 (calculated data)
- TOC (mg C/g)	376 (calculated data)

### 13. Disposal considerations

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Do not incinerate sealed containers. If discarded, this product is considered a RCRA ignitable waste, D001. Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	D001: Waste Flammable material with a flash point <140 F D002: Waste Corrosive material [pH <=2 or >=12.5, or corrosive to steel] The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
<b>Contaminated packaging</b>	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

### 14. Transport information

<b>DOT</b>	
UN number	UN2734
UN proper shipping name	AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S. (CYCLOHEXYLAMINE SOLUTION)
Transport hazard class(es)	
Class	8
Subsidiary risk	3
Packing group	II
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
ERG number	132
Some containers may be DOT exempt, please check BOL for exact container classification.	
<b>IATA</b>	
UN number	UN2734
UN proper shipping name	AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S. (CYCLOHEXYLAMINE SOLUTION)
Transport hazard class(es)	
Class	8
Subsidiary risk	3
Packing group	II
Environmental hazards	No.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
<b>IMDG</b>	
UN number	UN2734
UN proper shipping name	AMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S. (CYCLOHEXYLAMINE SOLUTION)
Transport hazard class(es)	
Class	8
Subsidiary risk	3
Packing group	II
Environmental hazards	
Marine pollutant	No.
EmS	Not available.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

DOT





## 15. Regulatory information

### US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

All components are on the U.S. EPA TSCA Inventory List.

#### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

#### CERCLA Hazardous Substance List (40 CFR 302.4)

Cyclohexylamine (CAS 108-91-8) Listed.

#### SARA 304 Emergency release notification

Cyclohexylamine (CAS 108-91-8) 10000 LBS

#### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

### Superfund Amendments and Reauthorization Act of 1986 (SARA)

#### Hazard categories

Immediate Hazard - Yes

Delayed Hazard - Yes

Fire Hazard - Yes

Pressure Hazard - No

Reactivity Hazard - No

#### SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity	Threshold planning quantity	Threshold planning quantity, lower value	Threshold planning quantity, upper value
Cyclohexylamine	108-91-8	10000	10000 lbs		
Aniline	62-53-3	5000	1000 lbs		

SARA 311/312 Hazardous chemical No

#### SARA 313 (TRI reporting)

Not regulated.

### Other federal regulations

#### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

#### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Cyclohexylamine (CAS 108-91-8)

#### Safe Drinking Water Act (SDWA)

Not regulated.

### Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

### Food and drug administration

ALL ingredients in this product are authorized in 21CFR173.310 for use as boiler water additives where the steam may contact food.



NSF Registered and/or meets  
 USDA (according to 1998  
 guidelines): Registration No. – 146011  
 Category Code(s):  
 G5 Cooling and retort water treatment products  
 G6 Boiler treatment products, steam line products – food contact

US state regulations WARNING: This product contains a chemical known to the State of California to cause cancer.

US - Massachusetts RTK - Substance List  
 Cyclohexylamine (CAS 108-91-8)

US - Pennsylvania RTK - Hazardous Substances  
 Cyclohexylamine (CAS 108-91-8)

US - Rhode Island RTK  
 Cyclohexylamine (CAS 108-91-8)

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)  
 Not listed.

US. New Jersey Worker and Community Right-to-Know Act  
 Cyclohexylamine (CAS 108-91-8) 500 LBS

US. California Proposition 65  
 WARNING: This product contains a chemical known to the State of California to cause cancer.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance  
 Aniline (CAS 62-53-3) Listed: January 1, 1990

US - California Proposition 65 - CRT: Listed date/Developmental toxin  
 No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin  
 No ingredient listed.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin  
 No ingredient listed.

## 16. Other information, including date of preparation or last revision

Issue date Dec-11-2014

Revision date Dec-11-2014

Version # 1.0

List of abbreviations CAS: Chemical Abstract Service Registration Number  
 NFPA: National Fire Protection Association  
 ACGIH: American Conference of Governmental Industrial Hygienists  
 TWA: Time Weighted Average  
 STEL: Short Term Exposure Limit  
 LD50: Lethal Dose, 50%  
 LC50: Lethal Concentration, 50%  
 NOEL: No Observed Effect Level  
 COD: Chemical Oxygen Demand  
 BOD: Biochemical Oxygen Demand  
 TOC: Total Organic Carbon  
 TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.  
 IATA: International Air Transport Association  
 IMDG: International Maritime Dangerous Goods Code  
 TLV: Threshold Limit Value

References: No data available

Disclaimer The information in the sheet was written based on the best knowledge and experience currently available. The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Revision Information Product and Company Identification: Product and Company Identification  
 Physical & Chemical Properties: Multiple Properties  
 Toxicological Information: Toxicological Data  
 Transport Information: Material Transportation Information  
 GHS: Classification

Prepared by This SDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).

\* Trademark of General Electric Company. May be registered in one or more countries.

Material name: STEAMATE\* NA2060

Version number: 1.0

Page: 9 / 9



## SAFETY DATA SHEET

### 1. Identification

**Product identifier** SULFURIC ACID 98%  
**Other means of identification** None.  
**Recommended use** ALL PROPER AND LEGAL PURPOSES  
**Recommended restrictions** None known.  
**Manufacturer/Importer/Supplier/Distributor information**  
**Manufacturer**  
**Company name** Brenntag Mid-South, Inc.  
**Address** 1405 Highway 136, West  
Henderson, KY 42420  
**Telephone** 270-830-1222  
**E-mail** Not available.  
**Emergency phone number** 800-424-9300 CHEMTREC

### 2. Hazard(s) identification

**Physical hazards** Not classified.  
**Health hazards** Acute toxicity, inhalation Category 2  
Skin corrosion/irritation Category 1A  
Serious eye damage/eye irritation Category 1  
**Environmental hazards** Hazardous to the aquatic environment, acute hazard Category 3  
Hazardous to the aquatic environment, long-term hazard Category 3  
**OSHA defined hazards** Not classified.  
**Label elements**



**Signal word** Danger

**Hazard statement** Causes severe skin burns and eye damage. Causes serious eye damage. Fatal if inhaled. Harmful to aquatic life. Harmful to aquatic life with long lasting effects.

#### Precautionary statement

##### Prevention

Do not breathe vapor. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Wear eye protection/face protection. Wear protective gloves/protective clothing/eye protection/face protection. Wear respiratory protection.

##### Response

If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. Specific treatment is urgent (see this label). Wash contaminated clothing before reuse.

##### Storage

Store in a well-ventilated place. Keep container tightly closed. Store locked up.

##### Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

**Hazard(s) not otherwise classified (HNOC)**

None known.

#### Supplemental information

15% of the mixture consists of component(s) of unknown acute inhalation toxicity. 15% of the mixture consists of component(s) of unknown acute hazards to the aquatic environment. 15% of the mixture consists of component(s) of unknown long-term hazards to the aquatic environment.

### 3. Composition/information on ingredients

#### Mixtures

Chemical name	Common name and synonyms	CAS number	%
SULFURIC ACID		7664-93-9	85
Other components below reportable levels			15

\*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

### 4. First-aid measures

Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician or poison control center immediately.
Skin contact	Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.
Ingestion	Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
Most important symptoms/effects, acute and delayed	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

### 5. Fire-fighting measures

Suitable extinguishing media	Powder. Foam. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

### 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not breathe vapors or spray mist. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Prevent product from entering drains. Following product recovery, flush area with water.  Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.  Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground. Inform appropriate managerial or supervisory personnel of all environmental releases.

## 7. Handling and storage

<b>Precautions for safe handling</b>	Do not breathe vapors or spray mist. Do not get in eyes, on skin, or on clothing. Avoid prolonged exposure. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Avoid release to the environment. Observe good industrial hygiene practices.
<b>Conditions for safe storage, including any incompatibilities</b>	Store locked up. Store in original tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

## 8. Exposure controls/personal protection

### Occupational exposure limits

#### US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
SULFURIC ACID (CAS 7664-93-9)	PEL	1 mg/m3

#### US. ACGIH Threshold Limit Values

Components	Type	Value	Form
SULFURIC ACID (CAS 7664-93-9)	TWA	0.2 mg/m3	Thoracic fraction.

#### US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
SULFURIC ACID (CAS 7664-93-9)	TWA	1 mg/m3

<b>Biological limit values</b>	No biological exposure limits noted for the ingredient(s).
<b>Appropriate engineering controls</b>	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.
<b>Individual protection measures, such as personal protective equipment</b>	
<b>Eye/face protection</b>	Chemical respirator with organic vapor cartridge and full facepiece.
<b>Skin protection</b>	
<b>Hand protection</b>	Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.
<b>Other</b>	Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.
<b>Respiratory protection</b>	Chemical respirator with organic vapor cartridge and full facepiece.
<b>Thermal hazards</b>	Wear appropriate thermal protective clothing, when necessary.
<b>General hygiene considerations</b>	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

## 9. Physical and chemical properties

### Appearance

<b>Physical state</b>	Liquid.
<b>Form</b>	Liquid.
<b>Color</b>	CLEAR PALE YELLOW
<b>Odor</b>	ODORLESS
<b>Odor threshold</b>	Not available.
<b>pH</b>	Not available.
<b>Melting point/freezing point</b>	50.56 °F (10.31 °C) estimated
<b>Initial boiling point and boiling range</b>	554 °F (290 °C) estimated
<b>Flash point</b>	Not available.
<b>Evaporation rate</b>	Not available.
<b>Flammability (solid, gas)</b>	Not applicable.

**Upper/lower flammability or explosive limits**

Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	0.00008 hPa estimated
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Density	15.40 lbs/gal
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Specific gravity	1.85

**10. Stability and reactivity**

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

**11. Toxicological information****Information on likely routes of exposure**

Inhalation	Fatal if inhaled.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns.

Symptoms related to the physical, chemical and toxicological characteristics	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.
--	---

**Information on toxicological effects**

Acute toxicity	Fatal if inhaled.
Skin corrosion/irritation	Causes severe skin burns and eye damage.
Serious eye damage/eye irritation	Causes serious eye damage.

**Respiratory or skin sensitization**

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.

Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
------------------------	--

Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
-----------------	---



**OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)**

Not listed.

<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.
<b>Specific target organ toxicity - single exposure</b>	Not classified.
<b>Specific target organ toxicity - repeated exposure</b>	Not classified.
<b>Aspiration hazard</b>	Not an aspiration hazard.
<b>Chronic effects</b>	Prolonged inhalation may be harmful.

**12. Ecological information**

**Ecotoxicity** Harmful to aquatic life with long lasting effects.

Components	Species	Test Results
SULFURIC ACID (CAS 7664-93-9)		
Aquatic		
Fish	LC50 Western mosquitofish ( <i>Gambusia affinis</i> )	42 mg/l, 96 hours

\* Estimates for product may be based on additional component data not shown.

<b>Persistence and degradability</b>	No data is available on the degradability of this product.
<b>Bioaccumulative potential</b>	No data available.
<b>Mobility in soil</b>	No data available.
<b>Other adverse effects</b>	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

**13. Disposal considerations**

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
<b>Contaminated packaging</b>	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

**14. Transport information**

<b>DOT</b>	
<b>UN number</b>	UN1830
<b>UN proper shipping name</b>	SULFURIC ACID
<b>Transport hazard class(es)</b>	
Class	8
Subsidiary risk	-
<b>Packing group</b>	II
<b>Special precautions for user</b>	Read safety instructions, SDS and emergency procedures before handling.
<b>ERG number</b>	137
DOT information on packaging may be different from that listed.	

DOT



## 15. Regulatory information

**US federal regulations** This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

### CERCLA Hazardous Substance List (40 CFR 302.4)

SULFURIC ACID (CAS 7664-93-9) Listed.

### SARA 304 Emergency release notification

SULFURIC ACID (CAS 7664-93-9) 1000 LBS

### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

### Superfund Amendments and Reauthorization Act of 1986 (SARA)

**Hazard categories**  
 Immediate Hazard - Yes  
 Delayed Hazard - No  
 Fire Hazard - No  
 Pressure Hazard - No  
 Reactivity Hazard - No

### SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity	Threshold planning quantity	Threshold planning quantity, lower value	Threshold planning quantity, upper value
---------------	------------	---------------------	-----------------------------	--	--

SULFURIC ACID	7664-93-9	1000	1000 lbs		
---------------	-----------	------	----------	--	--

**SARA 311/312 Hazardous chemical** No

### SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
SULFURIC ACID	7664-93-9	85

### Other federal regulations

#### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

#### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

#### Safe Drinking Water Act (SDWA)

Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

SULFURIC ACID (CAS 7664-93-9) 6552

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

SULFURIC ACID (CAS 7664-93-9) 20 %WV

DEA Exempt Chemical Mixtures Code Number

SULFURIC ACID (CAS 7664-93-9) 6552

### US state regulations

**US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)**

Not listed.

**US. Massachusetts RTK - Substance List**

SULFURIC ACID (CAS 7664-93-9)

Material name: SULFURIC ACID 98%

830584 Version #: 06 Revision date: 09-01-2015 Issue date: 05-09-2015

SDS US  
6 / 7

**US. New Jersey Worker and Community Right-to-Know Act**

SULFURIC ACID (CAS 7664-93-9)

**US. Pennsylvania Worker and Community Right-to-Know Law**

SULFURIC ACID (CAS 7664-93-9)

**US. Rhode Island RTK**

SULFURIC ACID (CAS 7664-93-9)

**US. California Proposition 65**

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

**International Inventories**

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s)

**16. Other information, including date of preparation or last revision**

Issue date 05-09-2015

Revision date 09-01-2015

Version # 06

HMIS® ratings  
Health: 4  
Flammability: 0  
Physical hazard: 0

NFPA ratings  
Health: 4  
Flammability: 0  
Instability: 0

**Disclaimer**  
While the Company believes the information contained herein to be accurate, the Company makes no representation or warranty, express or implied, regarding, and assumes no liability for, the accuracy or completeness of the information. The Buyer assumes all responsibility for handling, using and/or reselling the Product in accordance with applicable federal, state, and local law. This SDS shall not in any way limit or preclude the operation and effect of any of the provisions of the Company's terms and conditions of sale.

# MATERIAL SAFETY DATA SHEET

## SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: 2" Minus Chipped Tire Rubber, Tire Derived Fuel

GENERAL USE: Fuel

PRODUCT DESCRIPTION: Processed tire rubber including wire and fabric



DISTRIBUTOR'S NAME M.A. Associates, Inc.	DATE PREPARED: February 26, 2004 SUPERSEDES: September 2, 2003	Page 1 of 4
ADDRESS (NUMBER, STREET, P.O. BOX) 9225 Indian Creek Pkwy, Suite 200 6710	TELEPHONE NUMBER FOR INFORMATION (913) 663-0100	
(CITY, STATE AND ZIP CODE) Overland, KS 66210	COUNTRY USA	EMERGENCY TELEPHONE NUMBER CHEM • TEL (800) 255-3924 Outside USA (813) 248-0585
MANUFACTURER'S NAME Not specified		
ADDRESS (NUMBER, STREET, P.O. BOX)		TELEPHONE NUMBER FOR INFORMATION
(CITY, STATE AND ZIP CODE)	COUNTRY	EMERGENCY TELEPHONE NUMBER

## SECTION 2 - HAZARDOUS INGREDIENTS

HAZARDOUS COMPONENTS	CAS #	% (by weight)	OSHA PEL		ACGIH TWA		SARA TITLE III	RQ LBS
			PPM	MG/M3	PPM	MG/M3		
Reprocessed ground rubber (rubber tires)	Not specified	100	not established					
Contains or may contain								
Heavy paraffinic distillate solvent extract	64742-04-7	> 1	5	10	5	10		
Carbon black (a)	1333-86-4	> 1		3.5				
Naphthenic oil	Mixture	> 1		5		5		

(a) California Prop 65, Safe Drinking Water and Toxic Enforcement Act of 1986, chemicals known to the state to cause cancer or reproductive toxicity. A person in the course of doing business must warn others who may consume, come into contact with, or otherwise be exposed to this chemical.

## SECTION 3 - HAZARDS IDENTIFICATION

### EMERGENCY OVERVIEW

Processed vulcanized tire rubber, particle size ranges from 10 mesh to 2". Airborne dust particles not a likely hazard, however if dusts are created they may be harmful and irritating to respiratory tract. Contact with eyes may cause irritation. Prolonged contact with skin may cause irritation. Rubber tire manufacturing includes a small amount of heavy paraffinic oil. This oil should not present a hazard under normal conditions, however, contact with any oils produced by high temperature distillation of rubber chips should be avoided. Bulk material will support combustion, dusts are combustible and may present an explosion hazard. Hazard symbols for this product: None. Risk Phrases - Not classified

### POTENTIAL HEALTH EFFECTS

INHALATION: Breathing airborne particles or dust from secondary operations may cause irritation to respiratory tract. Contains substances which are considered nuisance dusts which require a NIOSH approved respirator when airborne particulate exceeds maximum allowable limit.

SKIN: None expected, however, prolonged contact may cause irritation.

EYES: Contact with eyes may cause irritation.

INGESTION: May cause gastric distress, stomach pains, vomiting and diarrhea.

### CARCINOGENICITY

According to the International Agency for Research on Cancer, (IARC) monograph, there is evidence that oils of this type can induce cancer in animals under laboratory conditions. Inhalation of mists arising from products containing these materials may also present a cancer hazard.

NTP?

No

IARC MONOGRAPHS?

Yes

OSHA REGULATED?

No

MATERIAL SAFETY DATA SHEET			
PRODUCT NAME: 2" Minus Chipped Tire Rubber, Tire Derived Fuel February 26, 2004			Page 2 of 4
<b>SECTION 4 - FIRST AID MEASURES</b>			
INHALATION: Remove affected person to fresh air; if symptoms persist seek medical attention.			
SKIN: Wash contacted area with soap and water; if irritation persists, seek medical attention.			
EYES: Remove contact lenses. Flush eyes with clear running water for 15 minutes while holding eyelids open; if irritation persists, seek medical attention.			
INGESTION: Give two glasses of water for dilution; DO NOT induce vomiting; never give anything by mouth to an unconscious person; seek medical attention.			
<b>SECTION 5 - FIRE FIGHTING MEASURES</b>			
FLASH POINT (METHOD USED) 550 - 650° F (288 - 343° C) COC		FLAMMABLE LIMITS LEL: Not applicable AUTOIGNITION TEMPERATURE: Not determined	UEL: Not applicable NFPA CLASS: IIIB
GENERAL HAZARDS: Product will support combustion. Products of combustion include compounds of carbon, hydrogen, oxygen and sulfur oxides, including carbon monoxide. Airborne accumulation of dust may present explosion hazard.			
EXTINGUISHING MEDIA Preferred method is suffocation of fire with dirt. Carbon dioxide, water fog, dry chemical, chemical foam may be used. Water and water fog may be used to cool fire, however water should be used sparingly to prevent oil "run-off".			
FIRE FIGHTING PROCEDURES Firefighters must wear full facepiece self - contained breathing apparatus in positive pressure mode. Solid stream of water may scatter and spread fire. Fine water spray can be used to keep fire cool.			
UNUSUAL FIRE AND EXPLOSION HAZARDS This product will ignite when exposed to heat or flame. Rubber burns with intense heat and produces dense smoke. Incomplete combustion produces oils and dense soot (carbon black)			
HAZARDOUS COMBUSTION PRODUCTS Smoke, fumes, oxides of carbon and oxides of sulfur.			
<b>SECTION 6 - ACCIDENTAL RELEASE MEASURES</b>			
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Avoid breathing dust. Recover and segregate product for reuse; shovel product into approved container for disposal.			
<b>SECTION 7 - HANDLING AND STORAGE</b>			
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Store bulk product in dry area. Keep this and other chemicals out of reach of children.			
<b>SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION</b>			
ENGINEERING CONTROLS The use of local exhaust ventilation and airborne particle collection is recommended. No other special controls are indicated.			
PERSONAL PROTECTION:			
RESPIRATORY PROTECTION (SPECIFY TYPE): NIOSH approved respirator designed to remove airborne particulate present in excess of maximum allowable concentrations due to secondary operations such as mixing, spraying, sanding, buffing, etc. Refer to 29 CFR 1910.134 or European Standard EN 149 for regulations.			
PROTECTIVE GLOVES: Neoprene or nitrile rubber gloves.			
EYE PROTECTION: Protective eyeglasses Refer to 29 CFR 1910.133 or European Standard EN166.			
OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Safety eyewash station nearby.			
WORK / HYGIENIC PRACTICES: Practice safe workplace habits. Minimize body contact with this, as well as all chemicals in general.			



MATERIAL SAFETY DATA SHEET				
PRODUCT NAME: 2" Minus Chipped Tire Rubber, Tire Derived Fuel February 26, 2004				Page 3 of 4
SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES				
VAPOR PRESSURE (MM Hg) Not determined		VAPOR DENSITY (AIR = 1) Not applicable		
SPECIFIC GRAVITY (WATER = 1) 1.14 - 1.24		EVAPORATION RATE (WATER = 1) Not applicable		
SOLUBILITY IN WATER Negligible		FREEZING POINT Not applicable		
pH Not applicable		APPEARANCE AND ODOR Processed tire rubber, wire, fabric, mild rubber tire odor		
BOILING POINT Not applicable		PHYSICAL STATE Solid (particles ranging from 10 mesh to 2" chunks)		
VISCOSITY Solid		VOLATILE ORGANIC COMPOUNDS (Total VOC's) None		
SECTION 10 - STABILITY AND REACTIVITY				
STABILITY UNSTABLE: STABLE: XXX		CONDITIONS TO AVOID: Avoid generating airborne dust.		
INCOMPATIBILITY (MATERIALS TO AVOID): Strong acids, strong oxidizers like peroxides may react with this product and create spontaneous combustion.				
HAZARDOUS DECOMPOSITION OR BYPRODUCTS: Decomposition will not occur if handled and stored properly. In case of a fire, oxides of carbon, hydrocarbons and sulfur, fumes, and smoke may be produced.				
HAZARDOUS POLYMERIZATION MAY OCCUR: WILL NOT OCCUR: XXX		CONDITIONS TO AVOID: None		
SECTION 11 - TOXICOLOGICAL INFORMATION				
Hazardous Ingredients	CAS #	EINECS #	LD50 of Ingredient (Specify Species and Route)	LC50 of Ingredient (Specify Species)
Reprocessed ground rubber (rubber tires)	Not specified	Not specified	Not established	Not established
Contains or may contain				
Heavy paraffinic distillate solvent extract	64742-04-7	265-103-7	Not established	Not established
Carbon black (a)	1333-86-4	215-609-9	440 mg / kg Intravenous - mouse	Not established
Naphthenic oil	Mixture	Not specified	Not established	Not established
SECTION 12 - ECOLOGICAL INFORMATION				
No data are available on the adverse effects of this material on the environment. Neither COD nor BOD data are available. Based on the chemical composition of this product it is assumed that the mixture can be treated in an acclimatized biological waste treatment plant system in limited quantities. However, such treatment should be evaluated and approved for each specific biological system. None of the ingredients in this mixture are classified as a Marine Pollutant.				
SECTION 13 - DISPOSAL CONSIDERATIONS				
WASTE DISPOSAL METHOD: Dispose of in accordance with Local, State, and Federal Regulations. Product is classified as non-hazardous, however, non-hazardous materials may become hazardous waste upon contact with other products. Refer to "40 CFR Protection of Environment Parts 260 - 299" for complete waste disposal regulations. Consult your local, state, or Federal Environmental Protection Agency before disposing of any chemicals.				
SECTION 14 - TRANSPORT INFORMATION				
PROPER SHIPPING NAME: Not Regulated				
DOT HAZARD CLASS / Pack Group: Not regulated		IATA HAZARD CLASS / Pack Group: Not regulated		
REFERENCE: Not Applicable		IMDG HAZARD CLASS: Not regulated		
UN / NA IDENTIFICATION NUMBER: None		RID/ADR Dangerous Goods Code: Not regulated		
LABEL: None Required		UN TDG Class / Pack Group: Not regulated		
HAZARD SYMBOLS: None				
Note: Transportation information provided is for reference only. Client is urged to consult CFR 49 parts 100 - 177, IMDG, IATA, EC, United Nations TDG, and WHMIS (Canada) TDG information manuals for detailed regulations and exceptions covering specific container sizes, packaging materials and methods of shipping.				

MATERIAL SAFETY DATA SHEET					
PRODUCT NAME: 2" Minus Chipped Tire Rubber, Tire Derived Fuel February 26, 2004			Page 4 of 4		
SECTION 15 - REGULATORY INFORMATION					
<p><b>TSCA (Toxic Substance Control Act)</b>            All components of this product are listed on the U.S. Toxic Substances Control Act Chemical Inventory (TSCA Inventory) or are exempted from listing because a Low Volume Exemption has been granted in accordance with 40 CFR 723.50.</p> <p><b>SARA TITLE III (Superfund Amendments and Reauthorization Act)</b>            311/312 Hazard Categories            None</p> <p>313 Reportable Ingredients:            None</p> <p><b>CERCLA (Comprehensive Response Compensation and Liability Act)</b>            None</p> <p><b>CPR (Canadian Controlled Products Regulations)</b>            This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.</p> <p><b>IDL (Canadian Ingredient Disclosure List)</b>            Components of this product identified by CAS number and listed on the Canadian Ingredient Disclosure List are shown in Section 2.</p> <p><b>DSL / NDSL (Canadian Domestic Substances List / Non-Domestic Substances List)</b>            Components of this product identified by CAS number are listed on the DSL or NDSL and may or may not be listed in Section 2 of this document. Only ingredients classified as "hazardous" are listed in Section 2 unless otherwise indicated.</p> <p><b>EINECS (European Inventory of Existing Commercial Chemical Substances)</b>            Components of this product identified by CAS numbers are on the European Inventory of Existing Commercial Chemical Substances.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <b>EC Risk Phrases</b>            Not classified         </td> <td style="width: 50%; vertical-align: top;"> <b>EC Safety Phrases</b>            S22 Do not breathe dust.            S24 Avoid contact with skin.         </td> </tr> </table>				<b>EC Risk Phrases</b> Not classified	<b>EC Safety Phrases</b> S22 Do not breathe dust. S24 Avoid contact with skin.
<b>EC Risk Phrases</b> Not classified	<b>EC Safety Phrases</b> S22 Do not breathe dust. S24 Avoid contact with skin.				
SECTION 16 - OTHER INFORMATION					
Specific toxicity tests have not been conducted on this product. Our hazard evaluation is based on Information from similar products, the ingredients, technical literature, and/or professional experience.					
<b>HMIS HAZARD RATINGS</b>	HEALTH FLAMMABILITY REACTIVITY	1 1 0	0 = INSIGNIFICANT 1 = SLIGHT 2 = MODERATE		
<b>PERSONAL PROTECTIVE EQUIPMENT</b>		B	Safety Glasses, Gloves		
<p><b>REVISION SUMMARY:</b>            This MSDS has been revised in the following sections:</p>					
Complete format revision					
<p style="text-align: center;">MSDS Prepared by: Chem-Tel, Inc.            1305 N. Florida Ave.            Tampa, Florida USA 33602            (800) 255-3924 Outside USA (813) 248-0573</p>					
<p>The information contained herein is believed to be accurate but is not warranted to be so. Data and calculations are based on information furnished by the manufacturer of the product and manufacturers of the components of the product. Users are advised to confirm in advance of need that information is current, applicable and suited to the circumstances of use. Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Furthermore, vendor assumes no responsibility for injury caused by abnormal use of this material even if reasonable safety procedures are followed. Any questions regarding this product should be directed to the manufacturer of the product as described in Section 1.</p>					



# Fisher Scientific

Part of Thermo Fisher Scientific

## SAFETY DATA SHEET

Creation Date 22-Nov-2010

Revision Date 31-Oct-2016

Revision Number 3

### 1. Identification

**Product Name** Triton X-100™

**Cat No. :** BP151-1; BP151-4; BP151-100; BP151-500

**Synonyms** Polyethylene Glycol p-tert-Octylphenyl Ether (Electrophoresis)

**Recommended Use** Laboratory chemicals.

**Uses advised against** No Information available

**Details of the supplier of the safety data sheet**

**Company**

Fisher Scientific  
One Reagent Lane  
Fair Lawn, NJ 07410  
Tel: (201) 796-7100

**Emergency Telephone Number**

CHEMTREC®, Inside the USA: 800-424-9300  
CHEMTREC®, Outside the USA: 001-703-527-3887

### 2. Hazard(s) Identification

**Classification**

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 4
Serious Eye Damage/Eye Irritation	Category 1

**Label Elements**

**Signal Word**

Danger

**Hazard Statements**

Harmful if swallowed  
Causes serious eye damage



**Precautionary Statements**

**Prevention**

Wash face, hands and any exposed skin thoroughly after handling

Do not eat, drink or smoke when using this product  
Wear protective gloves/protective clothing/eye protection/face protection

**Eyes**

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
Immediately call a POISON CENTER or doctor/physician

**Ingestion**

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell

Rinse mouth

**Disposal**

Dispose of contents/container to an approved waste disposal plant

**Hazards not otherwise classified (HNOC)**

Harmful to aquatic life with long lasting effects

### 3. Composition / information on ingredients

Component	CAS-No	Weight %
Poly(oxy-1,2-ethanediyl), alpha.-[4-(1,1,3,3-tetramethylbutyl)phenyl]-.omega. -hydroxy-	9002-93-1	>95

### 4. First-aid measures

<b>Eye Contact</b>	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.
<b>Skin Contact</b>	Wash off immediately with plenty of water for at least 15 minutes. Get medical attention if symptoms occur.
<b>Inhalation</b>	Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Obtain medical attention.
<b>Ingestion</b>	Do not induce vomiting. Call a physician or Poison Control Center immediately.
<b>Most important symptoms/effects Notes to Physician</b>	Causes severe eye damage. Treat symptomatically

### 5. Fire-fighting measures

<b>Suitable Extinguishing Media</b>	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
<b>Unsuitable Extinguishing Media</b>	No information available
<b>Flash Point</b>	274 °C / 525.2 °F
<b>Method -</b>	No information available
<b>Autoignition Temperature</b>	No information available
<b>Explosion Limits</b>	
<b>Upper</b>	No data available
<b>Lower</b>	No data available
<b>Sensitivity to Mechanical Impact</b>	No information available
<b>Sensitivity to Static Discharge</b>	No information available

**Specific Hazards Arising from the Chemical**

Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition.

**Hazardous Combustion Products**Carbon monoxide (CO) Carbon dioxide (CO<sub>2</sub>) Formaldehyde peroxides**Protective Equipment and Precautions for Firefighters**

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

**NFPA**Health  
2Flammability  
1Instability  
1Physical hazards  
N/A**6. Accidental release measures****Personal Precautions**

Use personal protective equipment. Ensure adequate ventilation. Avoid contact with skin, eyes and clothing.

**Environmental Precautions**

Should not be released into the environment. See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

**Methods for Containment and Clean Up** Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.**7. Handling and storage****Handling**

Wear personal protective equipment. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Do not breathe vapors or spray mist. Do not ingest.

**Storage**

Keep containers tightly closed in a dry, cool and well-ventilated place.

**8. Exposure controls / personal protection****Exposure Guidelines**

This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

**Engineering Measures**

Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

**Personal Protective Equipment****Eye/face Protection**

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin and body protection**

Wear appropriate protective gloves and clothing to prevent skin exposure.

**Respiratory Protection**

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

**Hygiene Measures**

Handle in accordance with good industrial hygiene and safety practice.

**9. Physical and chemical properties****Physical State**

Liquid

**Appearance**

Clear

**Odor**

Characteristic

**Odor Threshold**

No information available

**pH**

6-8 5% aq.sol

**Melting Point/Range**

6 °C / 42.8 °F

**Boiling Point/Range**

270 °C / 518 °F @ 760 mmHg

**Flash Point**

274 °C / 525.2 °F

**Evaporation Rate**

No information available



Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Specific Gravity	1.067
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C34 H62 O11
Molecular Weight	646.85

## 10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products. Excess heat. Exposure to air. Exposure to light. Exposure to moisture.
Incompatible Materials	Strong oxidizing agents, Strong acids, Strong reducing agents
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO <sub>2</sub> ), Formaldehyde, peroxides
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

## 11. Toxicological information

### Acute Toxicity

#### Product Information

##### Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Poly(oxy-1,2-ethanediyl), .alpha.-[4-(1,1,3,3-tetramethylbutyl) phenyl]-.omega.-hydroxy-	LD50 = 1800 mg/kg ( Rat )	Not listed	Not listed

**Toxicologically Synergistic Products** No information available

#### Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation	Severe eye irritant
Sensitization	No information available
Carcinogenicity	The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Poly(oxy-1,2-ethanediyl), .alpha.-[4-(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy-	9002-93-1	Not listed	Not listed	Not listed	Not listed	Not listed

**Mutagenic Effects** No information available

**Reproductive Effects** No information available.

Developmental Effects	No information available.
Teratogenicity	No information available.
STOT - single exposure	None known
STOT - repeated exposure	None known
Aspiration hazard	No information available
Symptoms / effects, both acute and delayed	No information available
Endocrine Disruptor Information	

Component	EU - Endocrine Disruptors Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Poly(oxy-1,2-ethanediyl), .alpha.-[4-(1,1,3,3-tetramethylbutyl)phenyl]- .omega.-hydroxy-	Group III Chemical	-	-

**Other Adverse Effects** The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

## 12. Ecological information

### Ecotoxicity

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Poly(oxy-1,2-ethanediyl), .alpha.-[4-(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy-	-	LC50 = 8.9 mg/L 96H LC50 = 4.0 mg/l 96H (Pimephales promelus)	-	EC50 = 26 mg/L 48h

**Persistence and Degradability** Soluble in water Persistence is unlikely based on information available.  
**Bioaccumulation/ Accumulation** No information available.

**Mobility** Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Poly(oxy-1,2-ethanediyl), .alpha.-[4-(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy-	2.7

## 13. Disposal considerations

**Waste Disposal Methods** Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

## 14. Transport information

DOT	Not regulated
TDG	Not regulated
IATA	Not regulated
IMDG/IMO	Not regulated

## 15. Regulatory information

### International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Poly(oxy-1,2-ethanediyl), .alpha.-[4-(1,1,3,3-tetramethylbutyl)phenyl]-.omega.-hydroxy-	X	X	-	-	-		X	-	X	X	X

**Legend:**

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

**U.S. Federal Regulations**

TSCA 12(b) Not applicable

SARA 313 Not applicable

**SARA 311/312 Hazard Categories**

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration  
Not applicable**CERCLA**

Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations Not applicable

**U.S. Department of Transportation**

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

**U.S. Department of Homeland Security**

This product does not contain any DHS chemicals.

**Other International Regulations**

Mexico - Grade No information available

**Canada**

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class	D1B Toxic materials
	D2B Toxic materials

E Corrosive material

**16. Other information**

Prepared By Regulatory Affairs  
Thermo Fisher Scientific  
Email: EMSDS.RA@thermofisher.com

Creation Date 22-Nov-2010

Revision Date 31-Oct-2016

Print Date 31-Oct-2016

Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

**Disclaimer**

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

**End of SDS**



# Safety Data Sheet

Lyden Oil Company

Page 1 of 10

## Green Antifreeze

SDS Number: 901221

### 1 PRODUCT AND COMPANY INFORMATION

Product Name: Green Antifreeze  
Revision Date: 01/22/2016  
SDS Number: 901221  
Common Name: Ethylene glycol solution  
CAS Number: Blend  
Product Code: 901221  
Synonyms: Automotive coolant

#### Company Identification:

*Manufactured for:*  
LYDEN OIL COMPANY  
3711 LeHarps Drive  
Youngstown, OH 44515

For Product Information: 1-330-792-1100  
For Emergencies: 1-800-424-9300  
CHEMTREC: 1-800-424-9300 or 1-703-527-3887

### 2 HAZARDS IDENTIFICATION



Signal Word:

**WARNING**

Hazard Classes/Categories:

Acute toxicity, Oral category 4.  
Specific target organ toxicity – repeated exposure, Category 2.





## Safety Data Sheet

Lyden Oil Company

Page 2 of 10

### Green Antifreeze

SDS Number: 901221

#### Hazard Statement(s):

H302: Harmful if swallowed.

H373: May cause damage to organs (kidneys) through prolonged or repeated exposure.

#### Precaution Statement(s):

P101: If medical advice is needed, have product container or label at hand.

P102: Keep out of reach of children.

P103: Read label before use.

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fumes/gas/mist/vapors/spray.

P264: Wash skin thoroughly after handling.

P270: Do not eat, drink or smoke when using this product.

P280: Wear protective gloves/protective clothing/eye protection/face protection.

P301+310: IF SWALLOWED: Immediately call a POISON CENTER/doctor.

P301+330+331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P304+340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308+313: IF exposed: Call a POISON CENTER or doctor/physician.

P405: Store locked up.

P501: Dispose of contents/container in accordance with local/regional/national/international regulation.

#### Other Hazard Statement(s):

-NFPA Ratings:

Health = 1

Fire = 1

Reactivity = 0

**3** COMPOSITION / INFORMATION ON INGREDIENTSIngredients:

*Mixture of the substances listed below with nonhazardous additions.*

Chemical Name	CAS Number	Percentage
Ethylene Glycol	107-21-1	90-97
Diethylene Glycol	111-46-6	<5
Water	7732-18-5	<4
Denatonium Benzoate	3734-33-6	30-50 ppm

*\*Any concentration shown as a range is to protect confidentiality or is due to batch variation.*

**4** FIRST AID MEASURESDescription of First Aid Measures:

## Inhalation:

Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.  
In case of unconsciousness place patient stably in side position for transportation.

## Skin Contact:

Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation continues, consult a doctor. Wash clothing before reuse.

## Eye Contact:

Rinse cautiously with water. Remove contact lenses, if present and easy to do. Get medical attention if eye irritation develops or persists.

## Ingestion:

DO NOT induce vomiting, seek medical attention immediately. Do not give anything by mouth to an unconscious person. To prevent aspiration of swallowed product, lay victim on side with head lower than waist. Vomiting may occur spontaneously. If vomiting occurs and the victim is conscious, give water to victim to further dilute the chemical.

**Green Antifreeze**

SDS Number: 901221

Symptoms and Effects, both acute and delayed:

Causes damage to organs (kidneys) Oral.  
Causes skin irritation.  
Causes serious eye damage.  
Swallowing a small quantity of this material will result in serious health hazard. The lethal dose in humans is estimated to be 100 mL (3 oz).

Recommended Actions:

Treat symptomatically. Call a doctor or poison control center for guidance.

**5 FIRE FIGHTING MEASURES**Recommended Fire-Extinguishing Equipment:

Water, water fog, water spray, alcohol foam, dry chemical or carbon dioxide.

Possible Hazards During a Fire:

Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds.

Recommendations to Firefighters:

Wear full protective firegear including self-containing breathing apparatus operated in the positive pressure mode with full facepiece, coat, pants, gloves and boots. Do not use a water jet.

**6 ACCIDENTAL RELEASE MEASURES**Personal Precautions:

Avoid eye contact. Avoid repeated or prolonged skin contact.  
Personal protective equipment must be worn.

**Green Antifreeze**

SDS Number: 901221

Avoid contact with skin, eyes or clothing. Keep unprotected persons away.

Emergency Procedures:

Contain spilled material, collect in suitable and properly labeled containers.

Environmental Precautions:

Do not allow product to reach sewage system or any water course.  
Inform respective authorities in case of seepage into water course or sewage system. Remove ignition sources. Use special care to avoid static electric charges. No naked lights. No smoking.

Cleanup Procedures:

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).  
Ensure adequate ventilation.

**7****HANDLING AND STORAGE**Handling Precautions:

Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor.  
Do not eat, drink or smoke when using this product.  
Wash affected areas thoroughly after handling.

Storage Requirements:

Keep only in the original container in a cool, well ventilated place away from : Heat sources. Keep container closed when not in use. Product may become solid at temperatures below -18 °C (0 °F).  
Do not cut, drill, weld, use a blowtorch on, etc. containers even when empty. Do not store near food, foodstuffs, drugs or potable water supplies.



**Green Antifreeze**

SDS Number: 901221

**8 EXPOSURE CONTROLS / PERSONAL PROTECTION**Exposure Limits:

-107-21-1 Ethylene Glycol (90-97%):

ACGIH TWA – 10 mg/m<sup>3</sup>Engineering Controls:

All ventilation should be designed in accordance with OSHA standard (29 CFR 1910.94). Have an eye wash station near by.

Personal Protective Equipment:

- General protective and hygienic measures:  
Keep away from foodstuffs, beverages and feed.  
Immediately remove all soiled and contaminated clothing.  
Store protective clothing separately.  
Avoid contact with the eyes and skin. Wear gloves and goggles.

- Breathing equipment:  
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.

**9 PHYSICAL AND CHEMICAL PROPERTIES**

Color:	Green
Physical State:	Liquid
Odor:	Mild
Odor Threshold:	Data not available
pH:	10.5-11 (50% solution in water)
Melting Point:	-18°C / 0°F
Boiling Point:	154°C / 317°F
Boiling Range:	Data not available
Flash Point:	116°C / 241°F
Evaporation Rate:	Data not available
Flammability:	Data not available





## Safety Data Sheet

Lyden Oil Company

Page 7 of 10

### Green Antifreeze

SDS Number: 901221

Flammability Limits:	Data not available
Vapor Pressure:	<0.1 mmHg at 20° C
Vapor Density:	Data not available
Relative Density:	1.12
Solubilities:	Soluble in water
Partition Coefficient:	Data not available
Auto-Ignition Temperature:	Data not available
Decomposition Temperature:	Data not available
Viscosity:	Data not available

#### 10 STABILITY AND REACTIVITY

Stability:

Stable under normal conditions.

Reactivity:

Not reactive under normal conditions.

Conditions to Avoid:

Extreme temperature, sparks, open flame, and direct sunlight.

Hazardous Reactions:

No known hazardous reactions.

Incompatible Materials:

Strong oxidizers, acids, and bases.

Decomposition Products:

Oxides of carbon.

#### 11 TOXICOLOGICAL INFORMATION

Routes of Exposure:

Inhalation, skin and eye contact are the primary routes of exposure although exposure may occur following accidental ingestion.



## Safety Data Sheet

Lyden Oil Company

Page 8 of 10

### Green Antifreeze

SDS Number: 901221

#### Exposure Effects:

Harmful in swallowed.  
Causes skin irritation.  
Causes serious eye damage.  
Swallowing a small quantity of this material will result in serious health hazard. The lethal dose in humans is estimated to be 100 mL (3 oz).

#### Measures of Toxicity:

-ethylene glycol (107-21-1):  
LD50 oral rat: > 5,000.00 mg/kg (Rat; Literature study)  
ATE US (oral): 500.00 mg/kg bodyweight  
-diethylene glycol (111-46-6):  
LD50 dermal rabbit: ATE US (oral) 500.00 mg/kg bodyweight  
ATE US (dermal) 11,890.00 mg/kg bodyweight  
-denatonium benzoate (3734-33-6):  
LD50 oral rat: 584.00 mg/kg (Rat; Literature study)  
LD50 dermal rabbit: > 2,000.00 mg/kg (Rabbit; Literature study)  
ATE US (oral) 584.00 mg/kg bodyweight

#### Carcinogenic/Mutagenic Precautions:

Non-carcinogenic and not expected to be mutagenic.

## 12 ECOLOGICAL INFORMATION

#### Ecological Precautions:

Avoid exposing to the environment.

#### Ecological Effects:

No specific environmental or aquatic data available.



## Safety Data Sheet

Lyden Oil Company

Page 9 of 10

### Green Antifreeze

SDS Number: 901221

#### 13 DISPOSAL CONSIDERATIONS

Disposal Methods:

Dispose of waste material in accordance with all local, state, and federal requirements.

Disposal Containers:

Use properly approved container for disposal.

Special Precautions:

Do not flush to surface waters or drains.

#### 14 TRANSPORT INFORMATION

UN Number:

UN3082

UN Shipping Name:

Environmentally hazardous substances, liquid, n.o.s.

Transport Hazard Class:

9

Packing Group:

III

Environmental Hazards:

Data not available

Bulk Transport Guidance:

Data not available

Special Precautions:

Non Bulk: Not regulated by the US D.O.T. (in quantities under 5,000 lbs in any one inner package).

#### 15 REGULATORY INFORMATION

This material and all of its components are listed on the Inventory of Existing Chemical Substances under the Toxic Substances Control Act.



## Safety Data Sheet

Lyden Oil Company

Page 10 of 10

### Green Antifreeze

SDS Number: 901221

16	OTHER INFORMATION
----	-------------------

Last Revision Date: 01/22/2016

*The information contained in this Safety Data Sheet (SDS) relates only to the specific material designated. LYDEN OIL COMPANY assumes no legal responsibility of the use or reliance upon this data. This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of the LYDEN OIL COMPANY.*

Attachment G  
Spurlock Station  
Stormwater Control Measures

Outfall Number	Treatment	Table F-1 Code
006	Stormwater from the substation area drains through ditches that have check dams to slow the flow and allow solids to settle out.	None
008	Stormwater from the landfill and portions of the ash haul road drains to a sediment pond to allow for solids settling prior to overflowing to Lawrence Creek at Outfall 008. Surface water run-off and erosion of CCR materials or soil from construction and landfill operations is controlled by utilizing surface water run-on and run-off control structures (ditches, surface water diversion berms, etc.) along with silt fences, rock silt checks, revegetation (seed/mulch) and sediment control ponds. This combination of BMP structures has shown to be an effective method at similar facilities to reduce or eliminate sediment and other potential contaminants from reaching a receiving stream.	1-U, 4-A
011	Stormwater that comes from the area of the landfill and portions of the haul road drains to a separate sediment pond that settles solids before discharging through Outfall 011 to Lawrence Creek. Surface water run-off and erosion of CCR materials or soil from construction and landfill operations is controlled by utilizing surface water run-on and run-off control structures (ditches, surface water diversion berms, etc.) along with silt fences, rock silt checks, revegetation (seed/mulch) and sediment control ponds. This combination of BMP structures has shown to be an effective method at similar facilities to reduce or eliminate sediment and other potential contaminants from reaching a receiving stream.	1-U, 4-A





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4  
ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

JUL 24 2017

Mr. Charles Snavelly  
Secretary  
Energy and Environment Cabinet  
12<sup>th</sup> Floor, Capital Plaza Tower  
500 Mero Street  
Frankfort, Kentucky 40601

Dear Mr. Snavelly:

In a letter to you dated September 16, 2016, the United States Environmental Protection Agency approved various revised water quality standards that had been established by the Commonwealth of Kentucky through amendments to the Kentucky Water Quality Regulations at Chapter 401 KAR 10:026, 10:029, 10:030 and 10:031. In its letter and supporting documentation, the EPA noted that it was taking 'No Action' on the removal of the acute criterion for selenium as this action was subject to consultation with the U.S. Fish and Wildlife Service (FWS) under the Endangered Species Act and that the Agency would notify the Commonwealth of the results of that consultation.

On June 6, 2017, the EPA submitted a biological evaluation to the FWS regarding Kentucky's removal of the acute criterion for selenium. On July 5, 2017, the FWS concurred with the EPA's "may affect, but not likely to adversely affect" determination (copy enclosed). The EPA's consultation with the FWS did not identify any deficiencies with the removal of the acute selenium criterion. Therefore, pursuant to Section 303(c) of the Clean Water Act (CWA), I am approving the removal of the acute selenium criterion.

As part of the EPA's original analysis, the EPA raised a series of questions to Kentucky regarding implementation of the selenium criteria without an acute value. Specifically, the EPA was concerned with permit limit derivation, permit compliance, and monitoring and assessment activities. The Commonwealth addressed all of these issues and the EPA will continue to monitor implementation of the overall selenium criteria to assure that all activities are consistent with the CWA.

Should you have any questions, please contact me at (404) 562-9469 or have a member of your staff contact Mr. Joel Hansel at (404) 562-9274.

Sincerely,

A handwritten signature in black ink, appearing to read "MSW", is written over a horizontal line.

Mary S. Walker  
Director  
Water Protection Division



## United States Department of the Interior

### FISH AND WILDLIFE SERVICE

Kentucky Ecological Services Field Office  
330 West Broadway, Suite 265  
Frankfort, Kentucky 40601  
(502) 695-0468

July 5, 2017

Ms. Joanne Benante  
Chief, Water Quality Planning Branch  
U. S. Environmental Protection Agency  
61 Forsyth Street  
Atlanta, Georgia 30303-8960

Subject: FWS #2017-B-0412, Consultation for the Environmental Protection Agency's  
Approval of the Deletion of Kentucky's Acute Water Quality Criterion for  
Selenium, Kentucky

Dear Ms. Benante:

The U. S. Fish and Wildlife Service, Kentucky Field Office (Service) has reviewed the Biological Evaluation of Revisions to Kentucky's Water Quality Criterion for Selenium (BE), received June 6, 2017. The submitted BE evaluated the direct, indirect and cumulative effects of the proposed action on federally listed species and their critical habitat within the Commonwealth of Kentucky.

On February 5, 2016, the Service concurred with the U. S. Environmental Protection Agency (EPA) not likely to adversely affect determinations for their approval of Kentucky's revised water quality criterion for selenium as described below:

1. Adoption of a whole body fish tissue criterion (8.6 µg/g dry weight) for selenium.
2. The potential approval of a criterion structure where fish tissue criterion elements has primacy over water column criterion elements (5.0 µg/L).

The Federal action subject of this BE is the EPA's approval of Kentucky's revised water quality criterion for selenium as described below:

3. The deletion of the 20 µg/L acute water quality criterion for selenium.

The effects of this federal action on federally listed species will occur indirectly through the implementation of Clean Water Act programs implemented by the Commonwealth of Kentucky (e.g. Kentucky Pollutant Discharge Elimination Systems program, Water Quality Certification Program, etc.) and are not anticipated to exceed those already evaluated under the previous consultation (FWS #2015-B-0574) on Kentucky's revised water quality criterion for selenium.

**No Effect Determinations:**

The EPA has concluded that the federal action covered by the BE will not affect the following species and designated critical habitat:

**Mammals**

*Critical Habitat:*

Indiana bat - Bat Cave, Carter County and Coach Cave, Edmonson County

**Plants**

*Species*

Price's potato-bean (*Apios priceana*), Braun's rockcress (*Arabis perstellata*), Cumberland sandwort (*Arenaria cumberlandensis*), Cumberland rosemary (*Conradina verticillata*), Kentucky glade cress (*Leavenworthia exigua* var. *laciniata*), Short's bladderpod (*Physaria globose*), American chaffseed (*Schwalbea americana*), Virginia spiraea (*Spiraea virginiana*), White-haired goldenrod (*Solidago albopilosa*), Short's goldenrod (*Solidago shortii*), Running buffalo clover (*Trifolium stoloniferum*)

*Critical Habitat*

Braun's rockcress – 14 units in Franklin County and 3 in Owen County

Kentucky glade cress – 6 units (18 subunits) in Bullitt and Jefferson Counties

Short's bladderpod – 6 units in Clark, Fayette, and Woodford Counties

**Mussel**

*Species*

Slabside pearlymussel (*Pleuronaia dolabelloides*)

The Service has no concerns with the exclusion of these species and critical habitats from the BE's analysis of effects.

**Not Likely to Adversely Affect Determinations:**

Based on the BE, the Service's prior concurrence with the approval of the whole body fish tissue chronic criterion, and available scientific literature, the Service concurs with the determination that the proposed federal action may affect but is not likely to adversely affect the following species and critical habitats:

**Mammals**

*Species*

Indiana bat (*Myotis sodalis*), Gray bat (*Myotis grisescens*), Northern long-eared bat (*Myotis septentrionalis*), Virginia big-eared bat (*Corynorhinus townsendii virginianus*)

*Summary of Effects*

All four listed bat species are insectivorous and could be exposed to a bioaccumulation of selenium through consumption of contaminated aquatic insects or from drinking water contaminated with selenium. However, none of these species are dependent upon aquatic

species, as terrestrial insects are also part of their diets. Additionally, mammal species have been found to be less sensitive to selenium than fish or birds; therefore deletion of the acute water column criterion and reliance on the whole body fish tissue chronic criterion is protective of these species groups (fish and birds) are considered protective of mammals.

## **Birds**

### *Species*

Least tern (*Sterna antillarum*)

### *Summary of Effects*

The least tern is a summer resident of Kentucky, nesting along the Mississippi River and the lower Ohio River. A piscivore, the least tern eats small fish it catches from the river. There is potential for bioaccumulation of selenium from the consumption of contaminated fish, however, there is no available scientific literature that indicates consumption of fish with the selenium levels allowed by the revised water quality criterion would result in negative impacts to this species.

## **Fishes**

### *Species*

Relict darter (*Etheostoma chienense*), Duskytail darter (*Etheostoma percnurum*), Kentucky arrow darter (*Etheostoma spilotum*), Cumberland darter (*Etheostoma susanae*), Palezone shiner (*Notropis albizonatus*), Blackside dace (*Phoxinus cumberlandensis*), Pallid sturgeon (*Scaphirhynchus albus*)

### *Critical Habitat*

Diamond darter (*Crystallaria cincotta*) – Green River, 95-mile reach in Green, Hart, and Edmonson counties (78 FR 52363-52387, September 22, 2013). This CH unit is considered to be unoccupied.

Cumberland darter – Bunches Creek, Calf Pen Fork, Capuchin Creek, Jellico Creek, Wolf Creek, and Youngs Creek – Whitley County; Barren Fork, Capuchin Creek, Cogur Fork, Elisha Branch, Indian Creek, Jellico Creek, Jenneys Branch, Kilburn Fork, Laurel Creek, Laurel Fork, and Rock Creek – McCreary County (77 FR 63603-63668, October 16, 2012).

### *Summary of Effects*

Very little research has been conducted on the effects of selenium on the taxa of fish that are federally-listed in Kentucky; however, the majority of Kentucky's listed fishes are small-bodied, short-lived insectivores with limited ability (due to size, life span, diet) to bioaccumulate selenium. Critical habitat would only be adversely affected to the extent that selenium concentrations would render the habitat unsuitable for the listed species for which it was designated. Since the proposed water quality criterion unlikely to result in adverse effects to listed fishes, changes to water quality as a result of the action are also unlikely to result in adverse effects to the above-referenced critical habitat.



## Crustaceans

### Species

Kentucky cave shrimp (*Palaemonias ganteri*), Big Sandy crayfish (*Cambarus callainus*)

### Critical Habitat

Kentucky cave shrimp – Roaring River Passage, Mammoth Cave National Park (48 FR 46337-46342, October 12, 1983).

### Summary of Effects

Although selenium testing has not been conducted on the Kentucky cave shrimp, nor the Big Sandy crayfish, crustaceans are generally tolerant of elevated selenium levels at concentrations well above the Kentucky criterion (25 µg/L vs 5.0 µg/L) (EPA 2015). Therefore the revised Kentucky criterion is considered protective of these species as well as designated critical habitat for the Kentucky cave shrimp.

## Mussels

### Species

Cumberland elktoe (*Alasmidonta atropurpurea*), Spectaclecase (*Cumberlandia monodonta*), Fanshell (*Cyprogenia stegaria*), Cumberlandian combshell (*Epioblasma brevidens*), Oyster mussel (*Epioblasma capsaeformis*), Tan riffleshell (*Epioblasma florentina walker*), Catpaw (*Epioblasma obliquata obliquata*), Northern riffleshell (*Epioblasma torulosa rangiana*), Snuffbox (*Epioblasma triquetra*), Pink mucket (*Lampsilis abrupta*), Ring pink (*Obovaria retusa*), Littlewing pearlymussel (*Pegias fabula*), White wartyback (*Plethobasus cicatricosus*), Orangefoot pimpleback (*Plethobasus cooperianus*), Sheepnose (*Plethobasus cyphus*), Clubshell (*Pleurobema clava*), Rough pigtoe (*Pleurobema plenum*), Fat pocketbook (*Potamilus capax*), Fluted kidneyshell (*Ptychobranhus subintum*), Rabbitsfoot (*Quadrula c. cylindrical*), Cumberland bean (*Villosa trabilis*)

### Critical Habitat

Cumberland elktoe – Big South Fork, Marsh Creek, and Rock Creek - McCreary County; Sinking Creek, Laurel County; Laurel Fork, Whitley County (69 FR 53136-53180, August 31, 2004).

Cumberlandian combshell – Big South Fork, McCreary County; Buck Creek, Pulaski County (69 FR 53136-53180, August 31, 2004).

Oyster mussel - Big South Fork, McCreary County; Buck Creek, Pulaski County (69 FR 53136-53180, August 31, 2004).

Rabbitsfoot – Tennessee River, Ohio River, Green River, and Red River (all proposed – 77 FR 63439-63536).

Fluted kidneyshell – Horse Lick Creek, Middle Fork Rockcastle River, Rockcastle River (unoccupied), Buck Creek, Rock Creek, Little South Fork Cumberland River, and Big South Fork Cumberland River (77 FR 60803-60882).

### Summary of Effects

Freshwater mussels are not known to be sensitive to the levels of selenium that would be allowed under the water quality criterion. Any adverse effects would occur indirectly through negative



impacts to host fish species. Similar to the listed fishes, most known host fish for Kentucky's listed mussel species (see Attachment 2) are small bodied, short lived species such as darters, sculpins, and cyprinids. Of the known host fish, the perches (e.g. rock bass, largemouth bass) are most likely to bioaccumulate selenium as they are piscivores. A 1997 study by Carolina Power & Light predicted an EC<sub>10</sub> for larval mortality and deformity in largemouth bass at whole body levels of 11.08 µg/g dry weight (in GEI 2015). Adverse effects to species and designated critical habitat are not anticipated at Kentucky's revised water quality criterion levels.

### Summary


The Service finds no scientific data to indicate that adverse effects to federally-listed species in Kentucky are reasonably certain to occur from exposure to selenium at the levels allowed by the Kentucky water quality criterion. Since much of this and the February 5, 2016 concurrence is based on limited data and surrogate species, the Service encourages EPA to work with KDOW to further evaluate the effects of selenium on Kentucky's native taxa.

Based on these determinations and our concurrences with them, we believe that the requirements of section 7 have been fulfilled as it relates to federally listed species listed in the BE. Obligations under section 7 must be reconsidered, however, if:

- (1) new information reveals that the proposed project may affect listed species or proposed critical habitat in a manner or to an extent not previously considered;
- (2) the proposed project is subsequently modified to include activities which were not considered during this consultation; or
- (3) new species are listed or critical habitat designated that might be affected by the proposed project.

If you need additional assistance in determining if a proposed project may impact a federally listed species, we recommend that you contact us for further assistance. Thank you for the opportunity to comment on this proposed action. If you have any questions regarding the information which we have provided, please contact Jennifer Garland at (502) 695-0468 extension 115.

Sincerely,

  
for Virgil Lee Andrews, Jr.  
Field Supervisor

cc: Joel Hansel, USEPA: Atlanta (electronic)  
Peter Goodman, KDOW: Frankfort (electronic)

### LITERATURE CITED:

U.S. Environmental Protection Agency (EPA). 20015. Biological Evaluation of Kentucky's Water Quality Criterion for Selenium. Atlanta, GA. 118 pp

**COMMONWEALTH OF KENTUCKY**  
**BEFORE THE PUBLIC SERVICE COMMISSION**

**IN THE MATTER OF:**

<b>THE APPLICATION OF EAST KENTUCKY</b>	<b>)</b>	
<b>POWER COOPERATIVE, INC. FOR APPROVAL</b>	<b>)</b>	
<b>TO AMEND ITS ENVIRONMENTAL</b>	<b>)</b>	
<b>COMPLIANCE PLAN AND RECOVER COSTS</b>	<b>)</b>	<b>CASE NO. 2017-00376</b>
<b>PURSUANT TO ITS ENVIRONMENTAL</b>	<b>)</b>	
<b>SURCHARGE, SETTLEMENT OF CERTAIN</b>	<b>)</b>	
<b>ASSET RETIREMENT OBLIGATIONS AND</b>	<b>)</b>	
<b>ISSUANCE OF A CERTIFICATE OF PUBLIC</b>	<b>)</b>	
<b>CONVENIENCE AND NECESSITY AND</b>	<b>)</b>	
<b>OTHER RELIEF</b>	<b>)</b>	

**DIRECT TESTIMONY OF CRAIG A. JOHNSON ON BEHALF OF**  
**EAST KENTUCKY POWER COOPERATIVE, INC.**

**Filed: November 20, 2017**

## **I. INTRODUCTION**

1 **Q. Please state your name, business address and occupation.**

2 A. My name is Craig A. Johnson and my business address is East Kentucky Power  
3 Cooperative, Inc. ("EKPC"), 4775 Lexington Road, Winchester, Kentucky 40391. I  
4 am the Senior Vice President of Power Production of EKPC.

5 **Q. Please state your education and professional experience.**

6 A. I received a Bachelor's degree in Engineering from West Virginia Institute of  
7 Technology and a Master's of Science degree in Engineering from the University of  
8 Kentucky. I am a licensed professional engineer in the Commonwealth of Kentucky.  
9 I have been employed by EKPC since September 1989 and have occupied my current  
10 position within the EKPC organization since January 2010.

11 **Q. Please provide a brief description of your duties at EKPC.**

12 A. I am responsible for all operational and maintenance functions at EKPC's two coal  
13 fired power plants, two combustion turbine plants, six landfill gas plants and one  
14 community solar facility. I am responsible for Production Engineering and  
15 Construction. I report to the Chief Operating Officer.

16 **Q. What is the purpose of your testimony?**

17 A. The purpose of my testimony is to describe the Hugh L. Spurlock Station ("Spurlock  
18 Station"), as it currently exists, as well as the various options that EKPC considered  
19 when determining how best to comply with the Disposal of Coal Combustion Residuals  
20 ("CCR") from Electric Utilities Rule ("CCR Rule"). I will also provide a detailed  
21 description of the CCR/ELG Project included.

1   **Q.    Are you sponsoring any exhibits?**

2   A.    No.

3   **Q.    Please begin by describing the Spurlock Station.**

4   A.    The Spurlock Station is EKPC's largest coal-fired electric generation facility. It is  
5       located in the City of Maysville, Kentucky, a few miles west of the center of town, and  
6       situated along the Ohio River. The Spurlock Station consists of four electric generation  
7       units. Spurlock Station Unit #1 ("Spurlock 1") began commercial operation on  
8       September 1, 1977. It has a net capacity of 300 MW. Spurlock Station Unit #2  
9       ("Spurlock 2") became operational on March 2, 1981. At 510 MW of net capacity, it  
10      is the largest electric generation unit at the Spurlock Station, as well as in the entire  
11      EKPC generation fleet. Spurlock 1 and Spurlock 2 are both conventional, pulverized  
12      coal units. Spurlock Station Unit #3 is known as the E. A. Gilbert Unit ("Gilbert Unit")  
13      and began commercial operation on March 1, 2005. The Gilbert Unit utilizes a  
14      Circulating Fluidized Bed ("CFB") technology and boasts a net generating capacity of  
15      268 MW. Spurlock Station Unit #4 ("Spurlock 4") is a sister unit to the Gilbert Unit  
16      and also has 268 MW of generating capacity. Spurlock 4 became operational on April  
17      1, 2009. The combined coal storage capacity of the Spurlock Station is 490,000 tons.  
18      The Spurlock Station primarily burns a range of eastern bituminous coals delivered by  
19      barge.

20   **Q.    Has EKPC made any investments in environmental controls for the Spurlock**  
21   **Station?**

22   A.    Yes. EKPC has heavily invested in environmental control equipment at the Spurlock

1 Station. For instance, Spurlock 1 is equipped with low NOx burners, selective catalytic  
2 reduction (“SCR”) technology, a cold-side electrostatic precipitator (“ESP”), a wet flue  
3 gas desulfurization (“FGD”) scrubber; and a wet ESP. Spurlock 2 is equipped with  
4 Low NOx burners, SCR technology, a hot-side ESP, wet FGD scrubber and a wet ESP.  
5 The Gilbert Unit and Spurlock 4 employ CFB combustion technology which in itself  
6 is an environmental control technology. The Gilbert Unit and Spurlock 4 are further  
7 equipped with selective non-catalytic reduction technology, flash dry absorber, dry  
8 FGD scrubbers and baghouses.

9 **Q. Are the Spurlock Station units important to EKPC?**

10 A. Yes. The four units at the Spurlock Station are among the least expensive electric  
11 generation units in the EKPC fleet and have maintained favorable capacity factors  
12 following EKPC’s full integration into the energy market administered by PJM  
13 Interconnection, LLC (“PJM”). Likewise, prudent management practices have assured  
14 that the Spurlock Station’s units have a high availability factor. In light of the  
15 consistent availability and low-cost operations, the Spurlock Station’s units are the  
16 workhorses of the EKPC electric generation fleet.

17 **Q. Can you briefly describe the management practices that you mentioned as being**  
18 **a key factor in keeping the Spurlock Station units’ high availability factor?**

19 A. Spurlock Station is staffed by, and receives services from, highly qualified employees.  
20 The Spurlock Station workforce is divided into four main groups: operations;  
21 maintenance; material handling; and system engineering. Support services such as  
22 environmental, supply chain management, maintenance support services and capital



1 project management are provided for as well but these functions are centralized at  
2 EKPC's headquarters in Winchester, Kentucky. Spurlock Station employs a Work  
3 Process Optimization practice to identify, prioritize and schedule all necessary  
4 maintenance for all station assets. EKPC uses its System Engineers as subject matter  
5 experts on different plant systems. EKPC uses short term and long term planning to  
6 develop and schedule work packages required for all maintenance items and to plan for  
7 unit outages. EKPC's centralized Production Support Services Team oversees the  
8 Computer Maintenance Management System, and critical path management scheduling  
9 software to help identify, plan and schedule all work orders and outages. Large capital  
10 projects like the CCR/ELG Project is planned and executed by EKPC's central  
11 Engineering and Construction Team. EKPC's Environmental Team oversees all  
12 emissions monitoring equipment.

13 **Q. What is the relationship of the Spurlock Station to the adjacent plant owned by**  
14 **International Paper Company ("International Paper")?**

15 A. Through a three-party agreement involving EKPC and Fleming-Mason Energy  
16 Cooperative Corporation ("Fleming-Mason Energy"), the Spurlock Station has a  
17 unique commercial relationship with International Paper. International Paper operates  
18 a recycling facility that manufactures corrugated paper at a facility located adjacent to  
19 the Spurlock Station. International Paper is one of the larger employers in Mason  
20 County, Kentucky, has a peak electrical load of approximately 24 MW and a steam  
21 load equivalent to 29 MW. The steam for International Paper's industrial process is  
22 supplied primarily from Spurlock 2, however, Spurlock 1 is also able to supply steam

1 to International Paper when necessary. International Paper is a 365 days-a-year, 24/7  
2 operation, which requires a reliable supply of steam to sustain its operations.

3 **Q. What would happen if the Spurlock Station was no longer able to provide steam**  
4 **service to International Paper?**

5 A. From what I understand, International Paper would either have to make a substantial  
6 investment to construct and operate its own steam generator or it would have to shutter  
7 its plant with the resulting loss of jobs. Neither option is likely to be a good one from  
8 International Paper's perspective.

9 **Q. What is the primary reason that EKPC is proposing to amend its Environmental**  
10 **Compliance Plan at this time?**

11 A. EKPC must comply with the CCR Rule and the ELG Rule. Mr. Purvis describes these  
12 rules in greater detail, but the bottom line is that the United States Environmental  
13 Protection Agency ("EPA") is significantly limiting the manner and methods by which  
14 coal combustion residuals ("CCR") and effluents from coal plant operations are  
15 handled and disposed. In addition to these federal rules, EKPC is also cognizant of the  
16 authority and expectations of the Kentucky Energy and Environment Cabinet  
17 Department for Environmental Protection's Division of Water ("KDOW"). As  
18 Spurlock Station moves through a permitting process, we anticipate that the  
19 requirements of our Kentucky Pollutant Discharge Elimination System ("KPDES")  
20 permit will become more stringent.

21 **Q. What considerations did EKPC take into account when determining how to**  
22 **comply with the CCR Rule and the ELG Rule?**

1 A. EKPC took into account several considerations. Cost, of course, is a critical factor.  
2 Beyond that, we were looking for a solution that was consistent with our Strategic Plan,  
3 which Mr. Mosier describes in his testimony. We also wanted to make sure that we  
4 protected our existing investment in the Spurlock Station and did what we could to  
5 mitigate any exposure to unnecessary risk. Importantly, due to the nature of the CCR  
6 Rule and the ELG Rule, every option considered by EKPC had to include significant  
7 modifications to the existing ash pond. Also, several options were disqualified from  
8 further consideration following an initial screening analysis due either to excessive  
9 cost, questionable viability or both.

10 **Q. What option did EKPC ultimately choose when it was determining how to comply**  
11 **with the CCR Rule and the ELG Rule?**

12 A. The option ultimately recommended by EKPC's management and approved by the  
13 Board of Directors is to comply with the CCR Rule and the ELG Rule by making  
14 modifications to the existing Spurlock Station so as to preserve the long-term  
15 usefulness of the four electric generating units that have been, and continue to be, the  
16 mainstay of the EKPC generation fleet. The estimated capital cost of compliance with  
17 the CCR Rule and the ELG Rule at the Spurlock Station is \$262.4 million. The  
18 compliance option also avoids significant stranded costs that would have had to be  
19 recovered from EKPC's sixteen owner-members. All other options that were  
20 considered would have triggered greater stranded asset costs. As stated before, no  
21 matter what option is chosen, closure of the existing ash pond impoundment is  
22 necessary.

1   **Q.    What other specific options did EKPC consider?**

2    A.    We looked at four other options in particular.  EKPC considered converting the fuel  
3           source for Spurlock 1 and Spurlock 2 units from coal to natural gas.  The option was  
4           attractive in that it would allow EKPC to avoid much of the cost of complying with the  
5           CCR Rule and the ELG Rule.  However, any cost savings were more than offset by  
6           several factors.  First, the cost of conversion of the units from coal to natural gas was  
7           expensive.  Second, EKPC would have had to build a dedicated natural gas  
8           transmission line of approximately 30 miles to connect the Spurlock Station to an  
9           interstate natural gas pipeline.  Timely acquisition of the easements necessary to  
10          accomplish the construction of such a pipeline presented a challenge given the  
11          relatively short compliance deadlines associated with the CCR Rule and the ELG Rule.  
12          Third, EKPC would have incurred significant costs associated with procuring power  
13          during the period when reconstruction of the units would be occurring.  While EKPC  
14          enjoys seasonal peak diversity within PJM as a whole, there is no guarantee that the  
15          cost of purchased power would be at a discount to EKPC's own cost of generation.  
16          Fourth, this option would have required EKPC to incur significant costs associated with  
17          stranded assets requiring rate recovery.  EKPC is currently writing down a stranded  
18          asset associated with the cancelled Smith Station Unit #1 coal-fired generation facility  
19          via the realization of capacity revenues in PJM.  Adding significantly to the Company's  
20          stranded assets balance was not a preferable outcome.  Finally, while EKPC does want  
21          to diversify its generation portfolio, it must do so prudently.  There is a risk associated  
22          with concentrating EKPC's generation fleet too heavily in the natural gas sector of the

1 industry. Moreover, if EKPC was forced to retire Spurlock 1 and Spurlock 2, it would  
2 lose its status as a net generator in PJM and would lose the value of having peak  
3 diversity within the PJM markets. This solution allows EKPC to preserve and  
4 maximize the value that EKPC receives from its membership in PJM. Likewise, the  
5 conversion of Spurlock 1 and Spurlock 2 to natural gas would cause the simple cycle  
6 unit to increase the cost of power to EKPC's owner-members and it would also have a  
7 negative impact upon the operations of International Paper. The cost of building a  
8 standalone natural gas boiler to make steam for International Paper is estimated to cost  
9 \$25 million which would be in addition to the conversion cost. The standalone natural  
10 gas fired boiler to supply this steam would be required due to the anticipated low  
11 dispatch hours of Spurlock 1 and Spurlock 2 after the conversion. The estimated cost  
12 of this natural gas conversion option is approximately \$306.6 million, which is  
13 significantly more expensive than the option that we ultimately settled upon. Thus, the  
14 natural gas conversion option was considered in detail, but ultimately rejected.

15 **Q. What were some of the other options EKPC considered?**

16 A. EKPC also considered retiring Spurlock 1 and Spurlock 2 and constructing a new 600  
17 MW combined cycle natural gas unit at its Smith Station and purchasing 200 MW of  
18 power from the wholesale market through a bilateral power purchase agreement.  
19 However, the cost of constructing a new combined cycle generation unit was cost  
20 prohibitive compared to the compliance option we selected and would have also left  
21 EKPC with certain stranded costs at the Spurlock Station. Moreover, entering into a  
22 long-term power purchase agreement creates price risk for EKPC as the forward market



1 price for capacity and energy is less transparent as one moves further out from the time  
2 of execution of such an agreement. The option was also inconsistent with the  
3 Commission's prior admonition in Case No. 2014-00226 that EKPC and other  
4 regulated utilities should own sufficient generation resources to satisfy their respective  
5 ordinary and customary loads. EKPC estimated that the cost of moving forward with  
6 the option to retire Spurlock 1 and Spurlock 2 and replacing that capacity and energy  
7 with a combined cycle unit was approximately \$560 million, along with energy market  
8 purchases and stranded costs. Since the capital cost alone of this option was going to  
9 be more than twice the price tag associated with the CCR/ELG Project option, it was  
10 quickly eliminated.

11 **Q. What else did EKPC consider?**

12 A. EKPC also considered an option where we would retire both Spurlock 1 and Spurlock  
13 2 and replace the units with a long-term market purchase of 800 MW of capacity and  
14 energy. For many of the reasons set forth above, this option was deemed less favorable  
15 than the construction of a combined cycle unit and a 200 MW market purchase. The  
16 estimated cost of power for this option would be the "PJM market price" plus a  
17 premium for capacity and energy at transaction dates. The cost for ash pond  
18 modifications would still be incurred, however, the total cost of this option is difficult  
19 to estimate and as stated, is controlled by market risk that is higher with long-term  
20 purchases. There would, of course, also have been a negative impact to International  
21 Paper.

22 **Q. Were there any other options that EKPC considered?**

1 A. Yes. EKPC also considered an option wherein we would demolish the wet FGD  
2 scrubbers serving Spurlock 1 and Spurlock 2 and replace them with a new dry scrubber  
3 system. EKPC estimated that the cost of compliance with a new dry scrubber system  
4 would be \$535 million, not counting the cost of recovering certain stranded assets that  
5 would be associated with the demolished wet scrubber system, the required ash pond  
6 costs, or purchases of up to 800MW in required interim capacity and energy. So again,  
7 this option was deemed to be too expensive to pursue.

8 **Q. How did EKPC go about the process of identifying each of the options you**  
9 **mentioned and analyzing them to determine which option was preferred?**

10 A. A wide range of technical options for complying with the CCR Rule and the ELG Rule  
11 were selected to identify any unique advantages or disadvantages related to future  
12 market or environmental regulatory conditions. All options were required to deliver  
13 800MW of reliable generation and comply with the known requirements of both  
14 rules. The primary factors for evaluating the options by comparison were total cost,  
15 operations and maintenance costs and impacts, flexibility and robustness in the face of  
16 changing market and environmental regulatory conditions, alignment with EKPC's  
17 strategic plan, and consideration of the impact to the operations of International  
18 Paper. A first cut was made based on screening level indications of the factors above,  
19 that left the proposed CCR/ELG Project and the Spurlock 1 and Spurlock 2 Gas  
20 Conversion options as the most reasonable remaining alternatives. Those options were  
21 further analyzed and evaluated to produce the conclusion that the CCR/ELG Project is  
22 the best option for the near and long term benefit of our owner-members.

1   **Q.    Will the CCR/ELG Project cause any of EKPC's existing assets to become**  
2       **stranded assets?**

3    A.    Yes. EKPC estimates that \$3,117,497 in existing assets will be considered stranded  
4       assets as a result of the CCR/ELG Project. Unfortunately, there is simply no way to  
5       avoid this. However, the CCR/ELG Project as proposed does minimize the amount of  
6       stranded assets. Mr. Scott discusses these stranded assets in more detail in his  
7       testimony.

8   **Q.    So let us discuss the CCR/ELG Project in a little more depth. What is involved in**  
9       **developing and constructing the CCR/ELG Project?**

10   A.    EKPC engaged the engineering firm Burns and McDonnell Engineering Company, Inc.  
11       ("Burns and McDonnell") to prepare a Scoping Report that would be the basis for  
12       further development and design of the CCR/ELG Project. The Scoping Report issued  
13       by Burns and McDonnell involves six major project components, which are as follows:

- 14       •     Bottom Ash Handling System – EKPC will convert the existing bottom ash  
15             system from a wet sluicing system to a new dry ash system. In addition, a  
16             separate pyrites handling system with dewatering bins and settling basin will be  
17             installed.
- 18       •     Wastewater Treatment System – EKPC will construct a new wastewater  
19             treatment plant to process FGD blowdown wastewater from Spurlock 1 and  
20             Spurlock 2. The wastewater treatment plant will provide a physical/chemical  
21             treatment of the FGD blowdown and utilize an Optimized Mechanical Vapor  
22             Compression ("MVC") System that incorporates Falling Film Evaporators

1 (“FFE”). The MVC will produce brine which will be sent to the Spurlock 1 and  
2 Spurlock 2 existing and new fly ash silo for ash conditioning. To accommodate  
3 excess wastewater flow, clarified FGD wastewater will be consumed by ash  
4 mixing in the existing fly ash silos and by dry scrubber evaporation in Gilbert  
5 and Spurlock 4.

- 6 • Fly Ash Handling System – EKPC will construct a new fly ash storage silo and  
7 replace the existing fly ash transfer building with equipment to handle fly ash  
8 from Spurlock 1 and Spurlock 2. Currently, Spurlock 1 and Spurlock 2 have  
9 dry fly ash collection systems but retain wet ash sluicing as a backup system.  
10 This addition of the new fly ash silo is necessary to assure redundancy for ash  
11 removal since sluicing to the ash pond will no longer be available. The existing  
12 fly ash transfer building was originally placed into service with Spurlock 2. It  
13 has reached the end of its useful life. Both units depend upon the fly ash transfer  
14 system for reliable unit operation.

- 15 • Balance of Plant Systems – EKPC will install new piping, controls,  
16 instrumentation, electrical and mechanical equipment with the Project that are  
17 necessary to operate these new systems. As part of this Project component,  
18 EKPC will construct two new Power Control Module buildings as well as new  
19 13,800 / 480 V station service transformers. The power feed from the  
20 switchyard to the new waste water and ash systems will be made via new 138  
21 kV / 13.8kV low resistance grounded transformers.

- 1       •     Ash Pond Closure – EKPC’s strategy is to identify, plan, permit and provide  
2             enough landfill space to meet end-of-life needs for the plant facility. As part of  
3             the ash pond closure, EKPC estimates that it will remove approximately 1.75  
4             million cubic yards of CCR material from the existing sixty-seven (67) acre  
5             surface impoundment, which coincidentally represents approximately one  
6             year’s ash production for normal operation at Spurlock. CCR materials will be  
7             removed and placed in the Spurlock CCR Landfill. EKPC is in the process of  
8             permitting additional space adjacent to the existing landfill. Permitting this  
9             additional space will provide enough waste boundary for Spurlock Station to  
10            operate for many years. To close the ash pond, CCR materials will be removed  
11            to the landfill, the existing dams will be left in place, new topsoil and seed will  
12            be applied over disturbed areas, and a new water mass balance pond will be  
13            established within the footprint of the original pond. Upon the completion of  
14            the CCR removal, the Spurlock ash pond impoundment will be considered  
15            “clean-closed by removal.”
- 16       •     Water Mass Balance Pond Chemical Treatment System – EKPC will repurpose  
17             seventeen (17) acres of the existing surface impoundment as a new Water Mass  
18             Balance (“WMB”) Pond. The WMB Pond will aid in settling constituents from  
19             various plant process flows including the coal pile runoff stream, neutralization  
20             basins, clarifiers and air heater wash wastewater, non-chemical metal cleaning  
21             wastes and storm water to meet proposed discharge requirements. The WMB  
22             Pond will include a chemical treatment system to regulate pond pH, alkalinity,



1 and total suspended solids and assist in the removal of iron and other chemical  
2 constituents ahead of discharging into the Ohio River pursuant to EKPC's  
3 KPDES permit application.

4 **Q. Okay, so for the Bottom Ash Handling System, how does conversion to this system**  
5 **from the existing bottom ash system help EKPC comply with the CCR Rule and**  
6 **ELG Rule?**

7 A. The conversion to a dry bottom ash system eliminates the use of water to transport the  
8 bottom ash/water mixture to the ash pond. The bottom ash system for each unit will be  
9 completely replaced with a dry bottom collection system, and from that collection  
10 system, bottom ash will be pneumatically conveyed to a new silo located adjacent to  
11 the units. From the silo, the bottom ash will be loaded onto trucks and hauled to  
12 EKPC's landfill.

13 **Q. What is the function of the separate pyrite handling system, dewatering bins and**  
14 **settling basin?**

15 A. Pyrites are a constituent found in the coal we receive. Pyrites are collected during the  
16 milling process, where the coal is reduced to a fine powder before being blown into the  
17 furnace for combustion. Currently, pyrites are sluiced with water to the ash pond. The  
18 new system will still use sluicing but the sluiced pyrites will be sent to a new dewatering  
19 bin and settling basin. The design will be a closed loop system, where the water will  
20 be recovered from the settling bin and re-used in the sluicing process. Pyrites are not  
21 considered a CCR product, but, due to the elimination of the ash pond, will require the  
22 installation of the new collection system.

1 **Q. With regard to the Wastewater Treatment System, please describe what is meant**  
2 **by a “physical/chemical treatment” process?**

3 A. During the wet scrubbing process, a certain amount of wastewater is produced. This  
4 is commonly referred to as FGD blowdown or purge water. FGD blowdown is  
5 necessary to maintain the proper reagent chemistry required for removal of SO<sub>2</sub> from  
6 the flue gas and for the protection of the equipment from corrosion. The rate of FGD  
7 blowdown is expressed in Gallons per Minute (“GPM”). This waste stream contains  
8 solids from the scrubbing process and it is currently conveyed to the ash pond. The  
9 solids settle out in the ash pond and the remaining water is discharged.

10 The physical/chemical treatment of this wastewater is required because the ash  
11 pond will no longer be in service. The physical/chemical treatment removes solids and  
12 conditions the wastewater so it can be used: 1) for fly ash conditioning prior to loading  
13 it into trucks; by spraying it into our Gilbert 3 and Spurlock 4 dry scrubbing process to  
14 evaporate it; or 3) by distilling the wastewater in the optimized MVC system. The  
15 sludge produced by the physical/chemical process will be dewatered in plate and frame  
16 filter presses. The dewatered sludge is then loaded and transported by truck to EKPC’s  
17 landfill and the water is recycled through the system.

18 **Q. Can you describe what an optimized MVC system does and how it fits into the**  
19 **overall wastewater treatment system?**

20 A. EKPC has estimated that there will be on average 400 GPM of FGD blowdown. The  
21 rate of blowdown will vary depending upon the type of coal being burned and the  
22 electric loading on the units. After the physical/chemical clarification process, EKPC

estimates that approximately 160 GPM can be used to condition the fly ash for transport to its landfill, and to be evaporated in the Gilbert and Spurlock 4 dry scrubbing process. This leaves approximately 240 GPM of clarified waste water. The MVC is a type of thermal evaporation. For every gallon of waste water that enters the MVC process, there are two streams that come out of the system. The majority of the waste water comes out as clean distilled water, approximately 210 GPM. The smaller percentage comes out in the form of concentrated brine, approximately 30 GPM. The concentrated brine produced will be sent for fly ash conditioning prior to loading the ash into trucks that will be disposed of in EKPC's landfill. The clean distilled water can be re-used in the other plant processes or sent to the WMB for discharge.

**Q. What are FFEs and how do they work?**

A. This is a major piece of equipment within the MVC where the thermal evaporation of the clarified blowdown takes place. This particular technology accomplishes thermal evaporation by passing a thin liquid film of the clarified blowdown over heated metal tubes. The tubes are arranged vertically. The energy source to heat the tubes is saturated steam. A proposed electric auxiliary boiler is required to produce the initial saturated steam for startup of the FFE's. Once the system becomes operational, water/vapor from the evaporation of the clarified blowdown is compressed by the mechanical vapor compressor and recycled back to the evaporator unit to provide additional heat transfer for evaporation, which improves the overall efficiency of the process.

**Q. With regard to the fly ash handling system, why is a new storage silo necessary to**

1       **create redundancy?**

2       A.     Spurlock 1 when constructed utilized only sluicing as a means to transport both fly ash  
3             and bottom ash to the existing ash pond. This changed with the addition of Spurlock  
4             2. A landfill was constructed to accept CCR waste when Spurlock 2 was built. Bottom  
5             ash continued to be conveyed to the ash pond from Spurlock 1 and Spurlock 2. The  
6             systems to sluice fly ash were retained for redundancy after the landfill went into  
7             operation. Closure of the ash pond will take away the redundancy which will place the  
8             combined 810 MWs at risk, with only the one existing ash silo. The new system will  
9             be installed with redundant critical equipment, and the addition of the second silo will  
10            ensure the reliability that is required to operate Spurlock 1 and Spurlock 2 in a prudent  
11            manner.

12    **Q.     When you mentioned the balance of plant systems, it suggests that the CCR/ELG**  
13       **Project will have its own power demands. How much parasitic load will the**  
14       **CCR/ELG Project take from the Spurlock Station?**

15    A.     The added parasitic load is estimated to be approximately 5 to 6 MWs.

16    **Q.     The ash pond closure is a big part of the CCR/ELG Project. Why is it necessary**  
17       **to close out the ash pond in order to satisfy the CCR Rule and ELG Rule?**

18    A.     The ash pond will be clean closed by removing all of the material deposited in the pond.  
19            Under the ELG Rule, sluicing of CCR will not be allowed after December 31, 2023.  
20            Also, the ash pond lies within the 100 – year flood plain of the Ohio River. The  
21            regulations do not allow capping in place because of the pond’s location within the  
22            flood plain.

1 **Q. What steps are necessary to assure that the existing landfill is able to receive all**  
2 **the ash that will be removed from the ash pond?**

3 A. It is estimated that the amount of material to be removed during the clean closure  
4 process of the ash pond is approximately 1.75 million cubic yards. The Spurlock  
5 Station units on average produce approximately that same amount of CCR products  
6 annually. The additional waste material from the excavation will use one year's worth  
7 of disposal volume and will be included in the build out plan for the landfill. EKPC is  
8 in the process of permitting an adjacent hollow which will provide adequate future  
9 landfill space. The additional material from the ash pond closure will not adversely  
10 impact the landfill operation or capacity.

11 **Q. What is the status of EKPC's application to receive a permit from state regulators**  
12 **for the landfill?**

13 A. Area D, which is also known as Peg's Hill, will be the designation of the new landfill.  
14 The application for Area D has been submitted to the Division of Solid Waste for  
15 review.

16 **Q. Can you describe what EKPC plans to do with the water mass balance pond that**  
17 **is included in the CCR/ELG Project?**

18 A. The existing ash pond receives all plant process water. A water treatment pond will be  
19 required even after EKPC stops sluicing CCR into the pond. The WMB will be  
20 constructed within the limits of the clean closed ash pond. The plant process water will  
21 be sent to the new lined WMB pond for treatment prior to discharge. Treatment is  
22 necessary to remain in compliance with EKPC's KPDES discharge permit.



1 **Q. Has EKPC taken any steps to begin construction of the CCR/ELG Project up to**  
2 **now?**

3 A. EKPC has not commenced construction or ordered any equipment that will be needed  
4 to complete the CCR/ELG Project. EKPC is aware that it cannot undertake these  
5 activities until after it is granted a Certificate of Public Convenience and Necessity  
6 (“CPCN”). So that EKPC is able to move forward as quickly as possible once a CPCN  
7 is granted, EKPC has retained Burns and McDonnell to continue preparing detailed  
8 plans and specifications and steps necessary to initiate orders for long lead equipment.

9 **Q. When does EKPC need to commence construction in order to timely complete the**  
10 **CCR/ELG Project?**

11 A. The Commission’s Order in this case should be issued in May 2018, depending upon  
12 when this case is accepted for filing. Assuming that a CPCN is granted, EKPC will  
13 begin placing long-lead equipment orders and letting contracts very shortly thereafter.  
14 As stated in the Scoping Report, there will be a considerable amount of money spent  
15 in 2018 to purchase long-lead equipment and for design work, although actual  
16 construction will begin in January of 2019 and be completed in November of 2024.

17 **Q. Isn’t the compliance deadline for the ELG Rule before November of 2024?**

18 A. Yes. The deadline for compliance is no later than December 31, 2023. Under the  
19 current schedule, EKPC will be able to comply with the Rules’ mandates on a timely  
20 basis. The work that will be completed in 2024 is important to wrapping-up the  
21 CCR/ELG Project, but does not prevent EKPC from timely compliance.

1 **Q. How many months of extra time does EKPC currently have built into its**  
2 **construction schedule?**

3 A. The schedule that is presented in the Burns and McDonnell Scoping Report does not  
4 have extra time. The schedule, as presented, allows for an efficient and economical  
5 execution of this project. While it may be possible to compress the schedule, it would  
6 come at some higher cost and risk.

7 **Q. What makes the schedule so tight?**

8 A. EKPC has waited to see what would happen with the CCR Rule and the ELG Rule in  
9 Washington before committing over a quarter of a billion dollars to compliance. In  
10 addition, EKPC is taking into account several other factors when putting its timeline  
11 together. These include the long lead times associated with equipment orders for  
12 critical CCR/ELG Project components, the need to coordinate construction activities  
13 with planned unit outages, and the time required to secure necessary regulatory  
14 approvals.

15 **Q. In addition to securing a CPCN from the Commission, what other administrative**  
16 **approvals are necessary?**

17 A. As explained by Mr. Purvis, EKPC will also be seeking permits – whether as a  
18 modification to an existing permit or as a new permit – from the United States Army  
19 Corps of Engineers, the United States Fish and Wildlife Service, the EPA, the Kentucky  
20 Division of Air Quality, KDOW, Kentucky Division of Waste Management, Kentucky  
21 Heritage Council and the Mason County Joint Planning Commission. EKPC has begun  
22 the process of seeking all necessary permits and approvals. In addition, as Mr. Stachnik

1 explains, EKPC will seek approval from the United States Department of Agriculture's  
2 Rural Utilities Service for approval of the long-term debt associated with financing the  
3 CCR/ELG Project.

4 **Q. Can you describe the approach that EKPC is taking with regard to developing the**  
5 **project?**

6 A. Yes. EKPC has retained Burns and McDonnell to assist as an engineering consultant  
7 on the CCR/ELG Project. Burns and McDonnell's role will be as EKPC's owner  
8 engineer, which means they will be responsible for the design, specification  
9 development, procurement recommendation, and supplemental staffing for  
10 construction management. In addition, EKPC intends to use a multiple contract  
11 approach with adjustment unit pricing to develop and construct the CCR/ELG Project.  
12 This approach allows EKPC to work with Burns and McDonnell to create and procure  
13 the necessary construction and major equipment contracts, then to contract directly  
14 with providers for those goods and services. The approach involves the use of multiple  
15 equipment and material contracts and multiple construction contracts and will allow  
16 EKPC to minimize costs by providing for competitive bidding to reduce contractor  
17 markups.

18 **Q. Can you provide an example of how this will work in practice?**

19 A. The Scoping Report is the playbook for the entire project. Section 4.0 "Contracting  
20 Approach", describes in detail how the project will be broken down into contracts.  
21 Each contract represents the procurement of major equipment or services required for  
22 the successful completion of this project. Burns and McDonnell and EKPC will work

1 together to develop the bid specification, develop the bidders list, and conduct the  
2 procurement activities. Burns and McDonnell will evaluate bids and recommend the  
3 best proposal for EKPC's consideration. EKPC will execute the contract. The contract  
4 management will be done by EKPC with recommendations and participation from  
5 Burns and McDonnell.

6 **Q. What are the benefits to this type of approach to developing a project?**

7 A. EKPC has found that this type of contract approach yields the lowest cost project,  
8 mitigates schedule risk, and results in an end product that is of higher quality.

9 **Q. Has EKPC ever used a multiple contract approach before in the development of**  
10 **significant projects?**

11 A. EKPC has historically used the multiple contract approach. The most recent large  
12 projects to be executed in an identical fashion were the Cooper Station Retrofit Project  
13 and Cooper 1 Duct Reroute Project. Both of these projects were completed on time,  
14 on budget and resulted in high quality products.

15 **Q. How will EKPC be able to assure that it is receiving the lowest reasonable cost for**  
16 **the equipment and contracting services that it procures?**

17 A. EKPC will predominately use competitive bidding for the procurement of goods and  
18 services. There could be specialized equipment or services that will require sole source  
19 procurement.

20 **Q. Has EKPC calculated what the incremental operations and maintenance expense**  
21 **will be on an annual basis for the CCR/ELG Project once it is completed?**

22 A. Yes. EKPC estimates that the incremental annual operations and maintenance expense

1 associated with the CCR/ELG Project following its completion will be approximately  
2 \$4.2 million. This may be further broken down to include approximately \$1.7 million  
3 for labor, \$1.4 million for incremental chemical and electrical costs and \$1.1 for  
4 additional hauling cost.

5 **Q. Based upon your professional background and experience, do you believe that the**  
6 **CCR/ELG Project is the reasonable, least-cost option for allowing EKPC to timely**  
7 **comply with the CCR Rule and the ELG Rule?**

8 A. Yes. Mr. Mosier elaborates on the many benefits of the CCR/ELG Project in his  
9 testimony. Clearly, this option is less expensive than any other option that we  
10 considered. Although it requires significant capital investments, it is the best option  
11 for EKPC and our Owner-Members to satisfy regulatory requirements.

12 **Q. Does this conclude your testimony?**

13 A. Yes.



**COMMONWEALTH OF KENTUCKY**  
**BEFORE THE PUBLIC SERVICE COMMISSION**

**IN THE MATTER OF:**

**THE APPLICATION OF EAST KENTUCKY )  
POWER COOPERATIVE, INC. FOR APPROVAL )  
TO AMEND ITS ENVIRONMENTAL )  
COMPLIANCE PLAN AND RECOVER COSTS )  
PURSUANT TO ITS ENVIRONMENTAL )  
SURCHARGE, SETTLEMENT OF CERTAIN )  
ASSET RETIREMENT OBLIGATIONS AND )  
ISSUANCE OF A CERTIFICATE OF PUBLIC )  
CONVENIENCE AND NECESSITY AND )  
OTHER RELIEF )**

**CASE NO. 2017-00376**


---

**VERIFICATION OF CRAIG JOHNSON, P.E.**

---

COMMONWEALTH OF KENTUCKY )  
COUNTY OF CLARK )

Craig Johnson, P.E., Senior Vice President of Power Production at East Kentucky Power Cooperative, Inc., being duly sworn, states that he has read the foregoing prepared direct testimony and that he would respond in the same manner to the questions if so asked upon taking the stand, and that the matters and things set forth therein are true and correct to the best of his knowledge, information and belief.

  
Craig Johnson, P.E.

The foregoing Verification was signed, acknowledged and sworn to before me this 20<sup>th</sup> day of November, 2017 by Craig Johnson.

  
NOTARY PUBLIC

Commission No. 500144

My Commission Expires: 11/30/17



**COMMONWEALTH OF KENTUCKY**  
**BEFORE THE PUBLIC SERVICE COMMISSION**

**IN THE MATTER OF:**

<b>THE APPLICATION OF EAST KENTUCKY</b>	<b>)</b>	
<b>POWER COOPERATIVE, INC. FOR APPROVAL</b>	<b>)</b>	
<b>TO AMEND ITS ENVIRONMENTAL</b>	<b>)</b>	
<b>COMPLIANCE PLAN AND RECOVER COSTS</b>	<b>)</b>	<b>CASE NO. 2017-00376</b>
<b>PURSUANT TO ITS ENVIRONMENTAL</b>	<b>)</b>	
<b>SURCHARGE, SETTLEMENT OF CERTAIN</b>	<b>)</b>	
<b>ASSET RETIREMENT OBLIGATIONS AND</b>	<b>)</b>	
<b>ISSUANCE OF A CERTIFICATE OF PUBLIC</b>	<b>)</b>	
<b>CONVENIENCE AND NECESSITY AND</b>	<b>)</b>	
<b>OTHER RELIEF</b>	<b>)</b>	

**DIRECT TESTIMONY OF ROBIN HAYES**  
**ON BEHALF OF EAST KENTUCKY POWER COOPERATIVE, INC.**

**Filed: November 20, 2017**

1 **Q. Please state your name, business address, and occupation.**

2 A. My name is Robin Hayes and my business address is East Kentucky Power Cooperative,  
3 Inc. ("EKPC"), 4775 Lexington Road, Winchester, Kentucky 40391. I am the Director of  
4 Financial Planning and Analysis for EKPC.

5 **Q. Please state your education and professional experience.**

6 A. I graduated from the University of Louisville ("UofL") with a Bachelor of Science in  
7 Business Administration, with a concentration in Accounting, with high honors. I have  
8 also completed my Master in Business Administration with Distinction at UofL. I hold  
9 Certified Public Accountant ("CPA") and Certified Internal Auditor ("CIA") licenses. I  
10 have 30 years of finance and accounting experience with the last 22 years in utility  
11 organizations.

12 **Q. Please provide a brief description of your duties at EKPC.**

13 A. As Director of Financial Planning and Analysis, I am responsible for providing financial  
14 analysis, long-range financial planning, budget, and key performance indicators to EKPC  
15 and the EKPC Board of Directors.

16 **Q. What is the purpose of your testimony in this proceeding?**

17 A. The purpose of my testimony is to describe the economic analysis that EKPC undertook to  
18 determine whether the proposed Environmental Compliance Plan ("Compliance Plan")  
19 amendment was the most reasonable least cost option when compared to the natural gas  
20 conversion option available to EKPC.

21 **Q. Please describe what experience you have in preparing economic models similar to**  
22 **the one that you produced in this matter.**

23 A. I have created financial analyses of strategic choices throughout my career in the many  
24 positions I have held. Most recently in my capacity at EKPC, I have completed an

1 evaluation of the economic impact of the Bluegrass Generating Station acquisition in 2015  
2 and the Cooperative Solar project in 2016.

3 **Q. Are you sponsoring any Exhibits as part of your testimony?**

4 A. Yes. I am sponsoring Exhibit RH-1, which is a summary of the economic analyses that I  
5 performed on behalf of EKPC. This Exhibit was prepared by myself and I would ask that  
6 it be incorporated into my testimony by reference. Due to the proprietary and confidential  
7 nature of the Exhibit, it is subject to a motion for confidential treatment that is being  
8 tendered herewith.

9 **Q. Please describe the options that EKPC considered when it was determining how to**  
10 **comply with the Disposal of Coal Combustion Residuals (“CCR”) from Electric**  
11 **Utilities Rule (“CCR Rule”) and the Effluent Limitation Guidelines and Standards**  
12 **for the Steam Electric Power Generating Point Source Category (“ELG Rule”).**

13 A. Mr. Johnson describes all of the obligations that EKPC considered in more detail in his  
14 testimony and I will defer to him on the specifics, but generally speaking, EKPC looked at  
15 five different strategies for complying with the CCR Rule and the ELG Rule. First, EKPC  
16 considered a plan that would allow Spurlock Station Unit #1 (“Spurlock 1”) and Spurlock  
17 Station Unit #2 (“Spurlock 2”) to continue operation as coal-fired units. A second option  
18 involved converting Spurlock 1 and Spurlock 2 to natural gas-fired units. The third option  
19 would have seen EKPC retire both units and construct a 600 MW combined cycle unit at  
20 EKPC’s Smith Station, with EKPC making up the lost capacity through a 200 MW energy  
21 purchase. The fourth option would have been to retire both Spurlock 1 and Spurlock 2 and  
22 then purchase the full 800 MW of lost energy on the market. The final option was to  
23 convert Spurlock 1 and Spurlock 2 into units utilizing a new dry scrubber system instead  
24 of the wet flue gas desulfurization scrubbers currently in place.

1 **Q. Did you analyze each of these options as part of your analysis?**

2 A. No. The risks associated with such large market purchases were significant and made those  
3 options undesirable, particularly in light of the Commission's prior statement that EKPC  
4 should have enough generating capacity available to meet its native load. Likewise, the  
5 option to convert from wet scrubbers to dry scrubbers was substantially more expensive  
6 than the remaining options. Thus, after a screening-level analysis, it was clear that EKPC's  
7 only viable options were to proceed with the CCR/ELG Project outlined in the Application  
8 or to convert Spurlock 1 and Spurlock 2 to natural gas fired units. So it was these two  
9 options that I concentrated upon when I was building my economic model and developing  
10 a cost comparison.

11 **Q. Describe the analysis that you performed when comparing these two options.**

12 A. I prepared a net present value ("NPV") evaluation between the two alternatives for the  
13 period from 2017-2035 to evaluate the least-cost option to EKPC, our owner-members and  
14 their retail members.

15 **Q. Where did you obtain the data that you used for your economic model?**

16 A. The capital cost and incremental operating and maintenance ("O&M") cost for the  
17 CCR/ELG Project was obtained from the Burns and McDonnell Spurlock Station –  
18 CCR/ELG Compliance Project Scoping Report ("Scoping Report"). For the natural gas  
19 conversion option, I relied upon the information contained in the EKPC Spurlock Gas  
20 Conversion Study Report, provided by Burns and McDonnell, to construct capital cost  
21 information. The O&M cost for the gas conversion was obtained from EKPC's Power  
22 Production staff. The annual escalation rate for EKPC labor was based on the historic  
23 increase in wages approved by EKPC's Board of Directors over the past five years. I used  
24 PJM Maintenance Adder Escalation Index Numbers to compute an escalation rate for non-



labor expenses. I also relied upon EKPC's Real-Time System Simulator model results provided by Julie Tucker, EKPC's Director of Power Supply to compute incremental purchases and fuel for the gas conversion. Finally, I consulted with EKPC's Accounting Department to make sure that I was using appropriate values for depreciation and property taxes.

**Q. How did you go about constructing the economic model?**

A. I took the information regarding the assets from both Burns and McDonnell reports plus the information gathered to compute the incremental purchase power, fuel and operations, and fixed costs for both alternatives. I then computed project cash flows for these costs plus any non-cash expenses and less capital cash flows. I then computed the NPV for each alternative at the same discount rate.

**Q. Did you make any assumptions as part of your analysis?**

A. Yes. I had to make assumptions regarding the discount rate applied in my calculations. In addition, I made assumptions regarding the escalation rates for labor and non-labor costs based upon the information I was provided or gathered, as described above. Because the natural gas conversion option did not generate a detailed project plan such as the CCR/ELG Project's Scoping Report, I had to exercise a degree of independent, professional judgment in allocating and escalating certain costs associated with the natural gas conversion project over the total number of years required to implement that option.

**Q. What were the results of your analysis?**

A. The CCR/ELG Project, over the period from 2017-2035, has a significantly lower cost than the natural gas conversion project option. The CCR/ELG Project is therefore a better compliance strategy for EKPC, its owner-members and their retail members than the natural gas conversion option.

1    **Q.    Are you confident that your analysis is accurate and correct?**

2    A.    Yes. Based upon my thirty years of experience in the industry and my training as a CPA  
3           and CIA, I have a very high degree of confidence that the CCR/ELG Project costs less than  
4           the natural gas conversion option.

5    **Q.    Please summarize your testimony.**

6    A.    Based upon all the data made available to me, and after having prepared an economic model  
7           that I am very comfortable with, it is my opinion that the CCR/ELG Project that EKPC is  
8           proposing in this case is the reasonable, least cost option compared to the natural gas  
9           conversion option.

10   **Q.    Does this conclude your testimony?**

11   A.    Yes.

COMMONWEALTH OF KENTUCKY  
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

THE APPLICATION OF EAST KENTUCKY )  
POWER COOPERATIVE, INC. FOR APPROVAL )  
TO AMEND ITS ENVIRONMENTAL )  
COMPLIANCE PLAN AND RECOVER COSTS )  
PURSUANT TO ITS ENVIRONMENTAL )  
SURCHARGE, SETTLEMENT OF CERTAIN )  
ASSET RETIREMENT OBLIGATIONS AND )  
ISSUANCE OF A CERTIFICATE OF PUBLIC )  
CONVENIENCE AND NECESSITY AND )  
OTHER RELIEF )

CASE NO. 2017-00376

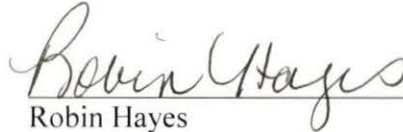
---

VERIFICATION OF ROBIN HAYES

---

COMMONWEALTH OF KENTUCKY )  
COUNTY OF CLARK )

Robin Hayes, Director of Financial Planning and Analysis East Kentucky Power Cooperative, Inc., being duly sworn, states that she has read the foregoing prepared direct testimony and that she would respond in the same manner to the questions if so asked upon taking the stand, and that the matters and things set forth therein are true and correct to the best of her knowledge, information and belief.

  
Robin Hayes

The foregoing Verification was signed, acknowledged and sworn to before me this 20<sup>th</sup> day of November, 2017 by Robin Hayes.

  
NOTARY PUBLIC

Commission No. 500144

My Commission Expires: 11/30/17



**REDACTED**

**EXHIBIT RH-1**

**PRESENT VALUE ANALYSIS OF CCR-ELG ALTERNATIVES**

Subject to Motion for Confidential Treatment

**COMMONWEALTH OF KENTUCKY**  
**BEFORE THE PUBLIC SERVICE COMMISSION**

**IN THE MATTER OF:**

<b>THE APPLICATION OF EAST KENTUCKY</b>	<b>)</b>	
<b>POWER COOPERATIVE, INC. FOR APPROVAL</b>	<b>)</b>	
<b>TO AMEND ITS ENVIRONMENTAL</b>	<b>)</b>	
<b>COMPLIANCE PLAN AND RECOVER COSTS</b>	<b>)</b>	<b>CASE NO. 2017-00376</b>
<b>PURSUANT TO ITS ENVIRONMENTAL</b>	<b>)</b>	
<b>SURCHARGE, SETTLEMENT OF CERTAIN</b>	<b>)</b>	
<b>ASSET RETIREMENT OBLIGATIONS AND</b>	<b>)</b>	
<b>ISSUANCE OF A CERTIFICATE OF PUBLIC</b>	<b>)</b>	
<b>CONVENIENCE AND NECESSITYAND</b>	<b>)</b>	
<b>OTHER RELIEF</b>	<b>)</b>	

**DIRECT TESTIMONY OF SAM YODER, P.E.**  
**ON BEHALF OF EAST KENTUCKY POWER COOPERATIVE, INC.**

**Filed: November 20, 2017**



1 **Q. Please state your name, business address, and occupation.**

2 A. My name is Sam Yoder and my business address is 9400 Ward Parkway, Kansas City, MO  
3 64114. I am a Project Manager for Burns and McDonnell Engineering Company, Inc.  
4 (“Burns and McDonnell”).

5 **Q. Please tell me about Burns and McDonnell.**

6 A. Burns & McDonnell is a full-service engineering, architecture, construction, environmental  
7 and consulting solutions firm, based in Kansas City, Missouri. Our staff of 5,700 includes  
8 engineers, architects, construction professionals, planners, estimators, economists,  
9 technicians and scientists, representing virtually all design disciplines. We plan, design,  
10 permit, construct and manage facilities all over the world.

11 **Q. Please state your education and professional experience.**

12 A. I have a B.S. in Chemical Engineering and B.S. in Mathematics from the University of  
13 Missouri, Columbia, 2007. I have worked for Burns & McDonnell for 10 years and I am a  
14 Professional Engineer in the Commonwealth of Kentucky.

15 **Q. Please provide a brief description of your duties at Burns and McDonnell.**

16 A. I am a Project Manager with Burns & McDonnell’s Energy Division. I am responsible for  
17 supervising and coordinating engineering staff, design, project schedule and cost, project  
18 planning, multi-contract coordination and management, and serve as the primary liaison  
19 with the Client.

20 **Q. What is the purpose of your testimony in this proceeding?**

21 A. The purpose of my testimony is to describe the role of Burns and McDonnell in helping  
22 EKPC develop the proposed CCR/ELG Compliance Project. I will also authenticate the  
23 Project Scoping Report (“Scoping Report”) that Burns and McDonnell prepared on behalf  
24 of EKPC.

1   **Q.    Are you sponsoring any exhibits as part of your testimony?**

2   A.    Yes. My *curriculum vitae* is attached hereto as Exhibit SY-1. A copy of the Scoping  
3       Report that I mentioned previously is attached hereto as Exhibit SY-2. These documents  
4       were developed under my direct supervisory control.

5   **Q.    How has Burns and McDonnell been involved in the development of the CCR/ELG**  
6       **Compliance Project?**

7   A.    EKPC approached Burns and McDonnell about helping to identify the technical solutions  
8       to comply with the CCR Rule and the ELG Rule. Since we were engaged, Burns and  
9       McDonnell has worked with EKPC to define the CCR/ELG Compliance Project which  
10       included developing a Bottom Ash / FGD Wastewater Control Technology Evaluation, an  
11       Ash Pond Closure Options Evaluation, an Electrical Load Flow Study, and the associated  
12       Key Documents to define the CCR/ELG Compliance Project Scope. The above listed  
13       evaluations were utilized by EKPC to decide the best compliance strategy for Spurlock  
14       Station. Once EKPC selected the technology and pond closure approach, Burns and  
15       McDonnell developed the Scoping Report that defines the preliminary design, project  
16       schedule and cost estimate. The product of that effort is the Scoping Report that is attached  
17       to my testimony as SY-2.

18   **Q.    What does the Scoping Report cover?**

19   A.    The Scoping Report is intended to provide EKPC and other interested parties, such as the  
20       Public Service Commission, an understanding of the CCR/ELG Project scope,  
21       assumptions, conceptual design, schedule and associated cost estimate. The Executive  
22       Summary and Introduction provide the highest-level summary and put some necessary  
23       caveats on what Burns and McDonnell was asked to accomplish as part of its review.

1 Section 3.0, the Project Definition section of the Scoping Report includes more details of  
2 the Project.

3 The Project Definition section describes the existing layout and configuration of  
4 the Spurlock Station and provides a reasonably high-level overview of the mechanical,  
5 electrical and control systems that will be required on the CCR/ELG Project. The Project  
6 Definition also includes a discussion on permitting requirements that are likely to be  
7 applicable to the CCR/ELG Project's development and a discussion of the existing  
8 facilities that will be demolished as part of the CCR/ELG Project.

9 The next major component of the Scoping Report is the Contracting Approach  
10 Section. In that portion of the Scoping Report, the contracting method that EKPC has  
11 selected to utilize on the CCR/ELG Project from the perspective of retaining contractors  
12 and subcontractors has been described. An important feature of this portion of the Scoping  
13 Report is the inclusion of a list of each major contract as well as a matrix showing how  
14 each contract interfaces with other contracts. This matrix helps EKPC plan and track the  
15 sequencing of the contracts accordingly. The last part of the Contracting Approach section  
16 of the Scoping Report provides a general description of the scope of each contract and  
17 further breaks the CCR/ELG Project down into construction contracts and equipment  
18 contracts.

19 The next section of the Scoping Report covers the Schedule for the CCR/ELG  
20 Project. It describes the major milestones that must be met in order to timely complete the  
21 work involved and also describes how the project will fit into the planned outages for the  
22 Spurlock Station.

23 The last major section of the Scoping Report is the Cost Estimate discussion. In  
24 this part of the Scoping Report, we provide estimates for both the capital investment and

1 the operations and maintenance investment associated with the CCR/ELG Project. We  
2 also have a discussion of the assumptions we used in preparing our cost estimates and how  
3 we calculated contingency amounts. Finally, there is a discussion of the cash flow that will  
4 be necessary to sustain the development of the CCR/ELG Project over the multiple years  
5 of design, procurement and construction.

6 Finally, the Scoping Report concludes with several Appendices that support the  
7 various topics mentioned above.

8 **Q. Do you believe that the \$262.4 million cost estimate associated with the CCR/ELG**  
9 **Compliance Project is a reasonable estimate?**

10 A. Yes. While there are assumptions that were made in the process of preparing the Scoping  
11 Report and certain limitations that exist when any engineer develops a project before  
12 beginning the project, the estimate we developed in preparing the Scoping Report is of  
13 budgetary planning quality for similar projects of this complexity and size.

14 **Q. Since completing the Scoping Report, what has Burns and McDonnell been doing to**  
15 **assist EKPC in the further development of the CCR/ELG Compliance Project?**

16 A. The final draft of the Scoping Report was substantially completed in March of 2017, but it  
17 was not published in its final form until October 2017. In April of 2017, EKPC and Burns  
18 and McDonnell have entered into a new contract whereby Burns and McDonnell will  
19 continue to provide further planning and detailed design work to assist with the  
20 development and implementation of the CCR/ELG Project. Generally, the recent activities  
21 toward that end involved working on further development of the project execution plan,  
22 gathering plant data and information, and developing long-lead time equipment  
23 specifications.

24 **Q. Does this conclude your testimony?**

1 A. Yes.



COMMONWEALTH OF KENTUCKY  
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:

THE APPLICATION OF EAST KENTUCKY	)	
POWER COOPERATIVE, INC. FOR APPROVAL	)	
TO AMEND ITS ENVIRONMENTAL	)	
COMPLIANCE PLAN AND RECOVER COSTS	)	CASE NO. 2017-00376
PURSUANT TO ITS ENVIRONMENTAL	)	
SURCHARGE, SETTLEMENT OF CERTAIN	)	
ASSET RETIREMENT OBLIGATIONS AND	)	
ISSUANCE OF A CERTIFICATE OF PUBLIC	)	
CONVENIENCE AND NECESSITY AND	)	
OTHER RELIEF	)	

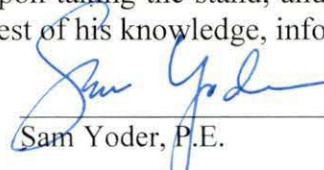
---

VERIFICATION OF SAM YODER, P.E.

---

STATE OF Missouri )  
 )  
COUNTY OF JACKSON )

Sam Yoder, P.E., Energy Division Project Manager with Burns and McDonnell, being duly sworn, states that he has read the foregoing prepared direct testimony and that he would respond in the same manner to the questions if so asked upon taking the stand, and that the matters and things set forth therein are true and correct to the best of his knowledge, information and belief.

  
\_\_\_\_\_  
Sam Yoder, P.E.

The foregoing Verification was signed, acknowledged and sworn to before me this 16 day of November, 2017 by Sam Yoder.

SARA BETH ACTON  
Notary Public - Notary Seal  
STATE OF MISSOURI  
Jackson County  
My Commission Expires April 20, 2019  
Commission # 15634903

  
\_\_\_\_\_  
NOTARY PUBLIC

Commission No. 15634903

My Commission Expires: 20 April 2019

## SAMUEL YODER, P.E.

### Project Manager



Mr. Yoder is a Project Manager with Burns & McDonnell's Energy Division. Mr. Yoder has been involved in more than \$1.5 Billion in coal-fired power plant pollution control retrofit projects. Mr. Yoder's experience includes all major phases of large capital projects, including project planning studies and evaluations, detailed engineering design, multi-contract coordination and management, construction and commissioning at coal-fired power plants.

#### EDUCATION

- ▶ BS, Chemical Engineering
- ▶ BS, Mathematics

#### REGISTRATIONS

- ▶ Professional Engineer (MO, KY)

**10** YEARS WITH BURNS & MCDONNELL

**10** YEARS OF EXPERIENCE

### Spurlock Station Coal Combustion Residuals and Effluent Limitations Guidelines Scoping Study | East Kentucky Power Cooperative

2016-2017

*Project manager* for the Spurlock Station coal combustion residuals (CCR) and effluent limitations guidelines (ELG) project scoping study. The study involves preliminary engineering design to determine the project costs and schedule to comply with CCR and ELG regulations on Spurlock Units 1 and 2.

### Coal Combustion Residuals and Effluent Limitations Guidelines Scoping Study | Confidential Client

2016-2017

*Project manager* for a coal combustion residuals (CCR) and effluent limitations guidelines (ELG) project scoping study. The study involves preliminary engineering design to determine the project costs and schedule to comply with CCR and ELG regulations at a coal-fired power plant.

### Coal Combustion Residual Documents Implementation Program | East Kentucky Power Cooperative

2015-2016

*Project manager* for the EKPC CCR Implementation Program that included the documents required to meet the new EPA CCR Rule. Documents included inspection lists, groundwater monitoring studies, quality assurance program, fugitive dust program, and website/data management development. Roles included reviewing and developing documentation for EKPC CCR implementation, client coordination and internal engineering coordination.

### Spurlock Station Site Drainage Improvement Project | East Kentucky Power Cooperative

2015-2016

*Project manager* for a diverse and fast paced project at Spurlock Station. The project consists of design and specification development, as well as construction management for rerouting the wet FGD blowdown from the coal pile runoff pond to the ash pond almost 8,000 feet away in less than 6 months. Once the reroute was completed, design and specifications were developed for deepening and lining the existing coal pile runoff pond. Lastly, site pavement design drawings and specifications were developed to pave nearly 15 acres at Spurlock Station.



## SAMUEL YODER, P.E.

(continued)

### Wilson Station Dry Sorbent Injection Project | Big Rivers Electric Corporation

2014-2016

*Project manager* for the Wilson Station Dry Sorbent Injection project. The project consists of dry sorbent injection silo, pipe rack and injection grid on Wilson Unit 1. The project consisted of developing design and specifications for the equipment supply contract as well as the installation contract.

### Dale Station Ash Pond Closure and Site Restoration | East Kentucky Power Cooperative

2013-Present

*Project manager* for closure by removal of ash ponds at East Kentucky Power Cooperative's Dale Station near Ford, Kentucky. The project consists of removal of approximately 500,000 cubic yards of coal combustion residuals (CCR) from multiple ponds along the Kentucky River and hauling the CCR material to a landfill being developed at East Kentucky Power Cooperative's J.K. Smith Station.

### Cooper Station Unit 1 – Duct Reroute Project | East Kentucky Power Cooperative

2013-2016

*Project manager* for the Cooper Unit 1 duct reroute project. The project consists of re-routing the Cooper Unit 1 flue gas into the previously constructed Cooper Unit 2 circulating dry scrubber system for MATS compliance. This unique project consisted of several equipment and material supply contracts as well as two installation contracts.

### Green Station Units 1 & 2 MATS Compliance Project | Big Rivers Electric Corporation

2013-2015

*Project manager* for the Green Station Unit 1 & 2 MATS compliance project. The project consists of dry sorbent injection and powdered activated carbon injection on Green Units 1 & 2 for MATS compliance. The project consisted of detailed design and specification development for equipment supply, pilings, foundations, and mechanical construction. In addition, the project had multiple installation contracts that required coordination.

### Spurlock Station Mercury Control Project | East Kentucky Power Cooperative

2013-2015

*Project manager* for the Spurlock Station mercury control project. The project involves the addition of a wet flue gas desulfurization (FGD) mercury reemission additive and a fuel additive to Spurlock Units 1 and 2.

### MATS Compliance Study | Indianapolis Power and Light

2014

*Project manager* for the Indianapolis Power and Light MATS compliance study that evaluated the potential application of calcium bromide fuel additive for Harding Street Unit 7. The purpose of the study was to determine whether the application of fuel additive alone could bring Harding Street Unit 7 into MATS compliance. In addition to the feasibility evaluation, Mr. Yoder helped develop a testing plan that could be utilized by IP&L for testing the fuel additive application.

### Cooper Station Unit 2, East Kentucky Power Cooperative

2009-2013

Mr. Yoder was the process engineer for the Cooper Unit 2 environmental project. The project involved the addition of a circulating dry flue gas desulfurization (FGD) system, baghouse, and selective catalytic reduction (SCR) systems to Cooper Station Unit 2, which is 225 MW.



## **SAMUEL YODER, P.E.**

(continued)

Mr. Yoder was the field mechanical engineer for the Cooper Unit 2 environmental project. In this role, Mr. Yoder answered both technical and contractual questions from the installing contractors, assisted in coordinating the onsite work activities between multiple installation contractors, and coordinated and managed the equipment manufacturer's field representative services.

Mr. Yoder was the process commissioning engineer for the Cooper Unit 2 environmental project. In this role, Mr. Yoder assisted in commissioning the SCR, the circulating dry scrubbing FGD, primary air fan, forced draft fan, induced draft fan, and air heater. In addition, Mr. Yoder assisted in commissioning the balance of plant equipment for the Cooper Unit 2 environmental project.

### **Cholla Power Station Unit 3, Arizona Public Service**

2007-2010

Mr. Yoder was the process engineer for the Cholla Unit 3 and Unit 4 scrubber and baghouse retrofit project for Arizona Public Service. The project involved the addition of wet FGD systems on each Unit, a new baghouse on Unit 4, and the replacement of the existing hot side electrostatic precipitators (ESP) with a baghouse on Unit 3. The Unit 4 ESP, which was abandoned on the Unit 4 retrofit, was converted into the Unit 3 baghouse.

### **Seminole Generating Stations Units 1 & 2, Seminole Electric**

2007-2009

Detailed engineering and design for modifications to existing air pollution control equipment and installation of new air pollution control equipment for the existing Units 1 and 2. Work included new SCRs, urea injection, sorbent injection testing, sorbent injection equipment for SO<sub>3</sub> control, and FGD modifications including new mist eliminator wash, installation of perforated trays, and new gypsum dewatering equipment.

### **Merom Station, Hoosier Energy Rural Electric Cooperative, Inc.**

2007

Development of specifications and drawings for procurement of sulfuric acid mist (SAM) control system. System was designed for reagent injection upstream of the existing particulate collection device.



# Spurlock Station – CCR / ELG Compliance Project Scoping Report



**East Kentucky Power Cooperative**

Project No. 89810  
Rev. 0  
October 2017



# **Spurlock Station – CCR / ELG Compliance Project Scoping Report**

**Prepared for**

**East Kentucky Power Cooperative  
Winchester, Kentucky**

**Project No. 89810**

**Rev. 0  
October 2017**

**Prepared by**

**Burns & McDonnell Engineering Company, Inc.  
Kansas City, Missouri**

COPYRIGHT © 2016 BURNS & McDONNELL ENGINEERING COMPANY, INC.

## INDEX AND CERTIFICATION

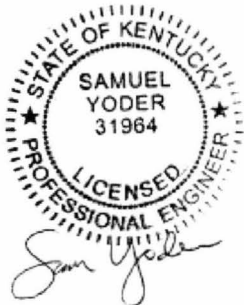
**East Kentucky Power Cooperative  
Spurlock Station –  
CCR / ELG Compliance Project Scoping Report  
Project No. 89810**

### Report Index

<u>Chapter Number</u>	<u>Chapter Title</u>	<u>Number of Pages</u>
1.0	Executive Summary	5
2.0	Introduction	2
3.0	Project Definition	24
4.0	Contracting Approach	24
5.0	Schedule	2
6.0	Cost Estimate	4
Appendix A	Drawings	78
Appendix B	Equipment List	7
Appendix C	Scope Assumptions Matrix	5
Appendix D	Design Basis	2
Appendix E	Schedule	5
Appendix F	Cost Estimate	2
Appendix G	Cash Flow	3
Appendix H	Permitting Matrix	2

### Certification

I hereby certify, as a Professional Engineer in the Commonwealth of Kentucky, that the information in this document was assembled under my direct supervisory control. This report is not intended or represented to be suitable for reuse by East Kentucky Power Cooperative or others without specific verification or adaptation by the Engineer.



\_\_\_\_\_  
Samuel Yoder (Kentucky License No. 31964)

Date: October 31, 2017

Oct 31 2017

## TABLE OF CONTENTS

	<u>Page No.</u>
<b>1.0 EXECUTIVE SUMMARY .....</b>	<b>1-1</b>
1.1 Purpose.....	1-2
1.2 Project Execution Approach .....	1-3
1.3 Schedule.....	1-3
1.4 Cost Estimate .....	1-4
1.5 Project Risks .....	1-5
 <b>2.0 INTRODUCTION .....</b>	 <b>2-1</b>
2.1 Background .....	2-1
2.2 Scope of Study .....	2-1
2.3 Limitations and Qualifications.....	2-1
 <b>3.0 PROJECT DEFINITION .....</b>	 <b>3-1</b>
3.1 Project Overview .....	3-1
3.2 Plant Location and Layout.....	3-2
3.3 Mechanical Systems.....	3-4
3.3.1 Wastewater Treatment System .....	3-4
3.3.2 Fly Ash Handling System .....	3-8
3.3.3 Bottom Ash Handling System .....	3-9
3.3.4 Balance of Plant Systems.....	3-10
3.3.5 Water Mass Balance Pond Chemical Treatment System.....	3-12
3.4 Permitting Modifications .....	3-13
3.5 Electrical Systems.....	3-15
3.5.1 Auxiliary Electrical Power Supply .....	3-15
3.5.2 Direct Current (DC) Power Supply.....	3-17
3.5.3 Communications .....	3-17
3.5.4 Grounding and Lightning Protection .....	3-17
3.5.5 Area Lighting.....	3-18
3.6 Control Systems .....	3-18
3.6.1 General.....	3-18
3.6.2 DCS System Architecture .....	3-18
3.6.3 PLC Integration.....	3-19
3.6.4 Instrumentation .....	3-19
3.6.5 Startup and Commissioning .....	3-20
3.7 Civil / Structural / Architectural .....	3-20
3.7.1 Geotechnical .....	3-20
3.7.2 Civil.....	3-20
3.7.3 Structural.....	3-23
3.7.4 Lead and Asbestos Abatement.....	3-23
3.7.5 Pre-Engineered Buildings .....	3-24
3.8 Demolition .....	3-24

3.8.1	Mechanical .....	3-24
3.8.2	Electrical .....	3-24
3.8.3	Civil / Structural / Architectural .....	3-24
<b>4.0</b>	<b>CONTRACTING APPROACH.....</b>	<b>4-1</b>
4.1	General Approach .....	4-1
4.2	Contract List.....	4-1
4.3	Interface Schedule.....	4-2
4.4	Contract Scopes .....	4-4
4.4.1	General .....	4-4
4.4.2	Construction Contracts.....	4-5
4.4.3	Equipment Contracts.....	4-16
<b>5.0</b>	<b>SCHEDULE.....</b>	<b>5-1</b>
5.1	Critical Milestones .....	5-1
5.2	Project Schedule.....	5-1
<b>6.0</b>	<b>COST ESTIMATE .....</b>	<b>6-1</b>
6.1	General.....	6-1
6.2	Basis and Assumptions .....	6-1
6.2.1	Capital Cost Estimate Scope.....	6-1
6.2.2	Major Capital Cost Estimate Assumptions .....	6-2
6.2.3	Major Commercial Terms.....	6-2
6.3	Operations & Maintenance Estimates.....	6-3
6.4	Economic Conditions Considerations.....	6-3
6.5	Contingency .....	6-3
6.6	Summary Cost Estimate.....	6-3
6.7	Summary Cost Item Description.....	6-3
6.8	Cash Flow .....	6-4
 <b>APPENDIX A - DRAWINGS</b>		
<b>APPENDIX B - EQUIPMENT LIST</b>		
<b>APPENDIX C - SCOPE ASSUMPTIONS MATRIX</b>		
<b>APPENDIX D - DESIGN BASIS</b>		
<b>APPENDIX E - SCHEDULE</b>		
<b>APPENDIX F - COST ESTIMATE</b>		
<b>APPENDIX G - CASH FLOW</b>		
<b>APPENDIX H - PERMITTING MATRIX</b>		

**LIST OF TABLES**

	<b><u>Page No.</u></b>
Table 1-1: Project Scope .....	1-1
Table 1-2: Project Milestones .....	1-4
Table 3-1: Maximum and Minimum Values for Water Quality Constituents from Spurlock Units 1 & 2.....	3-6
Table 3-2: Potential ELG and Target Water Quality Based Compliance Limits .....	3-14
Table 4-1: List of Contracts .....	4-1
Table 4-2: Contracts Interfaces .....	4-3



**LIST OF ABBREVIATIONS**

<b><u>Abbreviation</u></b>	<b><u>Term/Phrase/Name</u></b>
ABB	ASEA Brown Boveri
AC	Alternating Current
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
AWQC	Ambient Water Quality Criteria
BMcD	Burns & McDonnell
BOP	Balance of Plant
CHDPE	Corrugated High-Density Polyethylene
CCR	Coal Combustion Residuals
CFB	Circulating Fluidized Bed
CPCN	Certificate of Public Convenience and Necessity
DC	Direct Current
DCS	Distributed Control System
EKPC	East Kentucky Power Cooperative
ELG	National Effluent Limitations Guidelines and Standards
ESP	Electrostatic Precipitator
F&E	Furnish and Erect
FGD	Flue Gas Desulfurization
GA	General Arrangement
gpm	Gallons per Minute
HDPE	High-Density Polyethylene

<b><u>Abbreviation</u></b>	<b><u>Term/Phrase/Name</u></b>
HMI	Human Machine Interface
IO	Input Output
KBC	Kentucky Building Code
KPDES	Kentucky Pollutant Discharge Elimination System
kV	Kilovolt
LNTP	Limited Notice to Proceed
MCC	Motor Control Center
MM	Million
MVA	Megavolt
MVC	Mechanical Vapor Compression
MW	Megawatt
NCMC	Non-Chemical Metal Cleaning
NID	Novel Integrated Design
O&M	Operations and Maintenance
ORSANCO	Ohio River Valley Water Sanitation Commission
OSHA	Occupational Safety and Health Administration
P&ID	Process and Instrumentation Diagram
PCM	Power Control Module
ppb	Parts per Billion
ppm	Parts per Million
ppt	Parts per Trillion
PSC	Public Service Commission

<b><u>Abbreviation</u></b>	<b><u>Term/Phrase/Name</u></b>
PSR	Project Scope Report
RUS	Rural Utility Service
SCR	Selective Catalytic Reduction
Spurlock	Spurlock Generating Station
SST	Station Service Transformers
SWPPP	Storm Water Pollution Prevention Plan
TCP/IP	Transmission Control Protocol / Internet Protocol
TSS	Total Suspended Solids
V	Volt
VDC	Volts of Direct Current
WMB	Water Mass Balance
WWT	Wastewater Treatment

## 1.0 EXECUTIVE SUMMARY

East Kentucky Power Cooperative (EKPC; Owner) operates the Hugh L. Spurlock Generating Station (Spurlock) in Maysville, KY. Spurlock consists of four operating coal-fired units: Unit 1 is a 300 net megawatt (MW) pulverized coal fired unit built in 1977, Unit 2 is a 510 net MW pulverized coal fired unit built in 1981, Unit 3 is a 268 net MW circulating fluidized bed (CFB) unit built in 2005, and Unit 4 is a 268 net MW CFB unit built in 2009. Unit 1 is equipped with selective catalytic reduction (SCR), cold-side electrostatic precipitator (ESP), wet flue gas desulfurization (FGD) scrubber, and a wet ESP. Unit 2 is equipped with SCR, hot-side ESP, wet FGD scrubber, and a wet ESP. Units 3 and 4 are equipped with selective non-catalytic reduction, flash dry absorber dry flue gas desulfurization scrubbers (also known as novel integrated design or NID), and baghouses. Spurlock burns a range of eastern bituminous coals.

Spurlock will be subject to the Environmental Protection Agency's Coal Combustion Residual (CCR) Rule issued in April 2015 and the Steam Electric Power Generating Effluent Limitation Guidelines (ELG) issued in September 2015. EKPC has retained Burns & McDonnell (BMcD) to assist in developing the scope, design, schedule and cost estimates to bring Spurlock Station into compliance with the CCR and ELG regulations. In addition, future permit requirements that may be more stringent than CCR and ELG compliances for other process flows were reviewed. This includes anticipated metals limits from the site's next Kentucky Pollutant Discharge Elimination System (KPDES) permit and the Ohio River Valley Water Sanitation Commission (ORSANCO) proposed permitting limits on discharges to the Ohio River. The scope includes the items summarized in Table 1-1 and discussed in detail in Section 3.0.

**Table 1-1: Project Scope**

<b><u>Major Scope Items</u></b>	<b>Description</b>
Optimized MVC System	The FGD wastewater for Units 1 and 2 will be processed in a new "Optimized Mechanical Vapor Compression (MVC) System" with falling film evaporators (FFE) designed for 240 gpm and 160 gpm treated by ash mixing and dry scrubber evaporation in Units 3 and 4. This is referred to as the Optimized MVC System herein.
Fly Ash	The scope includes a new fly ash storage silo and new fly ash transfer building with equipment to handle additional fly ash from Units 1 and 2.
Bottom Ash	The scope includes the conversion of the bottom ash system from a "wet" sluicing system to a new "dry" pneumatic system including new bottom ash hoppers, piping, and a silo.
Balance of Plant	The scope includes new piping, controls, instrumentation, electrical, and mechanical equipment in the Project to operate these new systems.

**Table 1-1: Project Scope**

<b>Major Scope Items</b>	<b>Description</b>
Water Mass Balance (WMB) Pond / Ash Pond Closure	The scope includes closure of the existing Ash Pond through removal of an estimated 1.75 million cubic yards of CCR material and re-purposing 17-acres of the total 67-acres to a new WMB pond. A new pond chemical treatment system is included to aid in settling constituents from various plant process flows including air heater wash wastewater / non-chemical metal cleaning (NCMC) wastes to meet proposed discharge requirements.

The scope does not include capital costs required for systems to comply with the following:

- Landfill Leachate– Currently, leachate limits for Total Suspended Solids (TSS) are based on the existing KPDES permit. The current permit has a more stringent limit on TSS for any 1-day maximum and 30-day average than ELG criteria for combustion residual leachate from existing sources. Oil and grease have no existing permit limit for leachate. Based on this information, it is not expected that additional treatment will be required for compliance.

## 1.1 Purpose

The purpose of this report is to present the study results for use in EKPC's evaluation of Project feasibility and budgeting as part of the Project development phase. The report provides the overall scope, schedule, and cost estimate of the Project based on the documents contained herein.

Prior to the development of this Project Scoping Report (PSR), three screening level reports were developed to assess the options available for meeting CCR, ELG, and potential ORSANCO or other permitting compliance at Spurlock. These reports were the following:

- Bottom Ash / FGD Wastewater Control Technology Evaluation which identifies potential technologies that are applicable to Spurlock for bottom ash handling and FGD wastewater control.
- Water Mass Balance Pond Recommendations which identifies the need for a WMB pond with a chemical feed system to meet proposed and expected ORSANCO limits on discharging wastewaters to the Ohio River.
- Ash Pond Closure Options Study which provides various options for closure of the existing Ash Pond to meet CCR compliance.



The selected modifications following EKPC's review of the screening level reports included an Optimized MVC System for FGD Wastewater Treatment (WWT), a pneumatic bottom ash handling system, and a 17-acre WMB pond following closure through removal of CCR material (also referred to as clean closure) of the existing Ash Pond which are described herein.

Additionally, an Electrical Load Flow Study report was developed to assess the electrical powering options available for the new CCR / ELG Project equipment. This electrical study provided recommendations including two new 138kV to 13.8kV transformers for powering the WWT equipment and tie-ins to the existing general services 4160V switchgear on Units 1 and 2 for the new fly ash transfer and bottom ash equipment. For purposes of this PSR, the recommendations provided in the Electrical Load Flow Study report were followed and used in the Project development.

## **1.2 Project Execution Approach**

The selected contracting strategy for the Project is a multiple contract approach with adjustment unit pricing. The multiple contract approach provides EKPC with more control over the design of the Project, the quality and type of the equipment and materials, and more ability to make changes as the Project progresses.

In the multiple contract approach, EKPC and an Owner's Engineer will work together to create and procure the construction and major equipment contracts for the Project. The procurement of the long lead time equipment such as the bottom ash handling system, Optimized MVC System, and fly ash handling system is necessary early in the Project to support detailed design and equipment delivery schedules that meet the required outage dates and the required regulatory dates. The contracting approach includes multiple equipment / material contracts and several construction contracts, as referenced in Section 4.2. The equipment contracts allow EKPC to reduce the cost of contractor markup via competitive bidding.

## **1.3 Schedule**

The Project schedule is driven by the need to comply with CCR and ELG regulations. The critical path of the Project is significantly impacted by long procurement lead time items for WWT and ash handling. Additionally, a CPCN is required for this Project. The duration of the CPCN permitting process is significant as equipment cannot be procured and construction cannot commence until the CPCN is approved, which can take up to six months to complete. Table 1-2 reflects the major milestones for the Project. The complete schedule is provided in Appendix E.

**Table 1-2: Project Milestones**

<b><u>Activity</u></b>	<b><u>Date</u></b>
LNTP Engineering/Permitting Activities Commence	April 2017
Commence CPCN Application	September 2017
Commence EKPC Board Approval of Project	February 2018
CPCN Approval	March 2018
EKPC Board Approval of Project	April 2018
FNTP Engineering	April 2018
Award of Long Lead Equipment	April 2018
Commence Switchyard Tie-In Outage Scheduling	March 2018
Commence Construction	January 2019
Ash Pond Closure / WMB Pond Commencement	January 2020
Switchyard Tie-In Outage	March 2020
Unit 1 Outage Commence	March 2020
Unit 1 Outage Complete	May 2020
Unit 2 Outage Commence	September 2020
Unit 2 Outage Complete	December 2020
WMB Pond Complete	December 2021
WMB Pond Sampling Complete	October 2022
WMB Pond Chemical Feed Equipment Construction Complete	October 2023
Ash Pond Closure Complete	November 2024

## 1.4 Cost Estimate

Safety will be a primary focus for the Project. The Project estimate includes full time safety professionals on-site during construction to oversee the entire Project's safety. Each contractor will also be required to provide full time safety professionals to properly manage safety during Project execution.

The estimated capital cost for the Spurlock CCR / ELG Project is \$262.4 MM including escalation for mechanical completion on Units 1 and 2 in 2020 and pond closure completion in 2024. This estimate is based on the capital cost basis and assumptions in Section 6.0 and Appendix C. A Project estimate and definition contingency is included in this estimate to cover the accuracy of pricing and commodity estimates for the scope defined in this report. In addition, an Owner's cost of \$8.5 Million is included in

the Project estimate based on input from EKPC. Owner's contingency for discretionary costs were not included per EKPC's request.

### **1.5 Project Risks**

Long lead equipment items associated with WWT and ash handling systems pose risk to schedule and cost, due to an increased market demand for ash handling and WWT equipment which is causing longer lead times as well as potentially higher pricing. Other potential Project risks are associated with the Ash Pond closure and include the implementation period which is nearly five years following this evaluation, and the accuracy of estimating the depth of CCR material in the pond that far into the future.

In addition, due to CCR / ELG projects potentially being constructed by others in the same time frame, there is a Project risk for labor availability and the associated labor rates assumed with this estimate.

\* \* \* \* \*

## **2.0 INTRODUCTION**

### **2.1 Background**

EKPC is developing a CCR / ELG Compliance Project for Spurlock Station near Maysville, Kentucky. As part of the Project development, EKPC retained BMcD to evaluate and perform the preliminary design of modifications at Spurlock to achieve compliance with the CCR, ELG, and potential ORSANCO or other permit regulations. The CCR / ELG Project will consist of providing an Optimized MVC System for FGD WWT, an upgrade to the existing fly ash handling system, modification of the existing bottom ash handling system and closure of the existing Ash Pond through removal of CCR material and then repurposing a small portion of the existing Ash Pond to a new WMB pond. This report summarizes the Project scope and presents the study results for use in EKPC's evaluation of Project feasibility and budgeting.

### **2.2 Scope of Study**

The PSR includes preparation of the following major items:

1. Project Design Basis
2. Key Conceptual Design Documents
3. Capital Cost Estimate
4. Owner's Cost Estimate
5. O&M Cost Estimate
6. Project Execution Schedule
7. Project Annual Cash Flow
8. Permitting Matrix

The PSR defines preliminary design parameters for major components of the Project and provides adequate information to support the following activities:

1. Evaluation of the economics of the Project
2. Preparation of a Project schedule
3. CPCN Application and PSC Approval process

### **2.3 Limitations and Qualifications**

Estimates and projections prepared by Burns & McDonnell relating to schedules, performance, construction costs, and operating and maintenance costs are based on our experience, qualifications and judgment as a professional consultant. Since Burns & McDonnell has no control over weather, cost and

availability of labor, material and equipment, labor productivity, construction contractor's procedures and methods, unavoidable delays, construction contractor's method of determining prices, economic conditions, government regulations and laws (including interpretation thereof), competitive bidding and market conditions or other factors affecting such estimates or projections, Burns & McDonnell does not guarantee that actual rates, costs, performance, schedules, etc., will not vary from the estimates and projections prepared herein.

\* \* \* \* \*



### 3.0 PROJECT DEFINITION

#### 3.1 Project Overview

The CCR / ELG Compliance Project for Spurlock includes modifications to major mechanical systems and repurposing the existing Ash Pond to a smaller WMB pond. The following provides an overview of the major systems associated with the Project.

- **Optimized MVC System** – The scope associated with the Optimized MVC System includes the addition of a FGD WWT facility to treat FGD blowdown for Spurlock Units 1 and 2. The selected WWT facility will have falling film evaporators (FFE) which are designed to treat 240 gpm of FGD wastewater. Due to a combined FGD wastewater flow that is nominally 400 gpm, the remaining 160 gpm will be managed by ash mixing in the existing fly ash silos and by dry scrubber evaporation on Units 3 and 4. The combination of the WWT facility, ash mixing, and dry scrubber evaporation is referred to as an Optimized MVC System specific to Spurlock.
- **Fly Ash** – This scope includes installation of a new transfer station building (and equipment) and a new fly ash storage silo to supplement and add redundancy to the existing fly ash system which is currently adequate for Units 1 and 2. The existing fly ash transfer station building and equipment will be demolished after placing the new transfer station and equipment into service.
- **Bottom Ash** – The scope associated with bottom ash includes the conversion of the existing bottom ash system on Units 1 and 2 from a “wet” sluicing system to a “dry” system. For bottom ash, this includes the installation of a new pneumatic bottom ash handling system including a new bottom ash storage silo and modification to the boiler bottom ash hoppers. Also included in the bottom ash modifications are economizer ash modifications on Units 1 and 2 where a new pressure feeder and economizer tank are provided with piping routed into the bottom ash handling system. Additionally, a separate pyrites handling system with dewatering bins and a settling basin will be provided.
- **Balance of Plant (BOP)** – This includes the various BOP systems required to operate the systems noted previously. Some of those systems include interconnecting piping, controls, instrumentation, and an electrical system consisting of two new PCM buildings as well as new 13,800 / 480V station service transformers. The power feed from the switchyard to the WWT PCM is via two new 138kV / 13.8kV low resistance grounded transformers.
- **Water Mass Balance (WMB) Pond / Ash Pond Closure** – The scope associated with the WMB pond includes closure of the existing Ash Pond by removal of CCR materials estimated at 1,750,000 cubic yards. A new 17-acre WMB pond will be established for managing other process

flows and stormwater for Spurlock in the western portion of the existing Ash Pond. Additionally, a new pond chemical feed system is required to regulate pond pH, alkalinity, total suspended solids, and assist in the removal of iron and other chemical constituents primarily from the coal pile runoff stream, neutralization basins, clarifiers and NCMC wastes from air heater washes. This chemical treatment system may be required to allow the discharge from the WMB pond to meet future permit requirements through existing Outfall #001. Chemicals fed by the system include sodium hydroxide (caustic), polymer, and sulfuric acid. The remaining area, not re-purposed to a WMB pond, will have the CCR material removed to the existing landfill, and new topsoil and seed applied to the pond bottom. Based on EKPC input, the storage capacity of the existing landfill with the addition of Peg's Hill expansion has adequate storage capacity for the inclusion of the relocated material from the Ash Pond closure and therefore no costs were included in this estimate for the Peg's Hill expansion. The Ash Pond area "clean closed" will not be regraded to drain. The new dike separating the WMB pond and this "clean-closed" Ash Pond will have an emergency overflow placed in it for potential upset conditions that may arise as well as this area may be used while cleaning out of constituent build-up in the bottom of the WMB pond. A ramp has been included to access the "clean-closed" area for maintenance activities. It however should be noted that the area "clean-closed" will not have an engineered liner and placing process flows into this area could lead to groundwater issues.

### **3.2 Plant Location and Layout**

Spurlock is an existing power plant located just west of Maysville, Kentucky on the Ohio River. The CCR / ELG Compliance Project is a modification of the existing ash handling equipment and provision of new WWT equipment on the site. The layout is influenced by existing structures, access, constructability, capital costs, O&M costs, and consideration of minimizing outage time during construction. A preliminary set of general arrangement and site layout drawings for the Project are included in Appendix A. Plant north is approximately a 30-degree rotation to the west of true north. The general arrangements and site layout drawings reflect a plant northing on the drawings, not a true northing.

The layout began with the preliminary sizing of the major equipment and locating that equipment in available areas. As the Project developed, the arrangements were modified with vendor input on equipment sizing for the major systems based on budgetary specifications developed by Burns & McDonnell. The new WWT equipment was located southwest of the existing coal pile and just east of the existing process / maintenance building. Additionally, the new fly ash silo was located in the same area and near the existing fly ash silo. The bottom ash silo and handling equipment was located just south of the old Unit 1 stack or just north of the Unit 1 boiler building. The new fly ash transfer building was

located adjacent to the existing transfer building. Finally, the WMB pond chemical feed system was located near the future WMB pond to make use of existing roads capable of supporting chemical delivery trucks adjacent to the pond influent and effluent pipelines.

Location of cranes influenced the major equipment layout as well. The new fly ash silo and WWT equipment will require crane access in this area of the site while not affecting the ash hauling road so that regular EKPC plant operations can continue throughout construction. Crane access for the fly ash transfer building will be provided from the northeast of the building adjacent to the Unit 2 stack. For the bottom ash silo, crane access will be in the open area just north of Unit 1.

Multiple locations for the fly ash silo were considered. Locating the fly ash silo close to the Unit 1 and Unit 2 precipitators was considered. This would allow for a vacuum only system, simplifying the fly ash handling equipment necessary for this Project. However, concerns with increased truck traffic near the plant removed this location from further evaluation. Additionally, the bottom ash silo required a location near units 1 and 2 which took up available space that might have been used for the fly ash silo. Instead, the new fly ash silo will be located in the green-field area located to the southeast of the existing silo along with the WWT facility. This area was selected by EKPC as the preferred location as it is near the existing fly ash silo and reduces the amount of pipe links, steel, and electrical interconnections needed. Additionally, with the silo close to the landfill, the O&M costs associated with hauling fly ash will be similar to the O&M costs from the existing fly ash silo.

The new fly ash transfer building will be located in the open area to the east of the existing transfer building in order to maintain close proximity to the hoppers on each unit. The existing fly ash transfer station will remain in service during the new construction in order to reduce outage time. In addition, while the vacuum piping tie-in is made to the new fly ash transfer system, the existing fly ash sluicing system could be used to temporarily transfer fly ash to the pond and further reduce the outage requirements.

The bottom ash silo location was evaluated for multiple locations as well. The governing factor for its location was limiting pipe distance and bends as bottom ash is very abrasive. Additionally, it is difficult to convey when the silo is more than 1000 feet away from the boiler. The selected location will allow for truck loading of bottom ash and pyrites with the ability to turn around within the existing footprint north of Unit 1. The location will also leave open space available for EKPC's use during major unit outages.

Finally, new WMB pond chemical feed equipment will be located just west of the existing pond and near the existing pipe rack to provide chemical feed near the inlet and outlet of the pond to minimize pipe runs.

Roads from the plant to the new equipment location will be paved to accommodate truck traffic which is consistent with current paving for trucks at Spurlock.

### **3.3 Mechanical Systems**

#### **3.3.1 Wastewater Treatment System**

The 400 gpm FGD blowdown streams from the Unit 1 and Unit 2 wet FGD scrubbers will be re-directed from the existing purge tanks to the new WWT system via a system of tanks and pumps. The wastewater is first equalized in redundant equalization tanks. Solids are then precipitated and removed via physical / chemical treatment clarifiers and reaction tanks. The sludge from the clarifiers is pumped to sludge storage tanks prior to being compressed into solid cake in the WWT filter presses. The clarified wastewater overflow from the clarifiers is collected in a clearwell and then pumped to two redundant clarified water storage tanks which are sized for 10 days of storage based on EKPC input and 225 gpm of additional FGD flow when Units 3 and 4 are both off-line.

From these tanks, the wastewater is either pumped to the MVC treatment system or back to the plant for storage in day tanks. The four one-day tanks and pumps in the plant allow the clarified wastewater to be either evaporated in the Unit 3 or Unit 4 NID, or utilized for ash mixing water in the pugmills within the existing Unit 3 / 4 ash silos. New high alloy NID mixers and ash pugmills are being provided to handle the higher level of chlorides in the clarified wastewater. The destination of the clarified wastewater within the plant is controlled with control valves in the distribution piping to maintain levels in each day tank per operator discretion.

Wastewater that is pumped from the clarified water tanks into the MVC system undergoes chemical pre-treatment, in-line filtering, and is pre-heated before entering the thermal falling film evaporators. The evaporators are a 2 x 60% arrangement and generate a purified distillate stream and high solids, high chlorides blowdown or brine stream. Vapor produced in the evaporators undergoes mechanical vapor compression and is constantly recycled to the evaporators to increase thermal efficiency. The distillate produced is used to pre-heat the incoming wastewater and is then sent to a storage tank. The distillate is used throughout the WWT system for assorted flushes and makeup water. Distillate which is not re-used is pumped to the WMB pond for discharge. However, the distillate can be periodically used in the Unit 1 wet FGD, Unit 2 wet FGD, Unit 1 cooling tower, and Unit 2 cooling tower for makeup water. The use of distillate for makeup water in these systems is limited however, to avoid cycling up of chlorides. Control valves and new piping connections to the systems for distillate usage are provided.

The blowdown / brine stream produced in the evaporators is cooled and then sent to two brine storage tanks near the new fly ash silo. The brine is pumped into the new fly ash silo pugmill for wet ash conditioning resulting in zero liquid discharge of the brine. The brine can also be pumped to the clarified water storage tanks as the large volume in these tanks will sufficiently dilute the chloride level. The water can then be pumped from the clarified water storage tanks back to the plant for elimination in either the NIDs or Unit 3 / 4 ash silos as described above. Routing the brine concentrate to the clarified water storage tanks would only be performed when the brine storage tanks are full and cannot be used in the Unit 1 / 2 fly ash silo.

The coagulant chemical storage tank will be provided with full volume containment. The chemical unloading truck area will include a spill pad and containment vault designed to hold one unloading truck chamber along with an allowance for storm water.

Curbed areas will be drained to a sump and pumped to the facility holding tanks. The newly established parking and outage laydown areas will drain to the existing ditch running south of the coal pile.

Pre-engineered building structures will be utilized to the extent possible. A pre-engineered building has been estimated for the WWT building with other buildings such as the filter press building, fly ash transfer building, and vacuum exhauster building estimated as stick-built structures. However, these stick built structures may later be developed in detailed design as pre-engineered buildings. The WWT building will be a single pre-engineered building housing the majority of the WWT equipment. A two-story conventional steel-frame structure will house the filter press equipment. Storage tanks, silos, and clarifiers will be located outdoors with associated pumps located within pre-manufactured enclosures near those larger tanks, silos, and clarifiers.

The piping, process equipment, and instrumentation of the new WWT system are shown on P&IDs WW-01 through WW-31 and WE-01 included in Appendix A. Refer to Appendix D for detailed design data used for sizing the system and equipment described above. The FGD blowdown wastewater quality is provided in Table 3-1 and some of the values were based on actual samples taken between February 2014 and August 2015 while others were based on similar project sites where constituent information was available. BMcD recommends additional water quality sampling be performed prior to procurement of equipment.



**Table 3-1: Maximum and Minimum Values for Water Quality Constituents  
from Spurlock Units 1 & 2**

Pollutant	Unit	Minimum Value	Maximum Value
Alkalinity	ppb	300	
Antimony	ppb	0.5	3.6
Arsenic	ppb	0.83	10.2
Beryllium	ppb	0.14	4.8
Cadmium	ppb	0.8	40.6
Calcium	ppm	4,561 (Design Value)	
Chromium	ppb	0.6	15.6
Chloride	ppm	20,000	
Copper	ppb	0.6	102.8
Fluoride	ppm	118	
Iron	ppb	35.1	9833.8
Lead	ppb	0.6	11.1
Magnesium		927	
Manganese	ppb	69,190	458,621
Mercury	ppt	20	5610
Nickel	ppb	94.8	534.0
Nitrate	ppm	3.1	27.3
Nitrite	ppm	0.2	10.0
pH	SU	5.13	6.15
Selenium (total)	ppb	242.7	3,154.4
Silver	ppb	1.2	2.13
Sodium	ppm	200	
Sulfate	ppm	1,117	
Silica	ppm	200	
Thallium	ppb	1.9	50.6
TSS	ppm	40,000	
Zinc	ppb	12	400

### 3.3.1.1 Wastewater Treatment Auxiliary Boiler System

Saturated steam is required for start-up of the falling film evaporators, as well as during normal operation. Due to the remote location of the WWT area from the existing plant, an auxiliary boiler skid is provided to utilize service water to produce steam as required. An ion-exchange skid is utilized as part of this system to treat the service water prior to its use as makeup water to the boiler. Ion-exchange resins (both anion and cation) are periodically sluiced from the ion exchange skid and taken off site for regeneration.

The auxiliary boiler utilizes electricity to generate steam from the purified service water. Following system startup, purified distillate from either falling film evaporator may be used instead of service water as makeup to the boiler.

The piping, process equipment, and instrumentation associated with the auxiliary boiler system are shown on P&ID SS-01 included in Appendix A.

### **3.3.1.2 Wastewater Treatment Chemical Feed System**

The WWT system requires the feed of various chemical streams at relatively small flow rates. Some of these chemical feed systems are tank and metering pump arrangements, while others are tote and metering pump arrangements. Chemical feed systems are located within or adjacent to the chemical storage room of the WWT Building. The following is a list of the chemical feed systems and their purpose within the WWT system:

- Sulfuric acid lowers pH to suitable range following the physical / chemical treatment system and prior to the falling film evaporators. Sulfuric acid solution is stored in chemical totes in the chemical room of the WWT building.
- Antifoam prevents foaming in the falling film evaporators which can lead to poor heat transfer and system shutdown. Antifoam solution is stored in chemical totes.
- Scale inhibitor prevents scaling of the falling film evaporator heat transfer surfaces. Scale inhibitor solution is stored in chemical totes in the chemical room of the WWT building.
- Polymer aids in the formation of large particle agglomeration which will promote settling in the clarifiers. Polymer solution is stored in an indoor storage tank in the chemical room of the WWT building and has an outdoor fill connection. Service water is mixed with the concentrated polymer solution to produce a dilute solution which is then injected into the WWT process.
- Coagulant aids in the formation of large particle agglomeration which will promote settling in the clarifiers. Coagulant is stored in outdoor storage tank which has separate containment area.

The piping, process equipment, and instrumentation associated with the WWT chemical feed systems are shown in P&IDs WW-23 through WW-25 included in Appendix A. Refer to Appendix D for design basis information used for preliminarily sizing the system and equipment.

### **3.3.1.3 WWT Hydrated Lime Handling System**

New hydrated lime storage silos and slurry makeup systems will be provided adjacent to the WWT building to produce hydrated lime slurry for pH adjustment of the FGD blowdown wastewater. Hydrated

lime is pneumatically unloaded into the silos by means of truck connections at grade. The lime is fed from the silo via two redundant trains in each silo using weigh bins with load cells which allow measurement of the flow of hydrated lime into each wastewater treatment system. Lime is metered out of the weigh bins into screw feeders. For the case of the WWT hydrated lime system, the lime from the screw feeders is fed to two redundant slurry makeup tanks where service water is added to create a hydrated lime slurry. The slurry is then pumped into the WWT system via two redundant recirculation loops.

The piping, process equipment, and instrumentation associated with the new hydrated lime handling systems as well as the tie-ins to the existing plant piping are shown on P&IDs LH-01, PC-02, and PC-03 included in Appendix A.

#### **3.3.1.4 Other Process Flows**

BMCD included treatment of air heater wash wastewater and NCMC wastes by placement of the NCMC wastes into the coal pile runoff pond, where it would provide initial settling of constituents. The coal pile runoff pond effluent would continue to be routed to the WMB pond and be treated by the WMB pond chemical treatment equipment to aid in settling of constituents prior to discharge. If necessary and constituent discharge limits are not met at the new WMB pond outlet, the effluent can be retreated as the Project includes the ability to route the water from the primary and secondary lagoon back to the WMB pond for another opportunity to chemically treat the wastewater prior to discharge from Outfall #001.

Landfill leachate wastewater was not included in the Project estimate. At this time, the ELG limits on landfill leachate appear to be met and no additional treatment is required for compliance.

#### **3.3.2 Fly Ash Handling System**

The existing fly ash handling system can operate as either a wet or dry system. The wet hydroveyor system will be removed from service after the installation of the new systems. The existing dry system uses vacuum exhausters to transport the fly ash from the hoppers to the ash storage tanks located in the existing fly ash transfer building. From the ash storage tank, the fly ash is transported to the existing fly ash silo using a pressure system.

A new fly ash silo is needed to provide additional redundancy to the system since the current system redundancy is provided by the wet hydroveyor system, which is being removed from service. The new fly ash handling system will use vacuum exhausters to transport the fly ash from the SCR, air heaters and precipitator hoppers from Spurlock Units 1 and 2. The ash will be transferred to filter separators and from there will be transported via pressure system to either the new fly ash silo or the existing fly ash silo. The filter separators, vacuum exhausters, and the pressure blowers (or compressors) will be located within a

new fly ash transfer building. In order to size the equipment and silo, the ash production rates were calculated based on operating both Spurlock Unit 1 and 2 at full load with coal containing 16% ash and an ash composition of 79% fly ash / 21% bottom ash. The ash removal rates are based on a 2:1 removal to production ratio. The total fly ash removal rate for the new system is 119 tons per hour for Units 1 and 2 combined. Ash production and removal rates used as the preliminary design basis are provided in Appendix D.

An upgrade of the existing system was considered. However, the existing wet system is not capable of providing full redundancy to the dry fly ash system (due to equipment degradation and additional loading from Units 1 and 2) and will require a longer plant outage to support installation of replacement equipment within the existing building. Additionally, current O&M on the existing equipment in the existing transfer building is difficult due to limited space and may create safety issues.

The piping, process equipment, and instrumentation associated with the modifications to the existing fly ash system are shown on the P&ID's in Appendix A. A list of major equipment required for the new fly ash handling system is also included on the equipment list in Appendix B.

### **3.3.3 Bottom Ash Handling System**

The existing bottom ash system utilizes sluice pumps, jet pumps and clinker grinders to sluice the ash to the pond. The existing ash sluice pumps and the piping to the pond will be repurposed and / or abandoned in place and a new pneumatic bottom ash handling system will be installed to replace the current ash sluicing system. The remaining equipment, including hoppers beneath the boilers, will be demolished for the new equipment.

The new bottom ash system on each unit will utilize pneumatic conveying equipment to handle approximately 16 tons per hour of combined bottom ash from the existing boilers on Units 1 and 2. This system is completely dry and uses no water for conveying the ash. A new set of dry hoppers will be installed that will have jaw crushers, isolation doors, another set of crushers, and a screw conveyor prior to the pneumatic piping to the filter separators and into the bottom ash silo via vacuum exhausters. Ash is cooled with an inlet flow of forced draft fan air. Additionally, economizer ash will be combined into the bottom ash system where the existing wet hydroveyor will be replaced with a new dry screw feeder that takes economizer ash to a new economizer ash tank and is then combined with the bottom ash piping and conveyed to the new bottom ash silo.

The unloading floor of the silo will be equipped with a new unloading conditioner (pug mill) that will moisten and load the ash into open top trucks for disposal. The silo will also be equipped with a dry unloading chute for unloading into trucks for disposal at the landfill.

The existing boiler seal trough system will be replaced with a new dry seal system. This system is a multi-layer seal that is similar in nature to an expansion joint made of high temperature fabrics and chain mesh.

The pyrites system will have a new, independent system of pumps, piping, dewatering bins, settling basin and sludge return pumps.

General arrangements and P&ID's can be found in Appendix A and the equipment list is included in Appendix B. Bottom ash production rates used for sizing the bottom ash silo and equipment can be found in Appendix D.

### **3.3.4 Balance of Plant Systems**

#### **3.3.4.1 Compressed Air**

The WWT building will house a new compressed air system to provide the required air for the equipment located in the WWT area and at the fly ash silo. The system will consist of two new compressors, a desiccant air dryer, and an air receiver to provide dry service and instrument air. Main users for compressed air will be the WWT filter presses, air operated diaphragm sludge and chemical feed pumps, fly ash silo bin vent filter, service air drops, valves, and instruments.

The fly ash transfer building, new bottom ash silo, and bottom ash vacuum exhaust enclosure will receive compressed air from the existing plant system as assumed on the approximate tie-in locations provided on the general arrangements in Appendix A. Main users for compressed air will be silo bin vent filter, service air drops and valves and instruments.

The WMB pond chemical feed area will be supplied with compressed air via a tie-in located in the existing ammonia storage area. A final tie-in location has not been chosen, but assumptions have been made for an approximate tie-in location and as identified on drawing GA1003 and IA-02 located in Appendix A. The main compressed air users in this area will service air hose drops, valves, and instruments.

The piping, process equipment, and instrumentation associated with the new compressed air system as well as the tie-in to the existing plant air are shown in P&IDs IA-01 and IA-02 included in Appendix A.



#### **3.3.4.2 Service Water**

The fly ash silo, bottom ash system, and WWT system will require service water. The tie-in to the existing service water system for the WWT area will be made near the existing fly ash silo at the existing process / maintenance building and routed above grade to the new WWT building and as identified on drawings GA1001 and WS-01 located in Appendix A. The main service water users in this area will be pump flush water, cooling water for blowdown / brine, hydrated lime slurry makeup, polymer makeup water, filter press cloth washes, seal water, startup steam makeup, hose drops, and water supply to the fly ash unloading pugmills located in the new silo.

The service water needs of the new fly ash transfer building and bottom ash silo will be supplied via a tie-in located in the existing plant and as identified on drawing GA1007 and WS-01 located in Appendix A. The main service water users in this area will be the bottom silo unloading pugmills, pyrite system makeup water, and hose drops.

Service water to the WMB pond chemical feed area will be supplied by the potable water system as discussed in a later section. The piping, process equipment, and instrumentation of the new service water system are shown on P&ID WS-01 included in Appendix A.

#### **3.3.4.3 Potable Water**

The fly ash silo, bottom ash system, and WWT system require potable water for both safety shower / eyewash stations and remote service water users. The tie-in to the potable water system for the WWT area and new fly ash silo will be made near the existing fly ash silo at the existing process / maintenance building and routed above grade to the new WWT building and fly ash silo as identified on drawings GA1001 and PW-01 located in Appendix A.

The potable water needs of the new fly ash transfer building and bottom ash silo will be supplied via a tie-in located in the existing plant and as identified on drawing GA1007 and PW-01 located in Appendix A. The potable water users in the fly ash transfer building and bottom ash silo will be safety shower / eyewash stations.

For the WMB pond chemical feed area, potable water will be utilized as service water to avoid the additional costs of running a new service water line in addition to a potable water line. The WMB pond chemical feed area also requires safety shower / eyewash stations due to chemical storage and unloading operations. The tie-in to the potable water system for the WMB pond area will be made near the existing ammonia storage area and routed above grade to the new WMB pond area. Refer to drawings GA1003 and PW-01 located in Appendix A for approximate tie-in locations. The potable water users in this area

will be safety shower / eyewash stations, hydrated lime slurry makeup, polymer mixing, and service water hose drops.

#### **3.3.4.4 Fire Protection Water**

The new structures for the Project will require new fire hydrants located in the vicinity of the WWT area. Tie-ins will be made to the existing fire protection system and routed below grade to the location of the new hydrants. The approximate tie-in location has been identified on drawings GA 1001 and FW-01 located in Appendix A.

#### **3.3.4.5 Lagoon Water Discharge**

With the removal of the wet bottom ash sluicing system it will be necessary to have other means of recirculating water from the existing lagoons back to the WMB pond. To facilitate this, the existing lagoon pumps will be left in place and a new line installed that will tie-in to the abandoned basalt lined bottom ash line that is currently routed to the existing Ash Pond. This will allow the lagoon water to be pumped back to the new WMB pond.

The piping, process equipment, and instrumentation of the new service water system are shown on P&ID WTR-0001 included with the report in Appendix A.

#### **3.3.4.6 Utility Racks**

The new ash transport and balance of plant piping between the plant and new WWT and fly ash silo area will be located on elevated racks, where necessary, to eliminate existing operating and maintenance issues associated with the ash transport piping being located in a trench system. The rack will be located along the road between the coal pile and the plant. Cable tray will also be routed on this rack for the power feed cables to the WWT area and for fiber connection to the plant. After crossing the road adjacent to the coal pile, the pipe and cable tray will be routed on a sleeper rack to reduce the costs associated with supporting the piping and to facilitate maintenance on the piping system. Plan and section views of the rack are shown on drawings in Appendix A.

### **3.3.5 Water Mass Balance Pond Chemical Treatment System**

The WMB pond system requires the feed of various chemical streams at relatively small flow rates to treat a peak flow from coal pile run-off pond during a 10-year storm event and NCMC wastes from air heater washes. These chemical feed systems are tote and metering pump arrangements. Chemical feed systems are located within the WMB pond chemical feed enclosure. The following is a list of the chemical feed systems and their purpose in the WMB pond chemical treatment system:

- Polymer aids in the formation of large particle agglomeration which will promote settling in the WMB pond. Polymer solution is stored in totes in the WMB pond chemical feed enclosure. Service water is mixed with the concentrated polymer solution to produce a dilute solution which is then injected into the coal pile runoff discharge piping upstream of the WMB pond. A static mixer in the piping provides mixing and contact to promote efficient polymer usage prior to the process flow entering the WMB pond for settling.
- Sulfuric acid lowers the pH of the WMB pond discharge stream prior to outfall into the Ohio River. The pH can increase during algae blooms in the WMB pond which may cause the permitted pH range limit of 6-9 to be exceeded, without such a system. A static mixer in the piping creates a thoroughly mixed solution for better process control and acid utilization.
- Reaction tank is used to provide mixing of the process flows with chemicals prior to discharge into the WMB pond.
- Hydrated lime provides pH adjustment for other process flows including the coal pile runoff pond. A new hydrated lime silo is provided adjacent to the new WMB pond chemical feed building.

The piping, process equipment, and instrumentation associated with the WMB pond chemical feed systems are shown on P&IDs PC-01 and PC-02 included in Appendix A. Refer to Appendix D for design basis information used for preliminarily sizing the system and equipment described above.

### 3.4 Permitting Modifications

The new mechanical systems described in Section 3.3 will require EKPC to modify the existing air permit(s) and KPDES permits for Spurlock. The following is a list of new or revised air emission points that may need to be addressed in the revised air permit(s):

- WWT Hydrated Lime Silo Bin Vent Filter
- WMB Pond Chemical Feed Area Hydrated Lime Silo Bin Vent Filter
- Bottom Ash Silo Bin Vent Filter
- New/Redundant Fly Ash Silo Bin Vent Filter
- Fly Ash Exhausters (4)
- Bottom Ash Exhausters (4)
- Economizer Ash Tank Vent

Additionally, to air emission points, there may be modifications to the existing Spurlock KPDES permit for the distillate discharge stream from the WWT system, which will be directed to the new WMB pond.

In addition to air emission points, there may be modifications to the existing Spurlock KPDES permit for the distillate discharge stream from the WWT system. For the purposes of permitting and planning, subject to ELG Reconsideration, EPA Rulemaking and Courts decisions, at this time, to achieve the 2015 ELG Effluent Guidelines Limitations for FGD WWT effluent limits, EKPC has elected the Optimized MVC system that will be capable of meeting ELG physical/chemical plus biological limits. OEM's have strongly cautioned against accepting the ELG voluntary incentives program limits because they may not be able to contractually guarantee the equipment meeting the new voluntary incentives program limitations. In addition, for permitting and planning purposes, the distillate from the MVC will be discharged into the new WMB pond ahead of the secondary lagoon and Ohio River Outfall #001 as shown on the Water Mass Balance diagram located in Appendix A. Should operating experience lead to a different internal discharge point, EKPC will update the Division and file an application as needed. The 2015 ELG limitations and WQBELs as anticipated to apply to Spurlock Station are indicated in Table 3-2. ELG limits are based on a 30-day average. WQBELs are anticipated daily maximum values, except for WQBELs that are based upon chronic criteria or fish consumption (selenium, lead, thallium), which are 30-day averages.

**Table 3-2: Potential ELG and Target Water Quality Based Compliance Limits**

<u>Parameter<sup>1</sup></u>	<u>FGD ELG Limit<sup>2</sup></u>	<u>WQBEL<sup>3</sup></u>
Arsenic <sup>2</sup>	8 µg/l	340 µg/L
Mercury <sup>2</sup>	356 ng/l	51 ng/L
Selenium <sup>2,4</sup>	12 µg/l	50 µg/L <sup>4</sup>
Nitrates / Nitrites, as N <sup>2</sup>	4.4 mg/L	-
Copper	-	14 µg/L
Iron	-	4 mg/L
Chromium III	-	570 µg/L
Chromium VI	-	16 µg/L
Zinc	-	120 µg/L
Cadmium	-	2.1 µg/L
Lead <sup>5</sup>	-	32 µg/L
Silver	-	3.8 µg/L
Thallium <sup>6</sup>	-	4.7 µg/L
Chloride	-	1200 mg/L
Nickel	-	470 µg/L

<sup>1</sup> Pollutants expected to be potentially present in significant concentrations based upon prior monitoring data.

<sup>2</sup> EPA is reconsidering the Steam Electric Effluent Limitation Guidelines and will go through rulemaking per the EPA response to the Court in a letter dated August 11, 2017 from E. Scott Pruitt, EPA Administrator. Two of the six waste streams are under reconsideration review: bottom ash transport water and flue gas desulfurization (FGD) wastewater stream. Noted above are the expected and potential compliance effluent limitations for FGD wastewater based on 30-day average based upon the current ELGs. Limits as discussed apply at FGD wastewater treatment system outlet.

<sup>3</sup> Values derived for Ohio River outfall assuming no diffuser is used and a mixing zone/variance is granted from ORSANCO's mercury limit. Hardness-dependent criteria for copper, chromium III, cadmium, lead, nickel, silver, and zinc are based on an assumed hardness of 100 mg/L and a reasonable mixing zone is granted for chronic criteria. Limits apply at Outfall #001.

<sup>4</sup> This is the predicted trigger level based upon an Ohio River mixing zone for the 5 µg/L chronic selenium criterion and assuming a conservative dilution factor of 10. If exceeded, fish tissue sampling would be triggered to ensure compliance and the fish tissue data would take precedence. The fish tissue standard that applies in the river is 8.6 micrograms/g (dry weight) of whole fish tissue.

<sup>5</sup> Limit dependent on size of mixing zone as this is a chronic criteria limitation. Predicted limit assumes a dilution factor of 10.

<sup>6</sup> Limit dependent on size of mixing zone as this is a fish consumption criterion. Predicted limit assumes a dilution factor of 10.

<sup>7</sup> Subject to EPA Reconsideration, and interpretation, potential FGD ELG limits would apply to the internal outfall from the WWT system whereas the WQBEL limits would apply to Outfall #001. By Final Rule published September 18, 2017, EPA postponed the earliest compliance date for FGD wastewater and bottom ash transport water to November 1, 2020. The last possible compliance date remains December 31, 2023. As noted in the September 18, 2017 Final Rule, EPA is reconsidering the ELG standards for the FGD WWT internal discharge and bottom ash transport water. As a result, the FGD limits in Table 3-2 may be revised and go through rulemaking, and public comment.

Appendix H provides a permitting matrix for anticipated permitting modifications, fees, and durations associated with those permits.

Finally, there may be permit and / or CCR document updates required for new fugitive dust sources and truck routes to new ash handling locations at the bottom ash silo, fly ash silo, and pyrites dewatering bins, as well as to the new chemical feed area near the existing Ash Pond. These documents will need to be updated periodically as required by the state and / or CCR Rule, or more frequently if needed.

### **3.5 Electrical Systems**

#### **3.5.1 Auxiliary Electrical Power Supply**

A 13.8kV switchgear lineup arranged in a main-tie-main configuration will be installed in a new PCM local to the WWT building, and supplies power to two water treatment compressors and to four station service transformers (SST) rated 13.8kV / 480V, 2000 / 2667kVA. The four SST's serve two 480V switchgear lineups, each arranged in a main-tie-main configuration to provide redundancy on the 480V system. The 480V switchgear buses supply five 480V motor control centers (MCC), which feed the WWT and fly ash silo process and building service loads.

A second 4160V switchgear lineup arranged in a main-tie-main configuration will be installed in a PCM local to the new fly ash transfer building. The 4160V fly ash transfer switchgear supplies power to three fly ash conveyor compressors and to two SST's, rated 4160V / 480V, 2000 / 2667kVA. The two SST's



serve a 480V switchgear arranged in a main-tie-main configuration. The fly ash transfer 480V switchgear A and B buses supply two 480V MCC's, which feed the fly ash transfer building, bottom ash, BOP, and WMB pond process and building service loads. The new fly ash transfer process and building service loads replace the existing Unit 2 fly ash transfer system. Based on the equipment list included in Appendix B, the total anticipated load of the WWT system is approximately 5MVA, and the total anticipated combined load of the fly ash transfer, bottom ash handling, BOP, and WMB pond systems is 4.5MVA.

The power supply to the WWT area PCM will be from two new 6.5 / 8.65MVA, 138kV / 13.8kV, low resistance grounded transformers. The proposed location for the new transformers, 138kV breakers arranged in a breaker and half scheme, and a 13.8kV breaker on the secondary of each transformer is in the existing 138kV switchyard. It is anticipated that two spare transformers on the north end of the 138kV switchyard will be relocated to new pads and concrete containment, such that if the size of the new equipment dictates, no new cabling or equipment will be installed under existing high voltage cabling from the switchyard to the plant. A firewall will be installed between the two new oil-filled transformers and the transformers will be placed on new concrete pads with concrete containment, however, no fire detection or suppression system is included or required beyond the firewall and concrete containment.

The power cabling from the secondary of the transformers will be routed in duct bank to cross the road on the south end of the plant, and stub up into a new tray system to follow the existing cable tray route from transformer T2A to the Unit 1 FGD 4160V switchgear. The new tray system will transition onto the new pipe rack at the back of the plant, and continue to the new WWT PCM.

The existing Unit 2 fly ash transfer building 4160V feed from the Unit 2 general services switchgear will be repurposed to feed the new fly ash transfer 4160V switchgear, Bus B. A spare breaker in the Unit 1 general services switchgear will be used to feed the new Fly Ash Transfer 4160V switchgear, bus B. The power cabling will be routed in cable tray from the general services switchgear in Unit 2 through the Unit 1 and 2 powerhouses to the new fly ash transfer PCM.

The Project is based upon the large electrical power distribution equipment being housed in PCMs that will be shop fabricated and shipped to site with electrical equipment installed and pre-wired. The large electrical power distribution equipment is segregated into two PCMs, one for the WWT area and one for the new fly ash transfer building area. The PCMs will be elevated on concrete piers with the cable tray system installed under the enclosure and both cable and non-segregated phase bus passing through cutouts

in the floor into the electrical power equipment, which will be specified for bottom entry. Platforms and stairs will be provided to access the PCMs.

Bus differential relays will be installed on medium voltage switchgear to reduce arc flash hazard rating. Electrical relays in the switchgear will be wired to the DCS for monitoring (see Section 3.5). Maintenance switches will be placed at 480V switchgear and 480V MCCs to reduce arc flash hazard rating while maintaining equipment.

An overall electrical one-line diagram (EE-1-0008) for the electrical distribution system for the WWT and fly ash transfer equipment have been included in Appendix A. This drawing shows the major electrical modifications based on a preliminary evaluation of the power requirements of the new equipment. A list of major electrical equipment is included in Appendix B.

### **3.5.2 Direct Current (DC) Power Supply**

The DC supply to the new WWT equipment requiring 125VDC power will be supplied from a new flooded cell DC battery system located in the WWT PCM. The Project basis for the battery sizing is based upon 120-minute capacity after the loss of alternating current (AC) power. The battery charger is based upon a 12-hour re-charge time for the batteries while serving the continuous load. The DC power supply for electrical equipment in the fly ash transfer PCM will be supplied from the Unit 1 FGD electrical building.

### **3.5.3 Communications**

The system will include speakers, amplifiers and wiring to match the existing plant Gai-Tronics communication systems. The page and party lines system will be connected into the existing plant system but will be powered from the new power distribution system.

### **3.5.4 Grounding and Lightning Protection**

An extension of the existing plant grounding system will be provided. The Project includes a system of buried bare copper ground conductor and copper-alloy sectional type ground rods. Grounding is included around the perimeter of the WWT PCM, WWT building enclosure, along the pipe rack and pipe sleepers, the fly ash transfer building, and the fly ash transfer PCM. Grounding has also been included for tanks, silos, and totes as identified in the equipment list in Appendix B.

The Project includes lightning protection for the fly ash silo, the WWT area, the fly ash transfer building area, the WMB pond enclosure and area, and portions of the pipe rack not protected by surrounding structures.

### **3.5.5 Area Lighting**

Area LED lighting in the new WWT building, filter press building, fly ash transfer building, bottom ash silo enclosure, WMB enclosure, standalone equipment enclosures, and both PCM's is included to adequately light the building for normal O&M. Stanchion mounted LED lighting on walkways was also included for the new pipe rack from the new fly ash transfer building area to the WWT area, and on walkways over new tanks in the WWT area and new tanks in the existing Unit 3 and 4 plant area.

## **3.6 Control Systems**

### **3.6.1 General**

The existing plant DCS, by ABB, will be expanded and / or modified to incorporate the new controls to be installed. A new set of redundant processors will be installed in each of the two new PCMs (WWT & fly ash transfer areas) to control the local equipment. The two PCMs will also each contain a local workstation. The new servers to be installed will be located in the WWT PCM.

Control logic implemented within the DCS will be based on information and logic submittals from the equipment manufacturers. The graphics developed for the DCS will be P&ID style graphics based on the graphic examples and P&IDs from the equipment vendors and other Project P&IDs. Existing DCS templates and standards for both logic and graphics will be incorporated into the new equipment design. It is anticipated the local DCS workstations in the PCMs will be the primary interface for control and monitoring of these systems; however, because the DCS will be integrated with the existing plant control system, the flexibility will exist for operating from other locations.

The system will have a Modbus Transmission Control Protocol / Internet Protocol (TCP / IP) communication interface to communicate with ancillary equipment for supervisory control and monitoring. Critical signals will be hardwired to the DCS.

EKPC has indicated that there will be an upgrade to the existing plant's DCS system in the near future. If possible, this will be coordinated and implemented with this Project, however that has not been included in the Project estimate, execution, or schedule currently.

### **3.6.2 DCS System Architecture**

New DCS equipment will be provided to control and monitor the new Project equipment to be installed. The DCS will be complete with redundant controllers, input / output (IO), Remote IO, power supplies, and ancillary hardware, fully wired and tested. The system will also include necessary servers, network

switches, media converters, and associated hardware for each communication link. Connection to the existing plant DCS will allow for the interface of existing plant DCS IO with the new equipment.

A new set of redundant DCS processors and local IO will be installed in each of the new PCMs (WWT & fly ash transfer areas). A remote IO rack will be installed in the WMB building. Utilizing these three distribution locations will minimize cables runs to instrumentation and electrical IO. IO for each system will be partitioned such that no one module, rack, or controller will prevent the entire system from operation. DCS communication cabling will be fiber for communication external to the PCMs or buildings housing the DCS equipment.

The WWT PCM will contain the new front end and system servers, as well as the redundant DCS processor pair and local IO. A local human machine interface (HMI) will be located in the WWT PCM. The fly ash transfer area PCM will contain a redundant DCS processor pair, local IO, and a local HMI as well. The operator graphics will include P&ID style animated graphics, faceplate controls, status screens, and alarm screens for monitoring and control.

Air compressors and switchgear relays for each system will be monitored and controlled through a combination of Modbus TCP / IP communications and hardwire control. Critical control points will be done through hardwired control. It is expected that at a minimum the Trip / Open command and Closed or Start and Stop functionality will be hardwired. Alarm acknowledge resets will be performed at the equipment controller or relay.

### **3.6.3 PLC Integration**

The majority of the Project equipment is to be DCS controlled. Pre-packaged equipment supplied with a local controller or PLC will be interfaced to the DCS. Where applicable, a communication interface to the local PLC may be utilized to for status and control; otherwise, a hardwired interface will be utilized to bring requisite information and control into the DCS. Logic modifications will be required for tie points, alarming, and / or status in the plant DCS.

### **3.6.4 Instrumentation**

The Project instrumentation will be supplied by either a supplier or under the associated installation contract. The ash handling equipment supplier will be responsible for providing instrumentation for the ash handling equipment. On-skid instrumentation will be provided by the associated equipment supplier. The remaining contingent of instruments for BOP will be provided under the installation contract.

### **3.6.5 Startup and Commissioning**

Startup management is included by Owner's Engineer with craft support by mechanical and electrical contractors. The equipment suppliers will support and advise equipment and controls startup and commissioning with technical advisors. Startup will include communications tests and IO checkout. Each piece of equipment will be operated from the HMI to confirm control and status. Sequence operations will be tested and verified. It is expected that equipment vendors for the air compressors, DCS, and switchgear will be present to assist with communications testing.

## **3.7 Civil / Structural / Architectural**

### **3.7.1 Geotechnical**

Current geotechnical information includes existing reports from construction of Units 1 through 4. Based on these existing geotechnical reports provided by EKPC, major equipment foundations were preliminarily sized and deep foundations utilizing H-piles with an installed depth of 120-feet to bedrock. To further refine foundations in detailed design, a geotechnical investigation will be performed.

### **3.7.2 Civil**

#### **3.7.2.1 Coordinate System**

The civil design coordinate system will provide horizontal and vertical control for precise location of proposed construction activities with respect to predetermined datum points. The drawings will provide sufficient information to show Spurlock plant grid system and orientation needed to properly locate existing and new work within the plant site, including the location of enclosures and structures (existing and new) with respect to a known location.

#### **3.7.2.2 Clearing, Grading, and Landscaping**

The areas to be cleared will be determined on the basis of the approximate construction limits so that as much as possible of the existing vegetation remains undisturbed. Removal and disposal will be subject to the guidelines of federal, state and local regulations in effect at the time of construction. Disposal of contaminated and hazardous materials will be off-site. Other construction trash and debris will be placed in trash containers and disposed of off-site.

Grades will be established to minimize the amount of earthwork required to construct the facilities. Rough or finished grading will be shown on construction drawings as solid contour lines. General grade of the transfer station and bottom ash and fly ash system areas will be verified during detailed design. Cut and fill will be performed to balance the site as much as possible. Additional grading work will occur



north of the east-west haul road for installation of the new pipe rack. Side slopes for ditches will be determined by soil testing which will verify slope stability and erosion characteristics.

Prior to construction, topsoil will be stripped from areas to be disturbed and stored separately on-site for use in site finishing construction. The areas adjacent to structures and exposed footings will be finish graded. The topsoil will be spread over areas which are disturbed during construction and do not receive other types of surface treatment such as riprap, crushed rock, or asphalt paving. Prior to completion of the work, these areas will be fine graded, seeded, and mulched.

Native grass seeding will be provided for areas disturbed by construction which are not covered with other surfacing. Sloped areas which are particularly subject to erosion will be protected by seeding or other methods of erosion control.

### **3.7.2.3 Storm Drainage**

Structures, piping, and grading will be provided to allow for positive storm drainage from new equipment work areas. New CHDPE culverts will drain portions of the new site to the existing coal pile drainage ditch, which will continue to drain to the existing coal pile runoff pond.

New catch basins and other structures, if deemed necessary during detailed design, will be constructed of reinforced concrete, and / or reinforced precast concrete. New structures will be designed to safely support external earth loads plus HS20 wheel loads, or greater, as necessary.

New storm drainage systems will be sized to handle the peak flow rate of the 10-year, 24-hour storm occurrence with minimal ponding and will be checked for flooding using the 25-year, 24-hour storm occurrence. New open ditches will have a minimum flow line slope of 0.3% with a maximum side slope of 3 horizontal to 1 vertical.

### **3.7.2.4 Roads, Drives, and Surfaced Areas**

The typical asphalt road section will be either heavy duty or light duty and match the existing pavement sections utilized at Spurlock. The heavy duty section will be designed for HS20 loading or greater. The light duty section will be designed for light traffic loading. As part of the road modifications, the haul road to the landfill will be widened next to the new WWT area to allow a separate set of lanes for normal plant traffic separate from the landfill haul truck traffic. New roads will be a minimum of, but not limited to, 12 feet wide (paved surface width). Typical roadway cross sections will be sloped to drain. The roads and approach ramps will have a maximum grade of 7%. The subgrade should consist of compacted material. New permanent roads will be designed for HS20 or greater loading.

Construction roads will be maintained throughout the construction period by various construction contracts. This maintenance will include removal of mud and snow, necessary grading and placing of additional crushed stone on temporary roads, and watering of roads during dry periods to mitigate dust problems. Existing and typical road maintenance will be maintained by EKPC during the construction period unless damaged by the construction contractor. The existing paved landfill haul road is designed for a 20 year life which includes the additional truck traffic from this Project's Ash Pond closure.

### **3.7.2.5 Dewatering**

Significant dewatering will need to occur at the existing Ash Pond during the closure work. This dewatering will be done by mechanical methods (i.e. construction equipment will move ash material into piles to create channels for water to drain out). It is assumed that the contractor's means and methods can be utilized during construction to eliminate potential negative impacts to water quality from the Ash Pond. EKPC will be responsible for monitoring the water quality during the construction period.

Due to the anticipated continual inflow of water from the coal pile runoff pond and the clarifiers, EKPC will be responsible for reducing the elevation of water in the existing Ash Pond to a minimum allowable operating depth prior to the start of Ash Pond closure activities where this elevation is anticipated to be 512 feet.

The lining portion of the new WMB pond work will be completed in two stages so the existing flows can continue to be treated via the "active" portion (where the new lining system is not being installed) of the Ash Pond. The dewatering product from the "inactive" portion of the Ash Pond will be directed to the "active" portion, during this time, and this water will then be sent to the existing pond outfall where it will be discharged. Once the "inactive" portion is lined, the two portions will switch.

### **3.7.2.6 Foundations**

The foundation system used may be spread footing, mat-type, or pile cap, but may change based on the geotechnical investigation. The crane loads and wind or seismic loads will not be considered as simultaneous loads. Concrete will be designed in accordance with the American Concrete Institute Building Code (ACI 318) and the Kentucky Building Code (KBC). Shallow foundations will bear at or below the frost depth as defined in ACI 318 and the KBC. Uplift forces will be taken by the weight of the footing and soil overburden or by piling embedment into rock or stiff soil. Foundations supporting rotating machinery will be checked for resonant frequency and will be isolated using expansion joints or isolation pads. Allowable settlements for total and differential settlement will be as determined from the future geotechnical investigation.

### **3.7.3 Structural**

#### **3.7.3.1 Access**

The Project will be arranged to facilitate access to equipment and systems for operations and maintenance. Stairs and / or platforms will be provided to allow personnel to access equipment; valves and instrumentation requiring frequent attention for maintenance, calibration or operation. Ladders will be provided where there is infrequent access to valves / instrumentation or space limitations dictate. WWT equipment access will utilize stairs to the top of tanks, filter presses, storage silos, and other equipment. Additionally, the WWT building includes a centrally located corridor with overhead doors which will be utilized for equipment maintenance. Access to the fly ash transfer equipment will be provided with a centrally located stair. Access to the fly ash silo and the bottom ash silo will be provided with an adjacent stair tower. Access to valves and actuators for the piping will be provided in the pipe rack framing or platforms as required.

#### **3.7.3.2 Basic Design Criteria**

Basic design criteria for the Project will be in accordance with the Kentucky Building Code (KBC) including appendices, amendments, and reference standard. The soil properties will be verified during detailed design by a geotechnical investigation. Materials for the Project will comply with the Occupational Safety and Health Administration (OSHA) Regulations and Standards 29CFR1910. Work performed on-site will comply with OSHA Regulations and Standards 29CFR1926. Additionally, work and materials will be in compliance with local, county, state, federal regulations, codes, standards, laws, and ordinances.

#### **3.7.3.3 Steel Structures**

Structural steel will be designed in accordance with American Institute of Steel Construction (AISC) 341 and 360. Steel structures associated with the Project include utility racks, filter press building, fly ash transfer building, bottom ash exhaust building, and supports for some ash handling and WWT equipment.

### **3.7.4 Lead and Asbestos Abatement**

It is recognized that the existing equipment may contain asbestos material and lead based paint. Costs associated with removal and abatement of these materials are difficult to capture with a preliminary cost estimate. Removal of asbestos materials and lead based paints are not specifically included in the current Project cost estimate however, from discussions with EKPC, lead and asbestos are not anticipated to be significant. The contracts will allow for a mutually agreed upon amount of time within the construction

schedule to accommodate asbestos and lead abatement activities without impacting the overall completion date. Asbestos materials and lead based paints in newly supplied equipment will be strictly prohibited.

### **3.7.5 Pre-Engineered Buildings**

The WWT building will be contracted as a pre-engineered building. Other buildings currently estimated and included as stick built building as part of this PSR will be reviewed during detailed design and may be determined to include in the pre-engineered building contractor's scope. The structures will be designed in accordance with the current Kentucky Building Code, International Building Code and other relevant codes.

## **3.8 Demolition**

### **3.8.1 Mechanical**

The mechanical demolition for the existing underboiler equipment includes the boiler hoppers and equipment located under the boiler and directly associated with the existing ash sluicing system. The existing ash sluice piping and ash sluice pumps will be abandoned in place and may be repurposed or reused.

### **3.8.2 Electrical**

The electrical demolition for the existing ash handling equipment that will not be reused or repurposed will include removal of the existing electrical equipment associated with the existing ash handling equipment system. Cables will be terminated, disconnected, and rolled back to their respective cable trays or duct banks where they will be tagged out of use.

### **3.8.3 Civil / Structural / Architectural**

Civil items such as foundations or paved roads that are demolished will be to provide necessary new foundations or civil structures. Replacement of paving is included wherever excavation occurs for undergrounds such as piping, electrical, and foundations.

Structural steel is not anticipated to be demolished to support this Project.

The existing fly ash transfer building and equipment will be demolished in its entirety following completion of the new fly ash transfer building.

\* \* \* \* \*

## 4.0 CONTRACTING APPROACH

### 4.1 General Approach

The selected contracting strategy for the Project is a multiple contract approach with adjustment unit pricing. The multiple contract approach provides EKPC with more control over the design of the Project, the quality of the equipment and materials, and more ability to make changes as the Project progresses.

In the multiple contract approach, EKPC and an Owner's Engineer will work together to create and procure the construction and major equipment contracts to be procured by EKPC. The procurement of the long lead time equipment such as the bottom ash handling system is necessary early in the Project to support detailed design and equipment delivery schedules that meet the required outage dates. The contracting approach includes multiple equipment / material contracts and several construction contracts. The equipment contracts allow EKPC to reduce the cost of contractor markup via competitive bidding.

The equipment contracts were setup in recognition of long lead time items that will need to be ordered early in the Project to support the schedule and are not impacted by the selection of other contractors. This section contains detailed descriptions of each contract along with an itemized list of the scope being provided for each. To assist in understanding the coordination of work between the multiple contracts, this section also provides detailed information on the coordination of responsibilities for design, fabrication, delivery, receipt & protection, foundations, piping, wiring, erection, commissioning and startup interfaces. The contract terms and required milestones will be coordinated to establish and manage the critical path for the Project.

### 4.2 Contract List

The following is the list of contracts that were used as a basis for this Project:

**Table 4-1: List of Contracts**

Contract Number	Contract Name
<b>Construction Contracts</b>	
C2660	Fly Ash Silo (F&E)
C2970	Field Erected Tanks (F&E)
C4310	Pre-Engineered Buildings (F&E)
C8110	Site Preparation / Civil / Foundations
C8120	Ash Pond Closure
C8140	Site Finishing
C8210	Deep Foundations / Piling



**Table 4-1: List of Contracts**

<b>Contract Number</b>	<b>Contract Name</b>
C8290	Demolition
C8320	Mechanical Construction
C8321	WMB Pond Chemical Feed Construction
C8410	Electrical Construction
C9010	Subsurface Investigation
C9020	Surveying
C9030	Pilot Trenching
C9250	Performance Testing
<b>Equipment Contracts</b>	
C1310	Flue Gas Desulfurization / NID Modifications
C2190	Miscellaneous Pumps
C2621	Hydrated Lime Handling / Preparation
C2630	Fly Ash Handling Equipment
C2631	Bottom Ash Handling Equipment
C2641	Filter Presses
C2710	Compressed Air System
C2910	Auxiliary Boiler
C2980	Shop Fabricated FRP Tanks
C2981	Chemical Equipment Enclosures
C3410	Wastewater Treatment
C3418	Pond Chemical Treatment
C3420	Chemical Mixers
C4220	Cranes and Hoists
C4520	Structural Steel
C5120	Auxiliary / Station Transformers
C5310	Power Control Module (PCM)
C6110	Distributed Control System (DCS)
C6210	Instruments

### 4.3 Interface Schedule

The following table identifies the interfaces between contracts to identify the responsibilities for each equipment foundation, receipt, installation, piping and wiring.

**Table 4-2: Contracts Interfaces**

<b>Contract</b>		<b>Contract Interfaces</b>				
No.	Description	RCVD BY	INST BY	FDNS BY	PIPE BY	WIRE BY
<b>Construction Contracts</b>						
C2660	Fly Ash Silo (F&E)	C2660	C2660	C8110	NA	NA
C2970	Field Erected Tanks (F&E)	C2970	C2970	C8110	NA	NA
C4310	Pre-Engineered Buildings (F&E)	C8320	C8320	C8110	NA	NA
C8110	Site Preparation / Civil / Foundations	C8110	C8110	C8110	C8110	C8110
C8120	Ash Pond Closure	C8120	C8120	NA	C8120	NA
C8140	Site Finishing	C8140	C8140	NA	NA	NA
C8210	Deep Foundations / Piling	C8210	C8210	C8110	NA	NA
C8290	Demolition	C8290	C8290	C8290	C8290	C8290
C8320	Mechanical Construction	C8320	C8320	C8110	C8320	C8410
C8321	WMB Pond Chemical Feed Construction	C8321	C8321	C8321	C8321	C8321
C8410	Electrical Construction	C8410	C8410	C8110	NA	C8410
C9010	Subsurface Investigation	NA	C9010	NA	NA	NA
C9020	Surveying	NA	C9020	NA	NA	NA
C9030	Pilot Trenching	NA	C9030	NA	NA	NA
C9250	Performance Testing	NA	C9250	NA	NA	NA
<b>Equipment Contracts</b>						
C1310	Flue Gas Desulfurization / NID Modifications	C8320	C8320	NA	C8320	C8410
C2190	Miscellaneous Pumps	C8320	C8320	C8110	C8320	C8410
C2621	Hydrated Lime Handling / Preparation	C8320	C8320	C8110	C8320	C8410
C2630	Fly Ash Handling Equipment	C8320	C8320	C8110	C8320	C8410
C2631	Bottom Ash Handling Equipment	C8320	C8320	C8110	C8320	C8410
C2641	Filter Presses	C8320	C8320	C8110	C8320	C8410
C2710	Compressed Air System	C8320	C8320	C8110	C8320	C8410
C2910	Auxiliary Boiler	C8320	C8320	C8110	C8320	C8410
C2980	Shop Fabricated FRP Tanks	C8320	C8320	C8110	C8320	C8410
C2981	Chemical Equipment Enclosures	C8320	C8320	C8110	C8320	C8410
C3410	Wastewater Treatment	C8320	C8320	C8110	C8320	C8410
C3418	Pond Chemical Treatment	C8320	C8320	C8110	C8320	C8410
C3420	Chemical Mixers	C8320	C8320	NA	C8320	C8410

**Table 4-2: Contracts Interfaces**

<b>Contract</b>		<b>Contract Interfaces</b>				
No.	Description	RCVD BY	INST BY	FDNS BY	PIPE BY	WIRE BY
C4220	Cranes and Hoists	C8320	C8320	NA	NA	C8410
C4520	Structural Steel	C8320	C8320	C8110	NA	NA
C5120	Auxiliary / Station Transformers	C8410	C8410	C8110	NA	C8410
C5310	Power Control Module (PCM)	C8410	C8410	C8110	NA	C8410
C6110	Distributed Control System (DCS)	C8410	C8410	NA	NA	C8410
C6210	Instruments	C8320	C8320	NA	NA	C8410

## 4.4 Contract Scopes

### 4.4.1 General

The following scope descriptions itemize the general content of the contracts that are currently contemplated. Table 4-2 identifies responsibilities for foundations, receipt of equipment and materials, construction / erection, and special interfaces to assist the reader in understanding the coordination of work. Assumptions have been made in preparing the scope description listing of items.

#### 4.4.1.1 Site Preparation / Foundations / Piling

The scope of the contracts is based on an engineering sequence to permit design and construction of underground utilities and foundations as early as possible in the construction sequence. This approach allows completion of trenching and excavation activities earlier to permit better access and coordination of contractors or construction crafts. Laydown area preparation, storm water drains, underground electrical utilities, foundations, piling, and grounding will be included in Contract C8110 – Site Preparation and Foundations.

#### 4.4.1.2 Mechanical Construction

Equipment, piping, and instrumentation furnished by equipment contracts will be erected and installed by Contract C8320 – Mechanical Construction. Additionally, structural steel for utility racks, stick built buildings, and miscellaneous equipment supports will be included in C8320. Above ground piping and instrumentation not included on equipment skids are generally included in C8320.

#### **4.4.1.3 Electrical Construction**

Electrical equipment and materials furnished by equipment contracts will be erected and installed by Contract C8410 – Electrical Construction. Major electrical equipment installation, wiring, and all interconnecting wiring for systems and equipment are generally included in C8410. Wiring for lighting / convenience outlets, HVAC and communication system is also included in the C8410. Additionally, electrical testing will be included in C8410.

#### **4.4.1.4 Start-Up**

Start-up and commissioning will be provided as part of this Project and coordinated with EKPC. Contractors provide the construction labor and superintendents required to place equipment and systems into operation. Manufacturer's field services are furnished by EKPC (through equipment contracts) to provide technical direction for equipment start-up.

#### **4.4.1.5 Demolition**

Contract C8290 – Ash Handling Equipment Demolition will perform demolition of abandoned equipment, buildings and piping. Electrical wiring will be determined on both ends, rolled back, and abandoned in place. For the existing power feed to the existing ash handling switchgear, this activity will be performed during the outage tie-in of the new fly ash handling building such that the existing Unit 2 General Services 4160V switchgear feeder breaker can be repurposed to feed the new fly ash transfer PCM. For other equipment, this activity will take place after new equipment is installed and operating.

### **4.4.2 Construction Contracts**

#### **CONTRACT C2660 – FLY ASH SILO**

- A. General Description: Design, fabricate, deliver, and erect the following:
1. One fly ash storage silo sized for 4,000 tons of fly ash storage.
  2. One stair tower with access platforms for the unloading level and silo roof.
  3. Special tools for erection and maintenance.

#### **CONTRACT C2970 – FIELD ERECTED TANKS**

- A. General Description: Design, furnish, deliver, and erect of the following:
1. Two FGD blowdown wastewater equalization tanks.
  2. Two clarified wastewater storage tanks.
  3. Two WWT sludge holding tanks.
  4. One distillate storage tank.
  5. One WMB pond reaction tank.

6. Field applied coatings for tanks as required.

**CONTRACT C4310 – PRE-ENGINEERED BUILDING**

A. General Description: Design, furnish, deliver, and erect of the following:

1. Wastewater Treatment building.
  - a. Including HVAC.

**CONTRACT C8110 – SITE PREPARATION / CIVIL / FOUNDATIONS**

A. General Description: This is a construction contract for site preparation, civil and foundations.

Services include the following:

1. Perform clearing, grubbing, and grading of required area on plant site.
2. Perform sampling, testing and analysis of the site soil compaction.
3. Performing rough and finish grading for the following:
  - a. New environmental equipment areas.
  - b. Construction parking including surfacing.
  - c. Construction lay-down including surfacing.
4. Construction service roads.
5. Underground utilities relocation, if required.
6. Underground utilities installation, if required.
7. Temporary yard lighting.
8. Fencing and gates.
9. Storm drainage system.
10. Perform final trash and construction debris removal and disposal of required areas on plant site.
11. Maintain temporary construction facilities (runoff ponds, lay-down area, parking areas, access roads, temporary fencing, temporary utilities, etc.).
12. Install and construct pile caps, mats, foundations, grade beams and anchor bolts as required for Contracts C2190, C2621, C2630, C2631, C2641, C2660, C2710, C2910, C2970, C2980, C2981, C3410, C4310, C4520, C5120, and C5310.
13. Furnish and install below grade electrical grounding grid.
14. Excavation, subgrade preparation, dewatering and backfill for foundations.
15. Furnish and install electrical manholes, duct banks, and below grade conduit embedded in or under concrete.
16. Furnish and install permanent drains to existing system as required.



17. Manufacture and / or test and deliver to site the following Equipment and Materials including:
  - a. Concrete and rebar.
  - b. Asphalt.
  - c. Crushed rock base and surface course.
18. Construction labor, supervision, materials, tools, equipment, machinery, scaffolding and blocking necessary for performing final construction work not included in other contracts, including the following:
  - a. Storm drainage system including curbs and gutters, if applicable.
  - b. Paving (asphalt and concrete).
  - c. Rock surfaces.
19. Miscellaneous foundations.

#### **CONTRACT C8120 – ASH POND CLOSURE**

- A. General Description: This is a construction contract for the removal of CCR material and completing subsequent re-lining of the west and central portions of the existing Ash Pond. The work includes, but is not limited to, the following major construction activities:
  1. Install, maintain, and remove erosion and sediment control measures in accordance with Storm Water Pollution Prevention Plan (SWPPP).
  2. Dewater existing Ash Pond below 512 feet.
  3. Control dust and maintain haul road from the Ash Pond to the landfill (which includes the borrow site) and vice versa.
  4. Modify existing ash piping system, including demolition of existing 10-inch HDPE piping so as to install the new capping system, and installation of new 10-inch, DR 11 HDPE piping by tying into existing line.
  5. Earthwork including excavation of CCR material, hauling and relocating CCR material, and compaction of CCR material at the Spurlock landfill, as well as compaction of material for earthwork required for the new WMB berm.
  6. Prepare subgrades to receive compacted clay liner.
  7. Perform sampling, testing and analysis of the subgrade soil and clay liner compaction.
  8. Haul and install 24-inch compacted clay liner on prepared subgrade in lined portion of pond.
    - a. Install compacted clay liner test pad a minimum size of 50-feet by 100-feet within the limits of Ash Pond. Provide testing and analysis of in-place test pad.

9. Place 60-mil textured HDPE geomembrane on compacted clay liner, including testing of installed material.
10. Place 12-inches of protective cover over lined portion of pond.
11. Riprap slopes above protective cover in lined portion of pond.
12. Return disturbed areas to pre-project conditions.

#### **CONTRACT C8140 – SITE FINISHING**

- A. General Description: This is a furnish and construct contract for finish grading, asphalt and concrete pavement installation, and required site work not covered by other contracts.

Contractor's responsibilities include the following:

1. Construct the subgrade for the final surfacing.
2. Complete finish grading and final drainage.
3. Furnish and place crushed rock, asphalt paving, and concrete surfacing not completed under Contract C8110.
4. Complete final pavement markings.
5. Comply with requirements of the Project's Storm Water Pollution Prevention Plan (SWPPP).
6. Topsoil and seed disturbed areas not receiving alternate surfacing.
7. Upon completion of the Project, remove erosion control structures once proper grass has been established.

#### **CONTRACT C8210 – DEEP FOUNDATIONS / PILING**

- A. Furnish all construction labor, supervision, equipment, tools, rigging, blocking, scaffolding material, supplies, transportation, project management, construction management (including scheduling and cost control), and services necessary to:

1. Furnish and install all foundation piling (steel H-piles) for this Project.
2. Perform all pile cut-offs at elevation(s) indicated in the Contract Documents.
3. Subcontract to perform all dynamic pile testing.
4. Furnish and install tension uplift straps and studs for all tension piles.
5. Furnish and install pile points.
6. Perform pile splicing and provide related materials to perform the splice, including welding, as-needed.
7. Receive, unload, store, secure, and install all test piling and production piling.

**CONTRACT C8290 – ASH HANDLING EQUIPMENT DEMOLITION**

A. General Description: This is a construction contract including the following:

1. Remove and dispose completely the existing fly ash transfer building including equipment, piping, structural steel, concrete, and electrical.
2. Remove and dispose completely bottom ash pipe from the pipe rack to the pond (with the exception of the basalt lined bottom ash line).
3. Remove and dispose completely the following Unit 1 and 2 wet fly ash equipment.
  - a. Pipe.
  - b. Hydroveyors.
  - c. Air separators.
4. Remove and dispose completely the following building, equipment and piping from the dry fly ash system for Unit 1 and 2.
  - a. Dry fly ash pipe between the transfer building and the sleeper utility rack located northwest of the gypsum stackout area.
  - b. Fly ash transfer building.
  - c. Vacuum exhausters.
  - d. Fly ash bag filter units.
  - e. Fly ash separator.
  - f. Fly ash transfer tank.
  - g. Fly ash transfer tank bin vent.
  - h. Fly ash pressure feeders.
  - i. Fly ash pressure blowers.
  - j. Fly ash pipe from the bag filter to the vacuum exhausters.
  - k. Fly ash vacuum piping from the pipe rack into the transfer building.
5. When demolishing equipment, pull the cable back to the tray or conduit, label, tape off and abandon. Cables will be determined on both ends.
6. Remaining foundations will be removed and backfilled with acceptable backfill material, and then have paving placed on top, as required for roads or general paved areas.
7. Remove and dispose of existing piping, fittings, pipe supports, pipe insulation and heat trace, and related appurtenances.
8. Repair of grating penetrations that result on remaining platforms from removed materials with checkered plate that is supplied and installed by this Contract.

**CONTRACT C8320 – MECHANICAL CONSTRUCTION**

A. General Description: This is a construction contract including the following:

1. Unload, receive, store (if required), and install equipment furnished by the following contracts:
  - a. WWT equipment by Contracts C1310, C2621, C2641, C2981, C3410, and C3420 – Flue Gas Desulfurization/ NID Modifications, Hydrated Lime Handling / Preparation, Filter Presses, Chemical Equipment Enclosures, Wastewater Treatment, and Chemical Mixers.
  - b. Miscellaneous Pumps by Contract C2190 – Miscellaneous Pumps.
  - c. Ash handling equipment furnished by Contracts C2630 and C2631 – Fly Ash and Bottom Ash Handling Equipment.
  - d. Air compressors and associated equipment furnished by Contract C2710 – Compressed Air System.
  - e. Auxiliary Boiler by Contract C2980 – Auxiliary Boiler.
  - f. Cranes and Hoists by Contract C4220 – Cranes and Hoists.
  - g. Pipe Rack and building steel furnished by Contract C4520 – Structural Steel.
2. Procure, fabricate, deliver, receive, protect, store, haul, assemble, erect, install, and place into service equipment and material including, but is not limited to, the following:
  - a. Balance of plant piping, valves, pipe supports (including supplemental structural steel and miscellaneous concrete pads), piping specials (expansion joints, strainers, filters, etc.) insulation and lagging.
  - b. Line mounted instruments for monitoring and analog control of the supporting systems and associated equipment.
  - c. Miscellaneous instruments and transmitters not included in another equipment package, including installation materials, such as brackets, adapters, tubing, etc.
  - d. Fire protection equipment and materials including:
    - 1) Piping and valves to extend the existing underground fire protection system to new equipment areas.
  - e. Plant heat tracing system for areas (if required). Work will be completed to specified terminal points and include monitoring system. Wiring from terminal points will be by Contract C8410 – Electrical Construction.
  - f. Cathodic protection system, if required.
  - g. Pipe insulation, if required.
3. Complete checkout, testing and assisting EKPC in placing into service of mechanical systems and equipment installed under this package.

4. Performing touch-up painting for equipment and materials provided by other contracts (if required).
5. Applying final paint systems to equipment and materials installed by Contract C8320 including the following:
  - a. Equipment.
  - b. Field erected tanks.
  - c. Pipe rack to shared facilities area.
6. Providing final cleanup of areas worked around or painted by this Contract.
7. Coatings for tanks.

#### **CONTRACT C8321 – WMB POND CHEMICAL FEED CONSTRUCTION**

- A. General Description: This is a construction contract including the following:
1. Perform clearing, grubbing, and grading of required area on plant site.
  2. Perform sampling, testing and analysis of the site soil compaction.
  3. Performing rough and finish grading for the following:
    - a. New environmental equipment areas.
    - b. Construction parking including surfacing.
    - c. Construction lay-down including surfacing.
  4. Construction service roads.
  5. Underground utilities relocation, if required.
  6. Underground utilities installation, if required.
  7. Temporary yard lighting.
  8. Fencing and gates.
  9. Storm drainage system.
  10. Perform final trash and construction debris removal and disposal of required areas on plant site.
  11. Maintain temporary construction facilities (runoff ponds, lay-down area, parking areas, access roads, temporary fencing, temporary utilities, etc.).
  12. Install and construct mats, foundations, grade beams and anchor bolts as required for Contract C3418.
  13. Furnish and install below grade electrical grounding grid.
  14. Excavation, subgrade preparation, dewatering and backfill for foundations.
  15. Furnish and install electrical manholes, duct banks, and below grade conduit embedded in or under concrete.



16. Furnish and install permanent drains to existing system as required.
17. Manufacture and / or test and deliver to site the following Equipment and Materials including:
  - a. Concrete and rebar.
  - b. Asphalt.
  - c. Crushed rock base and surface course.
18. Construction labor, supervision, materials, tools, equipment, machinery, scaffolding and blocking necessary for performing final construction work not included in other contracts, including the following:
  - a. Storm drainage system including curbs and gutters, if applicable.
  - b. Paving (asphalt and concrete).
  - c. Rock surfaces.
19. Miscellaneous foundations.
20. Unload, receive, store (if required), and install equipment furnished by Contracts C3418 – Pond Chemical Treatment.
21. Procure, fabricate, deliver, receive, protect, store, haul, assemble, erect, install, and place into service equipment and material including, but is not limited to, the following:
  - a. Balance of plant piping, valves, pipe supports (including supplemental structural steel and miscellaneous concrete pads), piping specials (expansion joints, strainers, filters, etc.) insulation and lagging.
  - b. Line mounted instruments for monitoring and analog control of the supporting systems and associated equipment.
  - c. Miscellaneous instruments and transmitters not included in another equipment package, including installation materials, such as brackets, adapters, tubing, etc.
  - d. Fire protection equipment and materials including:
    - 2) Piping and valves to extend the existing underground fire protection system to new equipment areas.
  - e. Plant heat tracing system for areas (if required). Work will be completed to specified terminal points and include monitoring system. Wiring from terminal points will be by this Contract.
  - f. Below grade piping, if required.
  - g. Cathodic protection system, if required.
  - h. Pipe insulation, if required.

22. Complete checkout, testing and assisting EKPC in placing into service of mechanical systems and equipment installed under this package.
23. Performing touch-up painting for equipment and materials provided by other contracts (if required).
24. Applying final paint systems to equipment and materials installed by Contract C8321 including the following:
  - d. Equipment.
  - e. Pipe rack to WMB pond chemical feed area.
25. Providing final cleanup of areas worked around or painted by this Contract.
26. Coatings for tanks.
27. Provide the following electrical equipment:
  - a. Lighting transformers.
  - b. 480V power panels.
  - c. 120 / 208V power panels.
  - d. Lighting contactors.
28. Furnish and install above grade conduit raceway systems.
29. Furnish and install cable tray.
30. Furnish and install power cabling to heat trace equipment
31. Perform electrical testing.
32. Make final grounding connections.
33. Furnish and install welding outlets.
34. Label cable tray and cable.
35. Perform structure-related wiring including:
  - a. Furnish, install and wire lighting / convenience outlets.
  - b. Wire HVAC systems.
  - c. Furnish and install telephone based communication / paging system.
36. Provide electrical testing services including:
  - a. Test equipment.
  - b. Personnel to perform wire checking and testing of wiring systems, equipment and controls.
37. Perform electrical system testing of the following systems:
  - a. Small power transformers.
  - b. Protective relays.
  - c. Motor control centers.

- d. Heat trace monitoring panels.
  - e. Power wiring.
  - f. Control wiring.
  - g. Control systems.
38. Perform final calibration of instruments

### **CONTRACT C8410 – ELECTRICAL CONSTRUCTION**

- A. General Description: This is a construction contract including the following:
- 1. Provide, install and perform wiring of equipment, instruments and controls on the Project.
  - 2. Receive, unload, store, install and wire the following equipment:
    - a. Contract C5310 – Power Control Module (PCM).
    - b. Contract C6110 – Distributed Control System (DCS).
  - 3. Provide the following electrical equipment:
    - a. Lighting transformers.
    - b. 480V power panels.
    - c. 120 / 208V power panels.
    - d. Lighting contactors.
  - 4. Furnish and install above grade conduit raceway systems.
  - 5. Furnish and install cable tray.
  - 6. Furnish and install power cabling to heat trace equipment provided by others.
  - 7. Perform electrical testing.
  - 8. Make final grounding connections.
  - 9. Furnish and install welding outlets.
  - 10. Label cable tray and cable.
  - 11. Perform structure-related wiring including:
    - a. Furnish, install and wire lighting / convenience outlets.
    - b. Wire HVAC systems.
    - c. Furnish and install telephone based communication / paging system.
  - 12. Provide electrical testing services including:
    - a. Test equipment.
    - b. Personnel to perform wire checking and testing of wiring systems, equipment and controls.
  - 13. Perform electrical system testing of the following systems:
    - a. Small power transformers.

- b. Switchgear.
  - c. Bus duct.
  - d. Protective relays.
  - e. Motor control centers.
  - f. Power panels and associated dry type transformers.
  - g. Heat trace monitoring panels.
  - h. Power wiring.
  - i. Control wiring.
  - j. Control systems.
14. Perform final calibration of instruments.

#### **CONTRACT C9010 – SUBSURFACE INVESTIGATION**

- A. General Description: Perform the scope of work as outlined below:
- 1. Obtain permits, licenses, and underground utility clearances.
  - 2. Perform soil borings.
  - 3. Perform index, strength, and soil resistivity tests.
  - 4. Provide engineering report.

#### **CONTRACT C9020 – SURVEYING**

- A. General Description: Perform the scope of work as outlined below:
- 1. Survey of existing site for new equipment locations.
  - 2. Bathymetric and topographic surveys of existing Ash Pond.
  - 3. Provide survey report and drawings.

#### **CONTRACT C9030 – PILOT TRENCHING**

- A. General Description: This is a construction contract including the following:
- 1. Excavation, waste material management, and bracing for trenching to uncover existing below-grade utilities, foundations, and other obstructions by means of a water / air jet and vacuum-extraction system or open cut excavation.
  - 2. Removal and replacement of pavement where required.
  - 3. Dewatering of pilot trenches.
  - 4. Backfilling and compaction of pilot trenches.
  - 5. Soil/compaction testing services as required.

#### **CONTRACT C9250 – PERFORMANCE TESTING**

- A. General Description: Perform the scope of work as outlined below:

1. Develop and provide performance test protocol for Owner review.
2. Provide labor and materials required for performance testing of the WWT, bottom ash, fly ash, and WMB pond systems.
3. Coordinate with EKPC and other parties to obtain coal, ash, and wastewater samples during performance testing.
4. Perform on-site and off-site laboratory analyses on coal, ash, and wastewater samples collected.
5. Provide performance testing report following completion of testing.

#### **4.4.3 Equipment Contracts**

##### **CONTRACT C1310 – FLUE GAS DESULFURIZATION/NID MODIFICATIONS**

- A. General Description: Design, manufacture and deliver equipment and materials including the following:
1. Eight replacement NID mixers fabricated from high alloy metals.
  2. Submittals and operating and maintenance manuals.
  3. Field technical services to support startup.

##### **CONTRACT C2190 – MISCELLANEOUS PUMPS**

- A. General Description: Design, manufacture and deliver equipment and materials including the following:
1. Miscellaneous pumps as indicated on the equipment list for C2190.
  2. Submittals and operating and maintenance manuals.
  3. Field technical services to support startup.

##### **CONTRACT C2621 – HYDRATED LIME HANDLING EQUIPMENT**

- A. General Description: Design, manufacture and deliver equipment and materials including the following:
1. Hydrated lime handling equipment as indicated on the equipment list for C2621.
  2. Submittals and operating and maintenance manuals.
  3. Field technical services to support startup.

##### **CONTRACT C2630 – FLY ASH HANDLING EQUIPMENT**

- A. General Description: Design, manufacture and deliver equipment and materials including the following:
1. Fly ash handling system:



- a. Detailed engineering, procurement and delivery for Material and Equipment required for a fly ash system that handles fly ash, SCR ash, and air heater ash from Unit 1 and Unit 2.
  - b. The new fly ash transfer station will transport ash utilizing a new vacuum to pressure transfer station where a common pressure system will convey the ash to the existing fly ash silo or to the new fly ash silo.
  - c. Interconnecting piping, valves and equipment required for a fully functioning system. If existing piping and valves are suitable they can be utilized for the new system as long as they are utilized in their existing location.
  - d. Both systems will be supplied with new filter separators, new vacuum exhausters and new pressure blowers. Reuse of the existing fly ash transfer equipment will not be allowed.
  - e. Equipment listed on the equipment list for C2630.
2. Fly ash silo equipment as indicated on the equipment list for C2630.
  3. Instrumentation and Control:
    - a. Instrumentation and control devices as required to monitor and control process equipment supplied under this Contract.
    - b. Design and supply of a complete set of logic diagrams to control and monitor the ash handling equipment supplied under this Contract. Logic design will also include modifications to existing systems required to operate new and existing equipment as a complete system.
    - c. Provide a recommended sample for the operator graphics to be implemented in the DCS for the control and monitoring of equipment and instrumentation provided under this Contract. Graphics will display existing equipment required to operate the new equipment.
  4. Spare parts, special tools, lubricants, and consumables.
  5. Submittals and operating and maintenance manuals.
  6. Field technical services to support startup.

#### **CONTRACT C2631 – BOTTOM ASH HANDLING EQUIPMENT**

- A. General Description: Design, manufacture and deliver equipment and materials including the following:
  1. Bottom ash handling system:

- a. Detailed engineering, procurement and delivery for material and equipment required for a complete bottom ash handling system that handles bottom ash, economizer ash, and pyrites from Unit 1 and Unit 2.
- b. New bottom ash welded steel storage silo including equipment as required for bottom ash handling.
- c. New dry bottom ash hoppers on units 1 and 2 (four hoppers per unit).
- d. Interconnecting piping, valves and equipment required for a fully functioning system including ceramic lined fittings at wear sections.
- e. Other bottom ash handling equipment indicated on the equipment list for C2631.
2. Instrumentation and Control:
  - a. Instrumentation and control devices as required to monitor and control process equipment supplied under this Contract.
  - b. Design and supply of a complete set of logic diagrams to control and monitor the ash handling equipment supplied under this Contract. Logic design will also include modifications to existing systems required to operate new and existing equipment as a complete system.
  - c. Provide a recommended sample for the operator graphics to be implemented in the DCS for the control and monitoring of equipment and instrumentation provided under this Contract.
    - 1) Graphics will display existing equipment required to operate the new equipment.
3. Structural and support steel for equipment including supporting columns and beams, hanger rods, platforms, galleries, grating, stairs and handrails.
4. Spare parts, special tools, lubricants, and consumables.
5. Submittals and operating and maintenance manuals.
6. Field technical services to support startup.

#### **CONTRACT C2641 – FILTER PRESSES**

- A. General Description: Design, manufacture and deliver equipment and materials including the following:
  1. Filter presses including frames, pump skids, wash water skid, wash water tank and other equipment or associated interconnecting piping and as indicated on the equipment list for C2641.
7. Instrumentation and Control:

- a. Instrumentation and control devices as required to monitor and control process equipment supplied under this Contract.
  - b. Design and supply of a complete set of logic diagrams to control and monitor the ash handling equipment supplied under this Contract. Logic design will also include modifications to existing systems required to operate new and existing equipment as a complete system.
  - c. Provide a recommended sample for the operator graphics to be implemented in the DCS for the control and monitoring of equipment and instrumentation provided under this Contract.
    - 1) Graphics will display existing equipment required to operate the new equipment.
2. Submittals and operating and maintenance manuals.
  3. Field technical services to support startup.

#### **CONTRACT C2710 – COMPRESSED AIR SYSTEM**

- A. General Description: Design, manufacture and deliver Equipment and Materials including the following:
  1. Air compressors, dryers, and related equipment included on the equipment list for C2710. Interconnecting piping to be included.
  2. Instrumentation and Control:
    - a. Instrumentation and control devices as required to monitor and control process equipment supplied under this Contract.
    - b. Design and supply of a complete set of logic diagrams to control and monitor the ash handling equipment supplied under this Contract. Logic design will also include modifications to existing systems required to operate new and existing equipment as a complete system.
    - c. Provide a recommended sample for the operator graphics to be implemented in the DCS for the control and monitoring of equipment and instrumentation provided under this Contract.
      - 1) Graphics will display existing equipment required to operate the new equipment.
  3. Submittals and operating and maintenance manuals.
  4. Field technical services to support startup.

#### **CONTRACT C2910 – AUXILIARY BOILER**

- A. General Description: Design, manufacture and deliver equipment and materials including the following:

1. One electric auxiliary boiler for WWT evaporator start-up and operating steam.
2. Instrumentation and Control:
  - a. Instrumentation and control devices as required to monitor and control process equipment supplied under this Contract.
  - b. Design and supply of a complete set of logic diagrams to control and monitor the ash handling equipment supplied under this Contract. Logic design will also include modifications to existing systems required to operate new and existing equipment as a complete system.
  - c. Provide a recommended sample for the operator graphics to be implemented in the DCS for the control and monitoring of equipment and instrumentation provided under this Contract.
    - 1) Graphics will display existing equipment required to operate the new equipment.
3. Submittals and operating and maintenance manuals.
4. Field technical services to support startup.

#### **CONTRACT C2980 – SHOP FABRICATED FIBERGLASS TANKS**

- A. General Description: Design, manufacture and deliver equipment and materials including the following:
  1. Various shop fabricated tanks for water, wastewater, and chemical storage and as indicated on the equipment list under C2980.
  2. Instrumentation and Control:
    - a. Instrumentation and control devices as required to monitor and control process equipment supplied under this Contract.
    - b. Design and supply of a complete set of logic diagrams to control and monitor the ash handling equipment supplied under this Contract. Logic design will also include modifications to existing systems required to operate new and existing equipment as a complete system.
    - c. Provide a recommended sample for the operator graphics to be implemented in the DCS for the control and monitoring of equipment and instrumentation provided under this Contract.
      - 1) Graphics will display existing equipment required to operate the new equipment.
  3. Submittals and operating and maintenance manuals.
  4. Field technical services to support startup.

**CONTRACT C2981 – CHEMICAL EQUIPMENT ENCLOSURES**

- A. General Description: Design, manufacture and deliver equipment and materials including the following:
1. Various pre-fabricated enclosures for pumps, piping, valves and instrumentation integral to the pump skid and enclosure. These enclosures are indicated on the equipment list under C2981.
  2. Instrumentation and Control:
    - a. Instrumentation and control devices as required to monitor and control process equipment supplied under this Contract.
    - b. Design and supply of a complete set of logic diagrams to control and monitor the ash handling equipment supplied under this Contract. Logic design will also include modifications to existing systems required to operate new and existing equipment as a complete system.
    - c. Provide a recommended sample for the operator graphics to be implemented in the DCS for the control and monitoring of equipment and instrumentation provided under this Contract.
      - 1) Graphics will display existing equipment required to operate the new equipment.
  3. Submittals and operating and maintenance manuals.
  4. Field technical services to support startup.

**CONTRACT C3410 – FGD WASTEWATER TREATMENT EQUIPMENT**

- A. General Description: Design, manufacture and deliver equipment and materials including the following:
1. Various WWT equipment including clarifiers, reactor tanks, evaporator tanks, falling film evaporators, and others as indicated on the equipment list under C3410.
  2. Instrumentation and Control:
    - a. Instrumentation and control devices as required to monitor and control process equipment supplied under this Contract.
    - b. Design and supply of a complete set of logic diagrams to control and monitor the ash handling equipment supplied under this Contract. Logic design will also include modifications to existing systems required to operate new and existing equipment as a complete system.



- c. Provide a recommended sample for the operator graphics to be implemented in the DCS for the control and monitoring of equipment and instrumentation provided under this Contract.
  - 1) Graphics will display existing equipment required to operate the new equipment.
- 3. Submittals and operating and maintenance manuals.
- 4. Field technical services to support startup.

#### **CONTRACT C3418– POND CHEMICAL FEED EQUIPMENT**

- A. General Description: Design, manufacture and deliver equipment and materials including the following:
  - 1. One WMB pond chemical feed enclosure with separate electrical room. Other WMB pond chemical feed equipment as indicated on the equipment list under C3418.
  - 2. Instrumentation and Control:
    - a. Instrumentation and control devices as required to monitor and control process equipment supplied under this Contract.
    - b. Design and supply of a complete set of logic diagrams to control and monitor the ash handling equipment supplied under this Contract. Logic design will also include modifications to existing systems required to operate new and existing equipment as a complete system.
    - c. Provide a recommended sample for the operator graphics to be implemented in the DCS for the control and monitoring of equipment and instrumentation provided under this Contract.
      - 1) Graphics will display existing equipment required to operate the new equipment.
  - 3. Submittals and operating and maintenance manuals.
  - 4. Field technical services to support startup.

#### **CONTRACT C3420 – AGITATORS**

- A. General Description: Design, manufacture and deliver equipment and materials including the following:
  - 1. Various agitators for tanks and sumps as indicated on the equipment list under C3420.
  - 2. Instrumentation and Control:
    - a. Instrumentation and control devices as required to monitor and control process equipment supplied under this Contract.
    - b. Design and supply of a complete set of logic diagrams to control and monitor the ash handling equipment supplied under this Contract. Logic design will also include

modifications to existing systems required to operate new and existing equipment as a complete system.

- c. Provide a recommended sample for the operator graphics to be implemented in the DCS for the control and monitoring of equipment and instrumentation provided under this Contract.
  - 1) Graphics will display existing equipment required to operate the new equipment.
- 3. Submittals and operating and maintenance manuals.
- 4. Field technical services to support startup.

#### **CONTRACT C4220 – CRANES AND HOISTS**

- A. General Description: Design, manufacture and deliver equipment and materials including the following:
  - 1. Bridge cranes, hoists, and runway beams, for the bottom ash dewatering filter press equipment.
  - 2. Monorails and Hoists for various other ash handling and WWT equipment as noted on the equipment list under C4220.
  - 3. Submittals and operating and maintenance manuals.
  - 4. Field technical services to support startup.

#### **CONTRACT C4520 – STRUCTURAL STEEL**

- A. General Description: Design, manufacture and deliver Fabricated Materials including the following:
  - 1. Galvanized structural steel for utility pipe racks, fly ash transfer building, filter press building, stair towers, dewatering bin enclosure and miscellaneous supports.

#### **CONTRACT C5310 – POWER CONTROL MODULE (PCM)**

- A. General Description: Design, manufacture and deliver Equipment and Materials including the following:
  - 1. Two PCM's. One for the WWT equipment and the other for the bottom ash and fly ash handling equipment as well as the WMB pond chemical feed equipment.
  - 2. 4160V switchgear and power centers.
  - 3. 480V switchgear and MCC's.
  - 4. 4160V – 480V transformers.
  - 5. Station Service transformers.
  - 6. Non-segregated phase bus.

7. Protective relays.

#### **CONTRACT C6110 – DISTRIBUTED CONTROL SYSTEM (DCS)**

- A. General Description: Design, manufacture and deliver Equipment and Materials including the following:
  1. System servers.
  2. DCS controllers and IO.
  3. DCS operator workstations.
  4. DCS communications hardware and software to communicate with new equipment to be installed.
  5. DCS network equipment and requisite media converters.
- B. Provide services to integrate logic diagrams and graphic sketches to control and monitor the WWT and ash handling equipment.
- C. Furnish field services to integrate the new DCS equipment with the existing DCS equipment and to support the startup and commissioning of the logic, operator graphics, and communication interfaces.

#### **CONTRACT C6210 – INSTRUMENTS**

- A. General Description: Design, manufacture and deliver Equipment and Materials including the following:
  1. Various instruments for balance of plant systems.
  2. Submittals and operating and maintenance manuals.
- B. This contract will not provide the instrumentation for the skidded equipment. Skid-mounted instrumentation will be provided by the skid supplier.
- C. This contract will not provide the instrumentation for the ash handling equipment. The ash handling instrumentation will be provided by the ash handling equipment supplier.

\* \* \* \* \*

## 5.0 SCHEDULE

### 5.1 Critical Milestones

The current schedule is based on a limited notice to proceed on engineering for the Spurlock CCR / ELG Compliance Project in April 2017, with the new equipment in service and operational in December 2020 and the Ash Pond closure complete in November 2024. Several key Project milestones will need to be accomplished to meet the overall schedule for the Project. A list of suggested important milestones as indicated on the Level 1 Project schedule included with this report are listed in Table 1-2.

The schedule is dependent on Project approvals and a variety of other influences, in particular the Certificate of Public Convenience and Necessity (CPCN) permit approval. Equipment may not be procured and construction cannot commence until the CPCN permit approval is received. Table 1-2 indicates limited design engineering beginning in April 2017 to prepare the major equipment specifications and preliminary designs to achieve the indicated schedule milestone dates.

### 5.2 Project Schedule

A level 1 Project schedule was prepared by BMcD for this Project which is included in Appendix E. The proposed schedule provides EKPC the ability to meet the CCR and ELG regulatory compliance timeframes. KPDES permit modifications to meet CCR and / or ELG compliance should be requested to not take effect until the CCR / ELG Compliance Project is complete. As part of the Project, two outages will be needed to make modifications and perform construction that can only be accomplished while the each unit is off-line. In addition to the unit outages, there will be multiple short duration switchyard outages. Two of these short outages will be less than one day for pouring of concrete foundations for bus supports next to the existing switchyard equipment. The main two tie-in outages in the switchyard will occur during the Spring 2020 outage and last a total of 6 days where 3 days are for each bus tie-in. Finally, the switchyard outage scheduling should start two years prior to the switchyard outages.

The Ash Pond closure duration was developed based on rates of material removal for the differing material in the pond of fly ash, bottom ash, FGD waste, and silts from the water intake clarifiers. Both winter breaks and rain days were included in the schedule development for closure.

After the creation of the new WMB pond, sampling will take place prior to discharge to the Ohio River for the duration of approximately 10 months. After sampling, it will be decided if the new WMB pond chemical equipment will be required to be used in conjunction with the WMB pond to treat other plant wastewaters prior to discharge to maintain compliance. It is expected that the WMB pond chemical feed

equipment will be required, specifically if air heater washes are treated in the WMB pond prior to discharge.

The scope split for the equipment and construction contracts is described in Section 4.0 – Contracting Approach. The performance of each construction contract is anticipated to be continuous without intermediate demobilization and remobilization except for Contract 8120 for Ash Pond Closure.

The schedules are based on early procurement of the long lead major plant equipment which includes but is not limited to the bottom ash equipment, fly ash silo, fly ash handling equipment, and electrical equipment. Vendor submittals are required from each equipment contractor which will support the detailed design of infrastructure (foundations, piping, wiring, instrumentation, etc.) required for installation of this equipment. Sufficient time has been built into the schedule for the Owner's Engineer to perform the detailed design to obtain competitive, lump sum bids for the respective construction.

\* \* \* \* \*



## **6.0 COST ESTIMATE**

### **6.1 General**

An initial capital cost estimate for the proposed Spurlock CCR / ELG Compliance Project is included in Appendix F. The estimated cost for these upgrades, inclusive of contingency and escalation is \$262.4 MM. No financing fees and interest during construction were included in the Project costs.

### **6.2 Basis and Assumptions**

The following describes the methodology used in the development of the Spurlock CCR / ELG Compliance Project cost estimate.

- The estimate is based on the assumptions and scope of supply indicated in this document and the Project assumptions in Section 3.0 and Appendix B. Design parameters and scope typically defined by these studies are estimated based on information provided by EKPC, preliminary calculations and BMcD experience.
- BMcD solicited and received budget level vendor quotations for the following:
  - WWT equipment
  - Fly ash silo
  - Bottom ash handling
  - Fly ash handling equipment
  - Ash Pond closure
  - Ash handling equipment demolition
- Landfill leachate wastewater is not considered in this cost estimate.
- Balance of Plant equipment: BMcD utilized in-house information from similar projects when developing the estimate.
- Construction Estimates: BMcD used recent pricing information from an internal database and industry standard pricing for construction commodities and indirect costs.
- Labor rates: Labor rates and productivity factors were developed based on BMcD in-house information which included a labor study in nearby regions.

#### **6.2.1 Capital Cost Estimate Scope**

A Project scope description for the cost estimate is included in Section 3.0. These descriptions along with the drawings and lists included in Appendices A, B, C and D define the scope included in the cost estimate.

### 6.2.2 Major Capital Cost Estimate Assumptions

Several major assumptions were used in developing the capital cost estimate. These assumptions include the following:

- Commercial operation of the equipment is assumed to be May 2020 for Unit 1 and December 2020 for Unit 2.
- Labor is assumed union labor and available without excessive hourly incentives or incentive packages.
- Escalation is assumed to average 1% per year for equipment and materials and 2 ½% per year for labor.
- Contingency is included at 10% for Project estimate and definition contingency. Owner's contingency for discretionary expenditures has not been included and will be evaluated on a case-by-case basis during Project execution.
- Cost for Builder's Risk Insurance was based on 0.45% of the direct costs.
- Costs for Performance Bonds were included in the major contract pricing buildups.
- No sales tax was included.
  - Per Kentucky's Department of Revenue, an exemption on sales tax can be acquired for pollution control facilities which this Project would likely fall under.
- No financing fees or interest during construction was included.
- No landfill expansion costs have been included in this estimate.

### 6.2.3 Major Commercial Terms

The following lists the major commercial terms assumed in developing the cost estimates. Minor assumptions are either self-evident in the data or have an insignificant effect on the estimated Project capital costs.

- Project is assumed to be performed with multiple prime contracts for the construction work as defined in Section 4.0 – Contracting Approach. Major equipment identified in Section 3.0 and minor equipment items (piping specialties, small-bore piping, wiring and other construction commodities) are expected to be included in the construction contracts.
- Project will include multiple equipment procurement contracts including contracts for WWT equipment, bottom and fly ash handling equipment, a compressed air system, and power control modules as defined in Section 4.0 – Contracting Approach.

- Project will be executed with durations similar to those shown on the Project schedule with the objective of achieving the Project milestone dates. It is assumed the Project will be executed with a schedule sufficient to minimize overtime. A 50-hour workweek was assumed as a means of providing an incentive to attract labor. This includes 40 hours of straight time and 10 hours of overtime for normal construction periods. A 60-hour workweek was assumed during commissioning and start-up. No additional overtime is included to accommodate a compressed work schedule.

### **6.3 Operations & Maintenance Estimates**

The differential (new vs. existing) O&M costs for Spurlock in 2017 dollars have been calculated and determined to be an additional \$4.25 MM per year. Refer to Appendix F for a summary of the O&M costs.

### **6.4 Economic Conditions Considerations**

An estimate for escalation of Project costs has been included in the capital cost estimate. Escalation of construction labor, materials, and indirects (including warranty, bond, and insurance) was based upon the average increase in craft labor costs for the United States at the time of this evaluation.

### **6.5 Contingency**

A Project estimate and definition contingency is included to cover accuracy of pricing and commodity estimates for the defined Project scope. This contingency is not intended to cover changes in the general Project scope (i.e. addition of buildings, addition of redundant equipment, addition of systems, etc.) nor major shifts in market conditions that could result in significant increases in contractor margins, major shortages of qualified labor, significant increases in escalation, or major changes in the cost of money (interest rate on loans).

Owner's contingency has been excluded per EKPC direction and discretionary costs will be evaluated during Project execution on a case-by-case basis.

### **6.6 Summary Cost Estimate**

The capital cost estimate developed for the Spurlock CCR / ELG Project is contained in Appendix F.

### **6.7 Summary Cost Item Description**

The cost estimate is based on the multiple contracting approach defined in Section 4.0 – Contracting Approach. Additional mark up costs have been included for equipment, labor and material assumed subcontracted.

The contracting approach was developed concurrently with the cost estimate and the summary cost estimate is not broken down by Contract.

## **6.8 Cash Flow**

A cash flow based on the Project schedule, contracting approach, and the cost estimate was developed and is included in Appendix G.

\* \* \* \* \*

## APPENDIX A – DRAWINGS

Please refer to accompanying  
envelope for this Appendix.



## APPENDIX B – EQUIPMENT LIST

Please refer to accompanying  
envelope for this Appendix.

## **APPENDIX C - SCOPE ASSUMPTIONS MATRIX**

**East Kentucky Power Cooperative  
Spurlock CCR / ELG Compliance Project  
Scope Assumptions Matrix**  
Burns McDonnell Project Number: 89810  
Rev. C



General Project Information:	
Project Description:	Wet to dry conversion for fly ash and bottom ash system (CCR equipment) on units 1 & 2, ash pond clean closure with 17-acre water mass balance pond, & FGD wastewater treatment (WWT) via Mechanical Vapor Compression (MVC or thermal evaporation) (240 gpm) as well as ash mixing in ash silos and FDA evaporation on units 3 & 4 (200 gpm). FGD wastewater treatment equipment is for units 1 & 2 FGD wastewater.
Plant Description:	Spurlock Unit 1 is a 300 net MW, opposed wall fired, pulverized coal boiler and Spurlock Unit 2 is a 510 net MW, tangentially fired, pulverized coal boiler. Unit 3 is a 268 net MW coal-fired circulating fluidized bed (CFB) boiler. Unit 4 is a 268 net MW coal-fired CFB boiler.
Performance Fuel	Bituminous coal. Not defined as part of project scoping report.
Design Fuel	Bituminous coal, 16% ash content, 79% Fly Ash, 21% Bottom Ash.
Heat Rejection	Cooling Towers
Operation	Base Load with outages for maintenance.
Capacity Factor	Unit 1 & 2: 90% Unit 3 & 4: 90%
Minimum Load Capability:	Unit 1: 300 MW, Unit 2: 510 MW, Unit 3: 268 MW, Unit 4: 268 MW. All net MW values.
Project Location:	Existing Spurlock Station near Maysville, Kentucky.
Site Description:	Brownfield existing coal fired.
Project COD date:	November 2024 for ash pond closure completion with CCR and ELG mechanical equipment in-service by December 2020.
Labor Type:	Union.
Labor Incentives:	Not Included: Per diem / job completion, Safety Included.
Project LD's:	Schedule and performance for each contract.
Contracting Methodology:	Multiple Contract.
Scope Basis / Assumptions:	
General:	
Water Supply:	
CCR/ELG Makeup Water:	Service Water.
Service Water:	Available at the process building for use in the WWT area. Available within the existing plant for use in the transfer building. For WMB chemical feed equipment, potable water available at the existing ammonia storage area will double as service water.
Potable Water:	New eyewash/safety showers will be provided in the WWT area, bottom ash silo, fly ash silo fly ash transfer building, and in the WMB chemical feed area fed by potable water. In the WWT area, potable water is assumed to be available at the process building. At the WMB chemical feed equipment, potable water will be provided from the existing ammonia storage area.
Fire Protection Water:	Fire Water - available near the existing process building next to U1/2 fly ash silo for the WWT area.
Other Water Sources:	Not defined.
Compressed Air:	New air compressors with heated, desiccant dryers in WWT area for new CCR and WWT equipment. Existing air tie-in near Unit 2 for the new fly ash transfer building. It is assumed that the existing compressed air system has capacity to support the new transfer building requirements since it will be replacing the existing fly ash transfer building. Compressed air required for miscellaneous NIDs/ash mixing valves, pumps, etc. within the plant is assumed available nearby within the plant. Compressed air required for the WMB chemical feed area is assumed available at the existing ammonia storage area.
Wastewater Disposal:	
Contaminated Wastewater:	Localized containment.
Sanitary Wastewater:	Sanitary tie-in to existing process building sanitary line for new unisex bathroom with toilet and shower provided.
Start-up Fuel:	Fuel Oil - No.2 Ultra Low Sulfur.
Fuel:	
Type:	Bituminous.
Delivery:	Rail and Barge.
Alternative Fuel:	Not considered.
Fuel Additives:	Kiln dust, GE FuelSolv, and Calcium Bromide.
Fly Ash Handling:	
Disposal:	Existing transfer station to be demolished. New transfer station to be installed adjacent to the existing building. Waste product will be picked up from the existing hopper pickup points with no hopper modifications. Wet ash disposal equipment and piping to be demolished and removed from service. The economizer ash will be taken to a new economizer ash tank on units 1 and 2 (one tank per unit), handled dry, and pneumatically conveyed to the new bottom ash silo.
Storage:	One new 4,000 ton concrete fly ash storage silo is included capable of 3-days storage.
Transportation:	New truck load out facilities will be incorporated in the new fly ash silo.
Bottom Ash Handling:	
Disposal:	Existing bottom ash overflow system will be removed and repurposed as a new dry pneumatic bottom ash handling system. Bottom ash hoppers will be removed and replaced with new dry bottom ash hoppers that have a dry seal, jaw crushers, isolation doors, crushers, screw feeders and new valves and piping that are routed to a silo. The existing bottom ash lines to the ash pond will be demolished and removed to the fly ash transfer building. The bottom ash piping from the fly ash transfer building to the ash pond will be repurposed as an FGD effluent pipe that dumps into the new WMB pond. Pyrites will be handled via new pumps and piping to dewatering bins and a settling basin.
Storage:	A new 3-day welded steel storage silo will be provided north of unit 1. New dewatering bins and a settling basin will be located in the same area for pyrites handling.
Transportation:	MAC trucks will be filled at the silo and dewatering bins for transportation to the landfill or taken off-site for beneficial reuse.
Wastewater Treatment:	
Disposal:	Clarified wastewater from the WWT system is pumped back to plant for use as makeup water to Unit 3 or Unit 4 NID, or ash conditioning in Unit 1/2 ash silos or Unit 3/4 ash silos. Fully treated distillate wastewater from WWT system is pumped to WMB pond for discharge. Treated wastewater from WWT system is distillate/demin quality and may be reused in the Unit 1 WFGD, Unit 2 FGD, Unit 1 cooling tower, or Unit 2 cooling tower as makeup water. Brine wastewater from WWT system is used for ash conditioning in Unit 1/2 ash silo or diluted in clarified water storage tanks for reuse in plant proper. Coal pile runoff wastewater is pumped to WMB pond for discharge following chemical treatment with WMB pond chemical treatment system.
Storage:	Clarified water storage tanks and other smaller NID and ash silo wastewater tanks allow for 10 days storage of wastewater not able to be treated, evaporated, or mixed into ash during Unit 3 and Unit 4 simultaneous shutdowns.
Transportation:	Metal cleaning wastewater (air heater wash and boiler cleaning/washes) will be treated with temporary system on as-needed basis with waste trucked to landfill or other offsite disposal.



**East Kentucky Power Cooperative  
Spurlock CCR / ELG Compliance Project  
Scope Assumptions Matrix**  
Burns McDonnell Project Number: 89810  
Rev. C



<b>Civil:</b>	
<b>Site Conditions:</b>	Transfer station is located near existing structures, foundations, and utilities. New WWT and fly ash silo are located closer to the landfill in an area with few existing structures. New bottom ash equipment is located near existing structures, foundations, and utilities.
<b>Layout Considerations:</b>	Close proximity to landfill haul road. Modifications to existing access roads has been provided and takes into consideration tree line location.
<b>Disposal of Spoils:</b>	Spoils will be disposed of on site. No hazardous materials are anticipated in the soils.
<b>Soil Conditions / Stability:</b>	Existing soils are assumed to be stable in and around the area and suitable for use as laydown without any further preparation.
<b>Subsurface Rock:</b>	Not encountered until an approximate elevation of 425' to 400'.
<b>Groundwater:</b>	An existing groundwater monitoring system is in place around the perimeter of the ash pond. It is assumed this system is adequate and no additional monitoring wells will need to be installed.
<b>Cut &amp; Fill:</b>	Site cut and fill will be required near the CCR handling area and WWT area. Substantial fill will be required south of new pipe rack. No grading assumed necessary near new transfer station or bottom ash silo, however asphalt and concrete paved areas will be required to be removed to the extent necessary to install this new equipment and buildings. Extensive earthwork, primarily for ash removal, will be required at the existing ash pond.
<b>Borrow Material:</b>	Clay and protective soil material for the ash pond modifications work will be from the EKPC approved borrow site that is approximately 4 miles (one-way) from the ash pond. Haul route traffic may be disrupted at times at the existing railroad crossing, for potentially up to two hours at a time.
<b>Dewatering:</b>	It is assumed that an engineered dewatering system will not be required for the transfer station and CCR handling area. Extensive dewatering will be necessary at the existing ash pond and it will be done by mechanical methods such as creating ditches, double-handling, or using a disc to dry out the material, not with barge-mounted equipment. Cofferdams, temporary berms, or sheet piles may be utilized to dewater portions of the existing ash pond while still accepting other process flows during initial Water Mass Balance (WMB) pond construction and Ash Pond closure. Once the WMB pond is built which will be required to be done first, process flows from the plant will be routed to the WMB pond while the rest of the ash pond is clean closed.
<b>Construction Stormwater Control:</b>	EKPC's SWPPP to include silt fencing, rock check dams, and construction entrances.
<b>Permanent Project Stormwater Control:</b>	New drainage ditches to direct runoff to existing pond(s) or modifications to existing storm water controls as necessary.
<b>Roads:</b>	Existing roads will be modified as necessary to provide access to new ash handling and WWT equipment. The haul road next to the new WWT equipment will be widened to accommodate a separate set of lanes for normal plant traffic to/from the ash handling and WWT equipment. The road to the WMB pond chemical feed equipment will be left as-is with gravel, no paving modifications included. The existing paved area to/from the new bottom ash equipment will be removed and replaced with a concrete pavement of sufficient thickness to handle truck loads.
<b>Parking:</b>	No modifications to existing facilities are included.
<b>Truck Scale:</b>	Existing truck scale will be left in place.
<b>Coal Pile Run-off:</b>	No modifications to existing included in this project.
<b>Ash Landfill:</b>	No further costs for on-site landfill have been included.
<b>Ash Pond:</b>	The existing ash pond will be closed through removal of CCR material. A portion of the existing ash pond will be repurposed to a lined 17-acre water mass balance pond. The remaining area not repurposed to a lined 17-acre water mass balance pond will have its CCR material removed and it will be left as-is with the potential to fill with water by EKPC. Prior to sub-contractor performing this scope of work, the existing ash pond will be drained to 512 feet by Owner.
<b>Site Security:</b>	Included in Owner's costs.
<b>Future Expansion:</b>	There are considerations for future installation of a pipe conveyor to the landfill from the new fly ash silo. This scope, layout and cost has not been included.
<b>Landscaping:</b>	Minimal landscaping is included. Disturbed areas will be seeded for erosion control.
<b>Rail Access:</b>	The rail crossing to the existing ash pond will be modified by paving the area in-between the rails for the new paved road to the WMB chemical feed equipment. No other rail modifications are included. Materials can be delivered on rail, if necessary.
<b>Truck Access:</b>	Existing roads will be used for construction access. No upgrades are included.
<b>Construction Parking &amp; Laydown</b>	Existing construction parking area will be utilized. Laydown will be local to new equipment locations.
<b>Structural:</b>	
<b>Soil Bearing Capacity:</b>	Existing geotechnical data in the plant area was utilized for general information for the scoping report. Foundations for small equipment, and pipe racks are assumed to be shallow foundations with a bearing capacity of 3,000 psf. Foundations for the new fly ash silo, bottom ash silo, PCMs, buildings, and major WWT equipment including tanks are assumed to be pile cap mats with H-piles that are 120 feet in depth. A geotechnical study is included with the estimate to determine foundation design recommendations for detailed design.
<b>Soil Improvement:</b>	No soil improvements are assumed as part of this scoping report. Results of a geotechnical study will determine if any improvements are required during detailed design.
<b>Piling:</b>	H-piles with 120 feet deep to rock are included in the estimate for the new fly ash silo, bottom ash silo, PCMs, buildings, and major WWT equipment including
<b>Groundwater:</b>	No engineered dewatering system is included as part of this project for the ash handling or WWT areas. The existing ash pond will require dewatering to elevation 512 feet, however this would not be considered groundwater.
<b>Enclosures:</b>	
<b>Fly Ash Transfer Building</b>	Two story enclosure including filter separators. The fly ash transfer building will be a steel framed braced system with insulated steel roof and wall panels. The elevated equipment floor will be reinforced concrete. A stairway is included for access to the elevated equipment floor and the access platforms for the filter separator. A monorail and hoist system is included for equipment maintenance. Personnel access and overhead doors will be provided as required.
<b>Fly Ash Silo</b>	The silo is enclosed however the roof of the silo supporting the filter separators is not enclosed. Stair tower access with secondary egress by ladders will not be enclosed.
<b>Bottom Ash Silo and Pyrites Dewatering Bins</b>	The silo is enclosed however the roof of the silo supporting the filter separators is not enclosed. Stair tower access with secondary egress by ladders will not be enclosed. The dewatering bins and bottom ash unloading floor will be enclosed. Dewatering bins are on elevated structural steel at approximately the same level as the bottom ash unloading floor and will have wall panels that extend to grade and "butt up" against the bottom ash silo to fully enclose truck ash and/or pyrites loading. Two new overhead doors will be provided, one on the dewatering bins entrance and the other on the bottom ash silo exit (or vice versa).
<b>Bottom Ash Exhauster Building</b>	A new enclosure will be provided for the bottom ash exhausters and pyrites sludge pumps in the vicinity of the bottom ash silo. It will be a one story steel framed braced system with insulated steel roof and wall panels. A monorail and hoist system is included for equipment maintenance. Personnel access and overhead doors will be provided as required.



**East Kentucky Power Cooperative  
Spurlock CCR / ELG Compliance Project  
Scope Assumptions Matrix**  
Burns McDonnell Project Number: 89810  
Rev. C



<b>WWT Building</b>	A new WWT building will be a pre-engineered metal building with personnel access and overhead doors as required. The building will have concrete trenches for water containment that will be routed to a new sump. Monorails are not provided as overhead door access and layout of equipment will allow for forklifts to enter/exit the building and remove small equipment needed for maintenance.
<b>Filter Press Building</b>	Two story enclosure with filter separators located above the truck unloading area below. A bridge crane for each filter press (3 total) is included for equipment maintenance. Personnel access is provided and 6 large overhead doors (3 on each side of the building) are provided for truck access. Trench and sump for containment of spills in the concrete base.
<b>Pump Enclosures</b>	Miscellaneous pump enclosures will be provided to locate pumps in the vicinity of their adjacent tanks. These will be pre-fabricated structures sent to site in one or multiple pieces and placed on their foundation.
<b>WMB Pond Chemical Feed Enclosure</b>	Pre-fabricated building housing the WMB pond chemical feed equipment as well as a partitioned and rated wall for electrical equipment in a separate room.
<b>Control Facilities:</b>	Included in the electrical buildings.
<b>Warehouse Facilities:</b>	Not Included.
<b>Maintenance Shops:</b>	Not Included.
<b>Pipe Rack:</b>	The pipe rack will be a braced structural steel frame. The pipe rack will be elevated at road crossings to allow for traffic. An access walkway will be provided along the piperack next to the cable tray.
<b>PCM:</b>	Two new electrical buildings will be provided (PCMs); one near the new WWT equipment and another within the plant local to the existing fly ash transfer building for the new fly ash handling and bottom ash handling equipment. Within the new WMB pond chemical feed building, a section of the building will be partitioned off for electrical and I&C equipment local to that chemical feed equipment.
<b>Transformers:</b>	Fire walls and containment not required.
<b>Mechanical:</b>	
<b>Noise:</b>	85dbA nearfield where practical.
<b>Fly Ash Silos</b>	A single 4,000 ton concrete fly ash silo.
<b>Fly Ash Handling:</b>	Vacuum exhausters, pressure conveyors, filter/separators, pugmill/paddle mixers, silo fluidizing air blowers.
<b>Equipment Redundancy</b>	2x100% for single train pumps, blowers, tanks, compressors, etc. 3 x 50% for dual, redundant trains.
<b>Bottom Ash Silos</b>	A single 50 ton concrete fly ash silo.
<b>Bottom Ash Handling:</b>	Vacuum exhausters, filter/separators, pugmill/paddle mixers, hopper doors, jaw crushers, Excen-crushers, screw conveyor feeders, pyrite sluice water supply pumps, pyrite sludge return pumps, pyrite settling bin, pyrite dewatering bins.
<b>Equipment Redundancy</b>	2x100% for single train pumps, blowers, tanks, compressors, etc. 3 x 50% for dual, redundant trains.
<b>Wastewater Treatment:</b>	Wastewater forwarding pumps, equalization tanks, wastewater feed pumps, softening reactor tanks, wastewater clarifiers, clarifier sludge pumps, clarifier cleanwell/pumps, clarified water storage tanks/pumps, evaporator feed tanks/pumps, wastewater heat exchangers, falling film evaporators, vapor compressors and lube oil skids, evaporator recirculation pumps, distillate tanks/pumps, blowdown tanks/pumps, blowdown heat exchangers, brine tanks/pumps, seed tank, clean-in-place tank/pump skid, chemical feed pumps, distillate storage tank, wastewater elimination pumps, sludge holdings tanks, filter press feed pumps, filter presses, cloth wash tank/pump, NID wastewater storage tanks/pumps, fly ash silo wastewater storage tanks/pumps, hydrated lime silos, hydrated lime screw feeders, hydrated lime slurry tanks, hydrated lime slurry pumps, WMB pond reaction tank, WMB pond reaction tank pumps, auxiliary steam boiler, area sumps/sump pumps. The anticipated solids removal is 4% for total suspended solids.
<b>Equipment Redundancy</b>	2x100% for single train pumps, blowers, tanks, compressors, etc. 3 x 50% for dual, redundant trains. Filter presses are 3x100% with 1x100% spare or used when solids exceed the 4% TSS.
<b>Compressed Air Supply:</b>	2x100% dedicated air system in the new WWT building. Heated desiccant type dryers.
<b>Air Quality:</b>	-40F dried instrument air, all air to be dried.
<b>Fire Protection:</b>	Fire Protection will be from a tie-in to the existing fire protection system. Fire protection system to include one new fire hydrant at the new fly ash silo and 10 new hydrants around the WWT building. No upgrades to existing fire pumps.
<b>Fire Detection:</b>	Fire Detection is included as required by code.
<b>Pipe</b>	
<b>Economizer Ash</b>	Cast iron (Nuvaloy).
<b>Pyrite</b>	Basalt-lined carbon steel.
<b>Hydraulic Oil</b>	Sch. 80 carbon steel (welded).
<b>Instrument Air</b>	HDPE below grade and Sch. 40 304 stainless steel (welded) above grade.
<b>Service Water</b>	HDPE below grade and carbon steel above grade.
<b>Fire Protection</b>	HDPE below grade.
<b>Potable Water</b>	HDPE below grade and copper above grade.
<b>WWT</b>	Fiberglass reinforced plastic (FRP).
<b>Chemical Feed</b>	PVC.
<b>Freeze Protection</b>	Piping for WWT located outdoors will be heat traced and insulated as required.
<b>Electrical:</b>	
<b>Electrical Distribution Equipment</b>	Two packaged control modules (PCM) will be included, one for the fly ash silo and wastewater treatment equipment, and the other for the fly ash transfer station and bottom ash equipment and silo. All PCM buildings to be air conditioned. PCMs shall be elevated to allow cabling to be installed from below without the need for a vault or tunnel. Elevated PCM to be supplied with platforms and stairs. Additionally there will be a WMB pond chemical feed equipment building that will have a separate room for electrical equipment located near the WMB pond and powered from the fly ash transfer station PCM. This building will not be elevated and cabling will enter the building on the side.
<b>Wire Routing</b>	Cable tray will be routed through existing steel areas or new steel will be provided for support. Ductbank is included near the switchyard for the new auxiliary transformer 13.8 kV feed to cross the road. Ductbank and underground electrical vaults will include sump only. No water level detection, alarms and automatic sump pumps for removal of water is included.
<b>Switchgear</b>	
<b>Existing Switchgear</b>	Upstream 4160V feeder breaker cubicles that will feed the 4160V Fly Ash Transfer Switchgear will be upgraded with microprocessor based relays.
<b>MV Switchgear / Power Centers</b>	Fly Ash Transfer: Arc - Resistant 4.16kV, 41kA MV switchgear, low resistance grounded system, motors fed from contactors, transformer feeders switchgear breakers, primary and alternate incoming "main" breakers. Remote racking included. Wastewater Treatment: Arc - Resistant 13.8kV, 41kA MV switchgear, low resistance grounded system, motors fed from contactors, transformer feeders switchgear breakers, primary and alternate incoming "main" breakers. Remote racking included.



**East Kentucky Power Cooperative  
Spurlock CCR / ELG Compliance Project  
Scope Assumptions Matrix**  
Burns McDonnell Project Number: 89810  
Rev. C



<b>480V Switchgear</b>	Arc - Resistant 5kV, 65kA MV switchgear, high resistance grounded system included. Low voltage switchgear arranged in a main-tie-main configuration.
<b>480V MCCs:</b>	Motor control centers for the pneumatic bottom ash system including bottom ash silo, fly ash silo, fly ash transfer systems, and for WWT equipment will be housed in the PCMs adjacent to the low voltage equipment. Motor control centers for the WMB pond chemical feed equipment will be housed in the WMB pond chemical feed equipment enclosure in a separate, partitioned room. 480V, 3Phase 3 Wire, 65kA, NEMA Type 1 gasketed for indoor installations.
<b>Emergency Power:</b>	For the WWT system 2 hour DC and AC UPS for breaker control, control system, and critical instrumentation. Flooded cell battery, 2 Hours shut down discharge duration, 12 Hours recharge time, Ungrounded, Two - Tier Configuration. Online battery monitoring system included. 125VDC power for the electrical equipment in the Ash Transfer PCM will be sourced from the Unit 1 FGD Electrical Building.
<b>Start-Up Power Supply:</b>	No changes will be made to the startup power supply.
<b>Auxiliary Power Supply:</b>	Two new 138/13.8 kV auxiliary transformers will be provided to supply power to the WWT area.
<b>Plant Communications:</b>	
<b>WWT Area</b>	Gaitronics communication and land line included.
<b>Fly Ash Silo</b>	Gaitronics communication and land line included.
<b>Fly Ash Transfer Station</b>	Gaitronics communication and land line included.
<b>Bottom Ash Silo</b>	Gaitronics communication and land line included.
<b>Bottom Ash Exhauster Building</b>	Gaitronics communication and land line included.
<b>PCMs</b>	Gaitronics communication and land line included.
<b>WMB Pond Chemical Feed Enclosure</b>	Gaitronics communication and land line included.
<b>Lightning Protection</b>	Included for all new buildings, the Ash Silo, the bottom ash silo area, and portions of the pipe rack not protected by surrounding structures.
<b>Transformers</b>	Dry type except for oil-filled transformers in the switchyard (138 kV to 13.8 kV).
<b>Controls:</b>	
<b>Plant Control System</b>	Fly ash transfer and bottom ash to be implemented in a single set of new, redundant DCS processors. The WWT will be implemented in a separate set of new, redundant DCS processors.
<b>Vibration Monitoring</b>	Not included.
<b>Electrical Relay data link</b>	Critical components hardwired to DCS and datalink over Modbus TCP/IP.
<b>Closed Circuit Television(CCTV)</b>	Not included.
<b>Instrumentation</b>	Balance of Plant Instruments (3) are included.
<b>Transmission / Interconnection:</b>	
<b>Transmission:</b>	No modifications are included.
<b>Switchyard:</b>	New tie-in to 138 kV line with a new 138 kV to 13.8 kV auxiliary transformer.
<b>Commercial:</b>	
<b>General Liability Insurance</b>	Included.
<b>Builder's Risk Insurance</b>	Included.
<b>Performance Bonds</b>	Included in individual contract buildups within the Project costs.
<b>Project L/D's</b>	Schedule and Performance for each contract.
<b>Retention:</b>	A 10% retention will be required on all contracts.
<b>Warranty:</b>	Warranty on major equipment will be required for 1 year +1 year from commercial operation. Warranty on auxiliary equipment will be required for 18 months +18 months from substantial completion to the extent possible.
<b>Construction Indirects:</b>	
<b>Construction Indirects:</b>	
<b>Commissioning / Start-up:</b>	Allowance included.
<b>Operator Training:</b>	Allowance included.
<b>Performance Testing:</b>	Allowance included for all major components regardless of contracting approach.
<b>Permits:</b>	Construction permits are included.
<b>Construction Utilities:</b>	
<b>Water Supply:</b>	Potable water available in Process building and Unit 1 / 2 Boiler area for Contractor tie-in and install / remove at end of project.
<b>Construction Sanitary Facilities</b>	Portable facilities provided by construction contractors.
<b>Construction Power and Construction Lighting:</b>	Power provided by EKPC. Internet and phones by Contractors. Construction power for activities near the new remote SFC will be sourced from the existing process building.
<b>Equipment Delivery:</b>	Equipment primarily to be delivered by truck. All unloading / handling by Contractor.
<b>Construction Schedule:</b>	It is assumed that the construction schedule will be adequate to allow the project to be completed with minimal overtime. Construction schedule will be estimated as a 5 x 10 schedule to provide an incentive to attract labor.
<b>Construction Facilities:</b>	Rental buildings with temporary E&CM building. Included in Owner's cost for E&CM. Construction Contractors to provide facility as part of their scope and is included in project estimate.
<b>Project Indirects:</b>	
<b>Project Development:</b>	Allowance included in Owner's Costs.
<b>Owner's Operation Personnel:</b>	Allowance included in Owner's Costs.
<b>Owner's Project Management:</b>	Allowance included in Owner's Costs.
<b>Owner's Engineering:</b>	Allowance included in Owner's Costs.
<b>Owner's Legal Counsel:</b>	Allowance included in Owner's Costs.
<b>Operator Training:</b>	Allowance included.
<b>Permitting &amp; License Fees:</b>	Allowance included in Owner's Costs.
<b>Landfill:</b>	Not included.
<b>Site Security:</b>	Allowance included in Owner's Costs.
<b>Warehouse Shelves:</b>	Not Included.
<b>Mobile Equipment, Vehicles:</b>	Allowance included.

**East Kentucky Power Cooperative  
Spurlock CCR / ELG Compliance Project  
Scope Assumptions Matrix**  
Burns McDonnell Project Number: 89810  
Rev. C



<b>Laboratory Equipment:</b>	No special laboratory equipment is included nor required for the WWT chemical laboratory.
<b>Commissioning Fuel &amp; Consumables</b>	Not Included.
<b>Commissioning Test Power Sales</b>	Not Included.
<b>Operating Spare Parts</b>	Included in Project costs.
<b>Commissioning Spares and First Fills</b>	Included in Project costs and Owner's Costs.
<b>Plant Maintenance Tools</b>	Not Included.
<b>Sales Tax:</b>	Not Included.
<b>Escalation:</b>	Escalation is included at a rate of 1% per year for equipment and 2 1/2% per year for labor.
<b>Contingency:</b>	Estimate and definition contingency of 10%. Owner's contingency not included and will be treated on a case-by-case basis.
<b>All Owner's Costs</b>	Allowance Included in Owner's Costs.
<b>General Assumptions:</b>	
<b>Reuse of existing equipment</b>	Existing pipe and equipment to be reused is assumed to be in adequate working order. Including bottom ash pipe and fly ash pipe.
<b>Items Excluded from the Scope:</b>	
1. Taxes including sales, use, gross receipts, property and any other types. Per Kentucky's Department of Revenue, an exemption on sales tax can be acquired for pollution control facilities which this Project would likely fall under.	
2. All insurance other than General Liability being carried as a project cost.	
3. Sound abatement above normal supply.	
4. Aesthetic landscaping other than erosion control.	
5. High escalation associated with extreme market conditions.	
6. Financing fees.	
7. Interest during construction.	

## **APPENDIX D - DESIGN BASIS**

Appendix D					
EKPC Spurlock Station CCR / ELG Compliance Project					
Ash System Design Basis					
Description	Units	Unit 1		Unit 2	
Rated Fuel Input	lbs/hr	320,000	320,000	625,000	625,000
Ash Content in Coal	%	16%		16%	
Bottom Ash Percent	%	21%		21%	
Fly Ash Percent	%	79%		79%	
		Unit 1		Unit 2	
		Max Rated Production	Design Removal <sup>[1]</sup>	Max Rated Production	Design Removal <sup>[1]</sup>
Total Ash Production	lbs/hr	51,200		100,000	
	tph	25.6		50	
Bottom Ash <sup>[1]</sup>	tph	5.4		10.5	
Pyrites <sup>[1,2]</sup>	tph	0.3		0.5	
Fly Ash	tph	20.22	40.45	39.50	79.00
Precipitator Ash	tph	20.22	40.45	39.50	79.00
Economizer Ash <sup>[3]</sup>	tph	2.02	4.04	3.95	7.90
Air Heater Ash <sup>[4]</sup>	tph	1.01	2.02	N/A	N/A
SCR Ash <sup>[4]</sup>	tph	1.01	2.02	N/A	N/A
Bottom Ash Density	lbs/cu ft	45	45	45	45
Bottom Ash Structural Design	lbs/cu ft	-	160	-	160
Fly Ash Density	lbs/cu ft	50	70	50	70
Fly Ash Structural Design	lbs/cu ft	-	120	-	120
Notes:					
1) Design values based on 2:1 removal rate for bottom ash and pyrites.					
2) Pyrites assumed 5% total bottom ash.					
3) Values for economizer ash assumed 10% of total fly ash.					
4) Values for SCR and air heater ash assumed 5% of total fly ash.					
5) Densities shall be confirmed by Supplier through testing and approved by Owner & Engineer prior to final design.					



Appendix D		
EKPC Spurlock Station CCR / ELG Compliance Project		
Wastewater Treatment Systems Design Basis		
Description	Units	Value
FGD Blowdown Wastewater Flowrates	GPM	
Total Design FGD Blowdown Wastewater Flow	GPM	400
MVC/Falling Film Evaporator Design Flowrate	GPM	240 (120 GPM per each of two trains)
Design Distillate Flow from Evaporators	GPM	210
Design Blowdown/Brine from Evaporators	GPM	30
NID Evaporation Design Flowrate	GPM	150
Ash Mixing/Conditioning Design Flowrate (per silo)	lbs/hr	25 (total of 75 GPM for three silos) <sup>1</sup>
WMB Pond Chemical Feed System Design Flowrate	GPM	2800 (coal pile runoff wastewater)
Equalization Tank Retention Time	Hours	24 (12 hours per tank)
Clarified Water Storage Tank Storage Time	Days	10 days <sup>2</sup>
Sludge Holding Tanks Storage Time	Days	1.5 (per tank)
WWT Hydrated Lime Silo Storage Capacity	Tons	37.5 (4 days of storage)
WMB Pond Hydrated Lime Silo Storage Capacity	Tons	75 tons <sup>4</sup>
FGD Blowdown Wastewater Quality Constituent	Units	Design Value (Range)
Chloride	mg/L	20,000
Fluoride	mg/L	118
Sulfate	mg/L	1,117
TSS	mg/L	40,000
Nitrate	mg/L	27.3 (3.1-27.3)
Nitrite	mg/L	10 (0.2-10)
Na	mg/L	200
Ca	mg/L	4,561
Mg	mg/L	927
SiO <sub>2</sub>	mg/L	200
Alkalinity	µg/L	300 (100-300)
pH	µg/L	6 (5.13-6.15)
Temp	µg/L	98 (94-98)
Antimony	µg/L	3.6 (0.5-3.6)
Arsenic	µg/L	10.2 (0.83-10.2)
Beryllium	µg/L	4.8 (0.14-4.8)
Cadmium	µg/L	40.6 (0.8-40.6)
Chromium	µg/L	15.6 (0.6-15.6)
Copper	µg/L	102.8 (0.6-102.8)
Iron	µg/L	9,833.8 (35.1-9,833.8)
Lead	µg/L	11.1 (0.6-11.1)
Manganese	µg/L	458,621 (69,190-458,621)
Mercury	µg/L	5.6 (0.02-5.6)
Nickel	µg/L	534.0 (94.8-534.0)
Selenium (Tot)	µg/L	3,154.4 (242.7-3,154.4)
Silver	µg/L	2.13
Thallium	µg/L	50.6 (1.9-50.6)
Zinc	µg/L	400 (12.0-400)
Notes:		
1) Ash mixing design flowrate assumes 12% moisture in the resulting ash mixture.		
2) Flowrate required storage in clarified water storage tanks is 225 GPM when both Unit 3 and Unit 4 are offline for 10 days as was requested by EKPC.		
3) All wastewater tanks are sized for suitable storage/retention time to support intermittent and variable nature of WWT system.		
4) Silo size coupled with reaction tank storage and hydrated lime slurry tank storage provides 1 to 1.5 days of storage assuming 24 hour rain event where coal pile runoff discharge pumps run continuously.		



## APPENDIX E – SCHEDULE

Please refer to accompanying  
envelope for this Appendix.

## **APPENDIX F - COST ESTIMATE**

**CAPITAL COST ESTIMATE  
EKPC  
SPURLOCK CCR / ELG PROJECT  
89810  
MAYSVILLE, KY**

Sort 1	Description	Labor Cost	Material Cost	Engr Equip/ Subcontract Cost	Const. Equipment Cost	Total Cost
WT	Waste Water Treatment	18,800,000	18,800,000	43,600,000	1,900,000	\$83,100,000
FA	Fly Ash	5,400,000	3,500,000	16,200,000	500,000	\$25,600,000
PCF	Pond Chemical Feed	1,800,000	1,000,000	2,200,000	200,000	\$5,200,000
BA	Bottom Ash	9,200,000	2,700,000	14,200,000	800,000	\$26,900,000
BOP	Balance of Plant	1,700,000	1,300,000	200,000	200,000	\$3,400,000
PC	Ash Pond Closure			43,400,000		\$43,400,000
M	Misc Directs	400,000		900,000		\$1,300,000
<b>Total Direct Cost</b>		<b>\$37,300,000</b>	<b>\$27,300,000</b>	<b>\$120,700,000</b>	<b>\$3,600,000</b>	<b>\$188,900,000</b>
<b>Rev.</b>	<b>Revision Date</b>					
A	10/19/16	Construction Mgmt & Indirects 6%				\$11,400,000
B	01/30/17	Engineering/Start Up/Field Services 12%				\$22,700,000
C	03/30/17	Commercial - Builders Risk Insurance				\$1,000,000
		Escalation				\$6,900,000
		<b>Total Indirect Cost</b>				<b>\$42,000,000</b>
		<b>Total Direct and Indirect Costs</b>				<b>\$230,900,000</b>
		Project Contingency 10%				\$23,000,000
		<b>Total Project Cost</b>				<b>\$253,900,000</b>
		Owner Cost - General				\$8,500,000
		Owner Cost - Owner Contingency				
		<b>Total Project Cost Incl. Owner Cost</b>				<b>\$262,400,000</b>



EKPC Spurlock CCR / ELG Compliance Project O&M Costs			
Expense	Year	Cost	
Labor Costs <sup>1</sup>	2017	\$ 68.75	\$/hr
Antifoam Cost <sup>3</sup>	2017	\$ 4.50	\$/lb
Antiscale Cost <sup>3</sup>	2017	\$ 2.50	\$/lb
Hydrated Lime Cost <sup>3</sup>	2017	\$ 0.08	\$/lb
Sulfuric Acid Cost <sup>3</sup>	2017	\$ 0.10	\$/lb
Coagulant Cost <sup>3</sup>	2017	\$ 0.10	\$/lb
Polymer Cost <sup>3</sup>	2017	\$ 1.24	\$/lb
Electrical Costs	2017	\$ 28.00	\$/MWh
<b>Inputs</b>			
Capacity Factor (Units 1 and 2)	90%		
Additional Electrical Use <sup>2</sup>	31,540,000	kWh/year	
Antifoam Use <sup>3</sup>	4	lb/hr	
Antiscale Use <sup>3</sup>	2	lb/hr	
Hydrated Lime Use <sup>3</sup>	479	lb/hr	
Sulfuric Acid Use <sup>3</sup>	8	lb/hr	
Coagulant Use <sup>3</sup>	33	lb/hr	
Polymer Use <sup>3</sup>	1	lb/hr	
Additional Full Time Equivalents to Operate MVC System <sup>3</sup>	12	FTE	
<b>Calculated Values</b>			
Operation Labor Costs	\$ 1,720,000	\$/year	
Chemical Costs	\$ 530,000	\$/year	
Additional Electrical Costs	\$ 880,000	\$/year	
<b>Incremental Costs</b>			
Labor O&M Differential Costs	\$ 1,720,000	\$/year	
Bottom Ash Hauling Costs	\$ 745,000	\$/year	
Filter Press Solids Hauling Costs	\$ 372,000	\$/year	
Chemical Differential Costs	\$ 530,000	\$/year	
Electrical Differential Costs	\$ 880,000	\$/year	
<b>Total O&amp;M Cost Differential</b>	<b>\$ 4,247,000</b>	<b>\$/year</b>	

1. Values obtained from EKPC based on historical data

2. Electrical usage differential was calculated by adding the energy use of the new Optimized MVC equipment together and multiplying by the \$/MWh. Bottom ash and fly ash equipment are not included in this calculation as they are considered replacement electrical loads.

3. Based on Burns & McDonnell experience in similar projects.

4. Chemical costs are for Wastewater Treatment equipment associated with FGD wastewater only. WMB Pond chemical feed equipment costs are not included.

## **APPENDIX G - CASH FLOW**



# Appendix G

## EKPC Spurlock Station CCR / ELG Compliance Project

### Cash Flow

Date	Incremental	Cumulative	Incremental %	Cumulative %	Millions
Apr-17	175,270	175,270	0.1%	0.1%	0.18
May-17	256,059	431,329	0.1%	0.2%	0.43
Jun-17	357,739	789,067	0.1%	0.3%	0.79
Jul-17	389,055	1,178,122	0.1%	0.4%	1.18
Aug-17	413,831	1,591,953	0.2%	0.6%	1.59
Sep-17	434,254	2,026,207	0.2%	0.8%	2.03
Oct-17	392,731	2,418,938	0.1%	0.9%	2.42
Nov-17	407,341	2,826,279	0.2%	1.1%	2.83
Dec-17	419,796	3,246,075	0.2%	1.2%	3.25
Jan-18	430,387	3,676,462	0.2%	1.4%	3.68
Feb-18	439,321	4,115,783	0.2%	1.6%	4.12
Mar-18	446,751	4,562,533	0.2%	1.7%	4.56
Apr-18	559,045	5,121,578	0.2%	2.0%	5.12
May-18	2,455,646	7,577,225	0.9%	2.9%	7.58
Jun-18	4,989,932	12,567,157	1.9%	4.8%	12.57
Jul-18	5,699,959	18,267,116	2.2%	7.0%	18.27
Aug-18	3,015,919	21,283,035	1.1%	8.1%	21.28
Sep-18	2,148,665	23,431,700	0.8%	8.9%	23.43
Oct-18	6,441,247	29,872,947	2.5%	11.4%	29.87
Nov-18	6,371,574	36,244,521	2.4%	13.8%	36.24
Dec-18	3,741,834	39,986,355	1.4%	15.2%	39.99
Jan-19	4,999,152	44,985,507	1.9%	17.1%	44.99
Feb-19	7,959,904	52,945,411	3.0%	20.2%	52.95
Mar-19	11,714,806	64,660,217	4.5%	24.6%	64.66
Apr-19	11,967,870	76,628,087	4.6%	29.2%	76.63
May-19	9,461,536	86,089,622	3.6%	32.8%	86.09
Jun-19	9,683,360	95,772,982	3.7%	36.5%	95.77
Jul-19	9,289,471	105,062,453	3.5%	40.0%	105.06
Aug-19	4,797,342	109,859,795	1.8%	41.9%	109.86
Sep-19	6,763,995	116,623,790	2.6%	44.4%	116.62
Oct-19	5,772,991	122,396,780	2.2%	46.6%	122.40
Nov-19	6,875,057	129,271,837	2.6%	49.3%	129.27
Dec-19	7,003,860	136,275,698	2.7%	51.9%	136.28
Jan-20	7,473,366	143,749,063	2.8%	54.8%	143.75
Feb-20	6,911,101	150,660,164	2.6%	57.4%	150.66
Mar-20	7,085,023	157,745,187	2.7%	60.1%	157.75
Apr-20	7,335,175	165,080,361	2.8%	62.9%	165.08
May-20	7,128,279	172,208,640	2.7%	65.6%	172.21
Jun-20	6,594,867	178,803,507	2.5%	68.1%	178.80
Jul-20	6,106,642	184,910,149	2.3%	70.5%	184.91
Aug-20	5,475,077	190,385,226	2.1%	72.6%	190.39
Sep-20	4,718,885	195,104,112	1.8%	74.4%	195.10
Oct-20	4,810,124	199,914,236	1.8%	76.2%	199.91
Nov-20	4,363,147	204,277,383	1.7%	77.8%	204.28
Dec-20	2,433,370	206,710,753	0.9%	78.8%	206.71
Jan-21	1,906,087	208,616,840	0.7%	79.5%	208.62
Feb-21	1,847,648	210,464,487	0.7%	80.2%	210.46
Mar-21	1,323,072	211,787,559	0.5%	80.7%	211.79



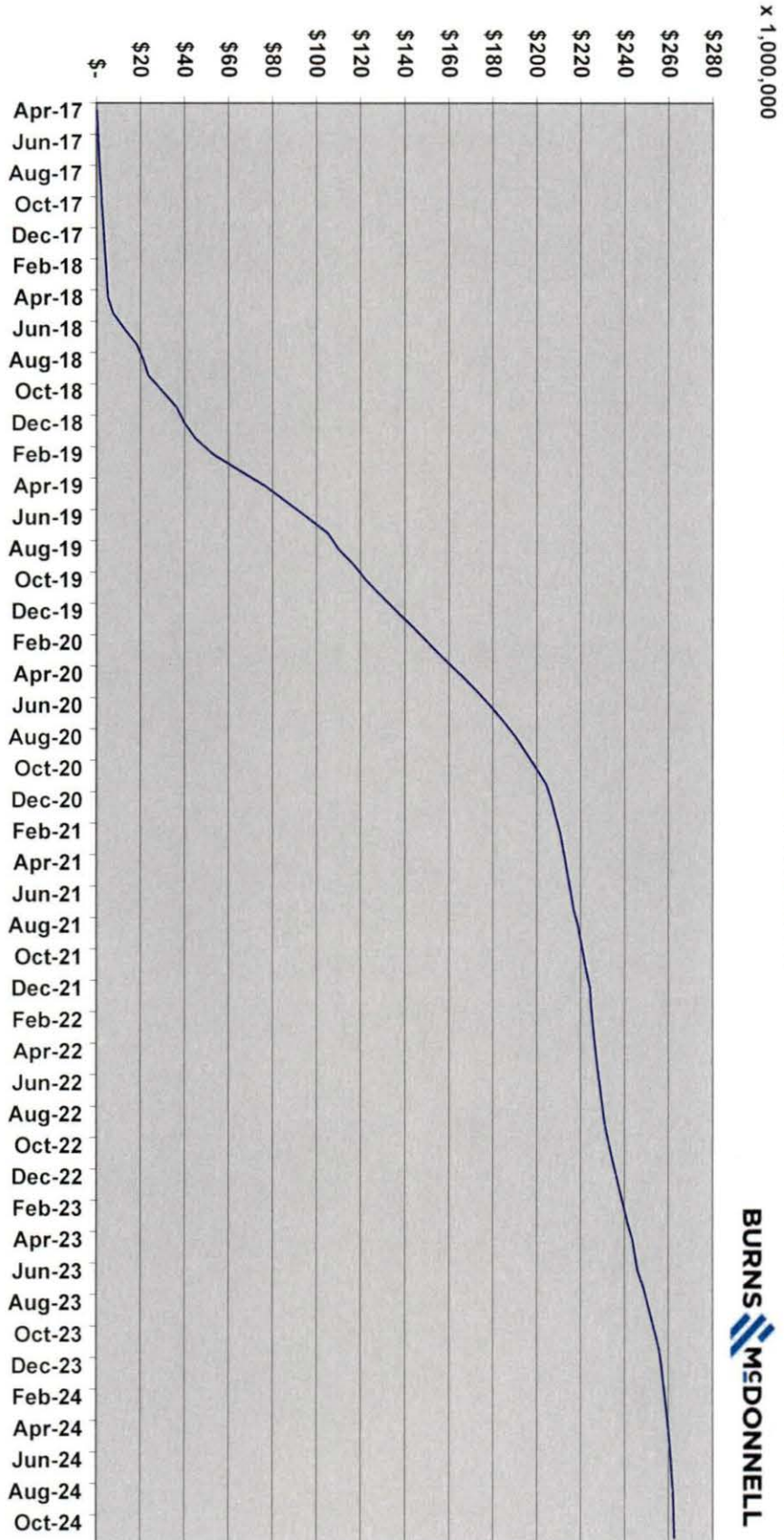
# Appendix G

## EKPC Spurlock Station CCR / ELG Compliance Project

### Cash Flow

Date	Incremental	Cumulative	Incremental %	Cumulative %	Millions
Apr-21	1,305,865	213,093,424	0.5%	81.2%	213.09
May-21	1,288,244	214,381,667	0.5%	81.7%	214.38
Jun-21	1,270,248	215,651,916	0.5%	82.2%	215.65
Jul-21	1,251,916	216,903,832	0.5%	82.7%	216.90
Aug-21	1,879,854	218,783,686	0.7%	83.4%	218.78
Sep-21	1,253,105	220,036,791	0.5%	83.9%	220.04
Oct-21	1,320,736	221,357,527	0.5%	84.4%	221.36
Nov-21	1,396,989	222,754,515	0.5%	84.9%	222.75
Dec-21	1,471,794	224,226,310	0.6%	85.5%	224.23
Jan-22	549,851	224,776,160	0.2%	85.7%	224.78
Feb-22	620,326	225,396,487	0.2%	85.9%	225.40
Mar-22	687,943	226,084,430	0.3%	86.2%	226.08
Apr-22	752,262	226,836,692	0.3%	86.4%	226.84
May-22	812,861	227,649,553	0.3%	86.8%	227.65
Jun-22	869,346	228,518,899	0.3%	87.1%	228.52
Jul-22	921,343	229,440,242	0.4%	87.4%	229.44
Aug-22	968,509	230,408,751	0.4%	87.8%	230.41
Sep-22	1,010,533	231,419,283	0.4%	88.2%	231.42
Oct-22	1,582,207	233,001,491	0.6%	88.8%	233.00
Nov-22	1,613,136	234,614,627	0.6%	89.4%	234.61
Dec-22	1,638,184	236,252,811	0.6%	90.0%	236.25
Jan-23	1,657,178	237,909,989	0.6%	90.7%	237.91
Feb-23	1,789,058	239,699,047	0.7%	91.3%	239.70
Mar-23	1,676,504	241,375,551	0.6%	92.0%	241.38
Apr-23	2,152,986	243,528,537	0.8%	92.8%	243.53
May-23	1,135,437	244,663,974	0.4%	93.2%	244.66
Jun-23	1,122,935	245,786,909	0.4%	93.7%	245.79
Jul-23	2,499,936	248,286,845	1.0%	94.6%	248.29
Aug-23	1,879,639	250,166,484	0.7%	95.3%	250.17
Sep-23	1,848,707	252,015,191	0.7%	96.0%	252.02
Oct-23	1,811,947	253,827,138	0.7%	96.7%	253.83
Nov-23	1,769,581	255,596,719	0.7%	97.4%	255.60
Dec-23	996,537	256,593,256	0.4%	97.8%	256.59
Jan-24	868,703	257,461,959	0.3%	98.1%	257.46
Feb-24	811,195	258,273,154	0.3%	98.4%	258.27
Mar-24	749,307	259,022,461	0.3%	98.7%	259.02
Apr-24	683,421	259,705,882	0.3%	99.0%	259.71
May-24	613,944	260,319,826	0.2%	99.2%	260.32
Jun-24	541,308	260,861,134	0.2%	99.4%	260.86
Jul-24	465,963	261,327,098	0.2%	99.6%	261.33
Aug-24	388,378	261,715,475	0.1%	99.7%	261.72
Sep-24	309,035	262,024,510	0.1%	99.9%	262.02
Oct-24	228,429	262,252,939	0.1%	99.9%	262.25
Nov-24	147,061	262,400,000	0.1%	100.0%	262.40

# Cumulative Cashflow



## APPENDIX H – PERMITTING MATRIX

Please refer to accompanying  
envelope for this Appendix.

**COMMONWEALTH OF KENTUCKY**  
**BEFORE THE PUBLIC SERVICE COMMISSION**

**IN THE MATTER OF:**

<b>THE APPLICATION OF EAST KENTUCKY</b>	<b>)</b>	
<b>POWER COOPERATIVE, INC. FOR APPROVAL</b>	<b>)</b>	
<b>TO AMEND ITS ENVIRONMENTAL</b>	<b>)</b>	
<b>COMPLIANCE PLAN AND RECOVER COSTS</b>	<b>)</b>	<b>CASE NO. 2017-00376</b>
<b>PURSUANT TO ITS ENVIRONMENTAL</b>	<b>)</b>	
<b>SURCHARGE, SETTLEMENT OF CERTAIN</b>	<b>)</b>	
<b>ASSET RETIREMENT OBLIGATIONS AND</b>	<b>)</b>	
<b>ISSUANCE OF A CERTIFICATE OF PUBLIC</b>	<b>)</b>	
<b>CONVENIENCE AND NECESSITYAND</b>	<b>)</b>	
<b>OTHER RELIEF</b>	<b>)</b>	

**DIRECT TESTIMONY OF RALPH L. LUCIANI**  
**ON BEHALF OF EAST KENTUCKY POWER COOPERATIVE, INC.**

**Filed: November 20, 2017**



1 **Q. Please state your name, business address, and occupation.**

2 A. My name is Ralph L. Luciani and my business address is 1200 19<sup>th</sup> Street, N.W., Suite 700,  
3 Washington, DC 20036. I am a Director at Navigant Consulting, Inc. ("Navigant").

4 **Q. Please tell me about Navigant Consulting.**

5 A. Navigant is a global professional services firm that primarily serves clients in the  
6 healthcare, energy, and financial services industries. In energy services, our experts work  
7 in areas related to regulatory processes, pricing, supply-and-demand dynamics, market  
8 design, fuel sourcing, financing, resource planning, technologies and operations.

9 **Q. Please state your education and professional experience.**

10 A. I hold a Bachelor of Science degree in Electrical Engineering and Economics from  
11 Carnegie Mellon University, as well as a Master of Science degree from the Graduate  
12 School of Industrial Administration at Carnegie Mellon University. I have more than  
13 twenty-five years of consulting experience analyzing economic and financial issues  
14 affecting the electric industry, including those related to costing, ratemaking, generation  
15 and transmission planning, environmental compliance, fuel supply, competitive  
16 restructuring, stranded cost, asset valuation, wholesale power solicitations, power  
17 marketing, and Regional Transmission Organization costs and benefits. Prior to joining  
18 Navigant, I was a Vice President at Charles River Associates, a Senior Vice President at  
19 PHB Hagler Bailly, and a Director at Putnam, Hayes and Bartlett, Inc. My education and  
20 professional experience is more fully described in my *curriculum vitae*, a copy of which is  
21 attached to this testimony as Exhibit RL-1.

22 **Q. Have you ever testified before the Kentucky Public Service Commission before?**

1 A. Yes. In Case No. 2012-00169<sup>1</sup> before this Commission, I offered testimony describing the  
2 costs and benefits of EKPC's proposed membership in PJM. I also served as an expert  
3 witness on behalf of EKPC in Case No. 2015-00267,<sup>2</sup> regarding the Company's acquisition  
4 of the Bluegrass Generating Station.

5 **Q. What is the purpose of your testimony in this proceeding?**

6 A. The purpose of my testimony is to describe an economic report that I prepared at EKPC's  
7 request and to authenticate that report.

8 **Q. Are you sponsoring any exhibits as part of your testimony?**

9 A. Yes. My *curriculum vitae* is attached hereto as Exhibit RL-1. A copy of the Spurlock  
10 Scenario Analysis that I mentioned previously is attached hereto as Exhibit RL-2. Both of  
11 these documents were prepared by me or by individuals working directly under my  
12 supervision.

13 **Q. Are you familiar with the CCR/ELG Project that EKPC is proposing in this**  
14 **proceeding?**

15 A. I am aware of it, but I am not familiar with the details of the proposal. The purpose and  
16 scope of my engagement was somewhat different.

17 **Q. Please explain the distinction.**

18 A. I was retained by the Power Supply business unit at EKPC. Power Supply has as one of  
19 its core tasks the responsibility for long-term planning of capacity needs that will be  
20 sufficient to meet EKPC's anticipated load. Power Supply was involved, as I understand

---

<sup>1</sup> See *In the Matter of Application of East Kentucky Power Cooperative, Inc. to Transfer Functional Control of Certain Transmission Facilities to PJM Interconnection, LLC*, Order, Case No. 2012-00169, (Ky. P.S.C. Dec. 20, 2012).

<sup>2</sup> See *In the Matter of Application of East Kentucky Power Cooperative, Inc. for Approval of the Acquisition of Existing Combustion Turbine Facilities from Bluegrass Generation Company, LLC at the Bluegrass Generating Station in LaGrange, Oldham County, Kentucky and for Approval of the Assumption of Certain Evidences of Indebtedness*, Order, Case No. 2015-00267, (Ky. P.S.C. Dec. 1, 2015).

1 it, in the development of the various options available to EKPC to comply with the CCR  
2 Rule and the ELG Rule, but once a preferred option was developed, it largely fell to a  
3 different business unit – Power Production – to develop the actual proposal that has come  
4 to be known as the CCR/ELG Project. Thus, Navigant’s role, which was to assist EKPC’s  
5 Power Supply team, was somewhat different than the role I understand that Burns and  
6 McDonnell assumed in assisting EKPC’s Power Production team.

7 **Q. So how would you characterize Navigant’s work in this matter?**

8 A. Navigant was asked to analyze the economic viability of Spurlock Unit 1 and Spurlock  
9 Unit 2 as coal-fired generation resources and as units converted to natural gas-fired  
10 generation resources. We also looked at a scenario where Spurlock Unit 1 and Spurlock  
11 Unit 2 were replaced entirely with a new natural gas combined cycle unit. In the analysis,  
12 we compared the operating economics of Spurlock Unit 1 and Spurlock Unit 2 against  
13 those units if they were converted to natural gas-fired generation or replaced with a single,  
14 large combined cycle unit. This analysis would then help EKPC determine whether  
15 proceeding with the CCR/ELG Project was the best option over the long term by assessing  
16 whether the continued use of Spurlock Unit 1 and Spurlock Unit 2 as coal-fired generation  
17 resources offered value to EKPC and its Owner Members.

18 **Q. What scenarios does your analysis include?**

19 A. For each of the three options, we looked at a base scenario which uses a reasonable estimate  
20 of future fuel costs and load growth, but excludes any future pricing for carbon dioxide  
21 emissions as was proposed under former President Obama’s Clean Power Plan (“CPP”).  
22 We then looked at scenarios where fuel prices were either higher or lower than expected,  
23 where load growth was less than anticipated and where something akin to the CPP was  
24 implemented.

1   **Q.    What did your analysis conclude?**

2   A.    I will let the full report speak for itself, of course, but broadly speaking what we found was  
3       that the capacity factors and energy market operating margins for the existing coal-fired  
4       Spurlock Unit 1 and Spurlock Unit 2 would remain the highest in the base scenario and the  
5       scenarios where fuel costs were higher than expected and load growth was less than  
6       expected. A combined cycle unit had higher capacity factors and operating margins only  
7       in the scenarios where fuel costs were lower than expected or a carbon pricing regulation  
8       such as the CPP was implemented. It is also important to note that the operating margins  
9       for the Spurlock units actually improve over time as capacity reserve margins tighten in  
10      PJM.

11   **Q.    Is it your professional opinion that Spurlock Unit 1 and Spurlock Unit 2 offer long**  
12       **term economic value to EKPC?**

13   A.    Yes, for the reasons set forth in Navigant's report.

14   **Q.    Does this conclude your testimony?**

15   A.    Yes.

**IN THE MATTER OF:**

**CASE NO. 2017-00376**

COMMONWEALTH OF VIRGINIA )  
 )  
COUNTY OF FAIRFAX )

Ralph L. Luciani  
Ralph L. Luciani

Hala Zein  
NOTARY PUBLIC

Commission No. 4312021 365692

My Commission Expires: 1/31/2021







## Ralph Luciani

Director

ralph.luciani@navigant.com  
1200 19th St. NW, Suite 700  
Washington, DC 20036  
Phone: 202.973.4537

### Professional Summary

Ralph Luciani is a Director in the Energy Practice in Navigant's Washington, D.C. office. He has more than 25 years of consulting experience analyzing economic and financial issues affecting regulated industries. Mr. Luciani focuses on the electricity industry, where he has assisted electric utilities and generating companies with business planning, resource planning, power solicitations, ratemaking, transmission cost-benefit studies, fuel and power supply contract negotiations, and environmental compliance strategy.

He led the economic evaluation performed by the Eastern Interconnection Planning Collaborative (EIPC) in a two-year study of the expansion of the transmission system needed to support future generation. Mr. Luciani has also recently performed cost-benefit studies for four different electric utilities considering joining a Regional Transmission Organization (RTO). In 2016, he oversaw the economic evaluation performed of renewable energy proposals in the New England Clean Energy RFP.

Mr. Luciani has assisted clients and their legal counsel in the management of numerous complex litigation matters, including electric utility prudence and rate cases, and assessments of economic damages in commercial disputes. He has appeared as an expert witness in a number of Federal Energy Regulatory Commission (FERC) and state public utility commission regulatory proceedings.

Prior to joining Navigant, Mr. Luciani was a Vice President at Charles River Associates and a Director at Putnam, Hayes & Bartlett, Inc. He holds an M.S. in Industrial Administration from Carnegie Mellon University, and a B.S. in Electrical Engineering and Economics from Carnegie Mellon University.

### Professional Experience

#### RTOs and Transmission

- » **RTO Cost-Benefit Studies.** Performed a number of major cost-benefit studies of RTOs over the last ten years, and provided related testimony in state regulatory proceedings. Coordinated a utility team in implementing a transition into an RTO in 2015.
- » **Transmission Planning.** On behalf of EIPC, led the economic evaluation in a two-year study of the potential build-out of the transmission system in the eastern U.S. needed through 2030.
- » **Competitive Transmission.** Assisted a transmission owner in developing transmission proposals in a RTO competitive bidding process to pass cost-benefit and reliability screens.

## Ralph Luciani

Director

- » **RTO Administrative Costs and Rates.** Served as the lead consultant in a FERC settlement process in which PJM establishing stated rates for the recovery of its administrative costs.
- » **Transmission Ratemaking.** On a number of occasions, filed testimony which developed OATT transmission, ancillary service, and reactive power.
- » **Transmission Costing.** Provided testimony and negotiated settlement agreements in a FERC settlement process regarding the assignment of costs for through and out transmission charges.

### Generation and Power Marketing

- » **Nuclear Power.** Assisted a utility in negotiating the sale of a nuclear plant, developed the financial model used in a utility's application for DOE-supported financing of a new nuclear facility, and provided testimony on CWIP financing in rates to support new nuclear plants.
- » **Wind/Transmission Studies.** Performed a number of wind/transmission cost-benefit studies, including analyzing the economics of installing 765 kV transmission lines to support new wind power in the Southwest Power Pool.
- » **Power Solicitations.** Assisted electric utilities in a number of solicitations for power, including formulating the RFP, conducting bidder's conferences, negotiating term sheets and definitive agreements, and obtaining regulatory approval for the final agreements.
- » **Generation Valuation Lecturer.** Served as the lead lecturer and instructor of an advanced training course on generation valuation under cost-of-service rates and under market-based pricing offered annually at a large U.S. investor-owned utility.
- » **Power Marketing.** Prepared several affidavits at FERC analyzing wholesale trading activities of power marketers, developed utility cost-based rates for wholesale sales of capacity and energy, and assisted counsel in reaching an arbitration settlement regarding standby power charges.
- » **Stranded Cost Derivation.** Presented testimony before four state utility commissions on the quantification of the stranded cost associated with the deregulation of generation.

### Financial Evaluation

- » **Cost of Capital.** Testified before the U.S. Bankruptcy Court and assisted counsel in arbitration proceedings regarding the proper discount rate to apply in assessing termination payments for wholesale power contracts, and assessed capital structure and rates for use in FERC proceedings.
- » **Municipalization.** Assisted an electric utility in deriving the exit charges to be assessed for a proposed municipalization of a portion of the electric utility's service territory.
- » **Mergers and Acquisitions.** Analyzed the potential acquisition of electric utilities and formulated transmission and distribution pro forma financials.

## Ralph Luciani

Director

- » **Organizational Restructuring.** Lead facilitator in a 12-month project that functionally unbundled the operation of an integrated electric utility into stand-alone profit centers.

### Distribution and Retail

- » **Distribution Performance-Based Rates.** Formulated a performance-based ratemaking (PBR) plan, for an electric utility, and presented the plan to the state public utility commission.
- » **Efficiency Programs.** Developed a financial and rate incentive model for an electric utility to evaluate the impact on rates and earnings of adopting energy efficiency programs.
- » **Retail Market Strategy.** Formulated models to assess the profitability of new retail loads in a competitive market and a product to reduce on-peak demand in residences.

### Environmental and Fuel

- » **Environmental Regulations.** Assisted utilities in formulating strategies for Clean Air Act provisions regarding SO<sub>2</sub> and NO<sub>x</sub>, and in assessing potential climate change regulations.
- » **Fuel Supply.** Assisted an electric utility in negotiating the terms of a buyout and replacement of a long-term coal supply contract, and in obtaining approval for the rate treatment.
- » **Nuclear.** Assisted counsel in litigation involving the responsibility for costs incurred in nuclear spent fuel storage and the estimation of damages related to steam generator replacement

### Professional History

Director, Navigant Consulting, Inc.  
Vice President, Charles River Associates  
Senior Vice President, PHB Hagler Bailly  
Director, Putnam, Hayes & Bartlett, Inc.  
Edison Engineer, General Electric Company (GE)

### Education

M.S., Industrial Administration, Carnegie Mellon University  
B.S., Electrical Engineering and Economics, Carnegie Mellon University

### Expert Testimony Experience

- » Testified before the Arkansas, Kansas, Kentucky, Louisiana, Maryland, Mississippi, Missouri, Ohio, Pennsylvania, Texas and Wisconsin public utility commissions, the Ontario Energy Board, the U.S. Bankruptcy Court, the U.S. Postal Service Commission, and the Federal Energy Regulatory Commission (FERC).



### Testimony or Expert Report Experience

Date	Case	Venue
2015	Application of Wisconsin Power and Light Company for a Certificate of Public Convenience and Necessity to Build an Approximately 650 Megawatt Natural Gas-Fuel Power Plant, Docket No. 6680-CE-176	Public Service Commission of Wisconsin
2015	Application of East Kentucky Power Cooperative, Inc. for Approval of the Acquisition of Existing Combustion Turbine Facilities from Bluegrass Generation Company, LLC, Case No. 2015-00267	Kentucky Public Service Commission
2013	Westar Generating, Inc., Purchase Power Agreement, Analysis of the Affiliate Transaction under the Commission's <i>Boston Edison Co. Re: Edgar Electric Energy Co.</i> , 55 FERC ¶ 61,382 (1991) (" <i>Edgar</i> ") Precedent, Docket No. ER13-1210-002	Federal Energy Regulatory Commission
2013	In the Matter of the Application of Duke Energy Ohio, Inc. For the Establishment of a Charge Pursuant to Revised Code Section 4909.18. Case No. 12-2400-EL-UNC	Public Utilities Commission of Ohio
2012	Application of East Kentucky Power Cooperative, Inc. to Transfer Functional Control of Its Transmission Assets to the PJM Interconnection, L.L.C., PSC Case No. 2012-00169	Kentucky Public Service Commission
2012	Show Cause Order Directed to Entergy Arkansas, Inc. Regarding Its Continued Membership in the Current Entergy System Agreement and Regarding the Future Operation and Control of Its Transmission Assets, Docket No. 10-011-U	Arkansas Public Service Commission
2012	Application of Entergy Texas, Inc. for Approval to Transfer Operational Control of Its Transmission Assets to the MISO RTO, Docket No. 40346	Texas State Office of Administrative Hearings
2012	Joint Application of Entergy Mississippi, Inc., and the Midwest Independent Transmission System Operator, Inc., for Transfer of Functional Control of Entergy Mississippi's Transmission Facilities to MISO, Docket No. 2011-UA-376	Mississippi Public Service Commission
2012	Joint Application of Entergy New Orleans, Inc. and Entergy Louisiana, L.L.C. Regarding Transfer of Functional Control of Certain Transmission Assets to the Midwest Independent Transmission System Operator, Docket No. UD-11-01	New Orleans City Council
2010	Application of Big Rivers Electric Corporation for Approval to Transfer Functional Control of its Transmission System to Midwest Independent Operator, Inc., Case No. 2010-00043	Kentucky Public Service Commission
2010	Cost-based Revenue Requirement for the Provision of Reactive Supply and Voltage Control from Generation Sources under Schedule 2 of the PJM Interconnection, L.L.C. Open Access Transmission Tariff, Docket No. ER10-865-000	Federal Energy Regulatory Commission

## Ralph Luciani

Director

2010	Application by Ontario Power Generation Inc., Payment Amounts for Prescribed Facilities for 2011 and 2012, Docket No. EB-2010-0008	Ontario Energy Board
2008	Application of Ameren Energy Marketing Company under Section 205 of the Federal Power Act, Docket No. ER09-398-000	Federal Energy Regulatory Commission
2008	Application of Aquila, Inc. for Authority to Transfer Operational Control of Certain Transmission Assets to the Midwest ISO, Docket No. EO-2008-0046	Missouri Public Service Commission
2008	Arizona Public Service Company, Docket No. ER08-514-000	Federal Energy Regulatory Commission
2007-8	TransCanada Pipelines Ltd. vs. USGen New England, Inc., Case Number 03-30465	U.S. Bankruptcy Court for the District of Maryland
2007	Application of Big Rivers Electric Corporation for Approval of Wholesale Tariff Additions, Case No. 2007-00455	Kentucky Public Service Commission
2006	Postal Rate and Fee Changes, Docket No. R2006-1	U.S. Postal Rate Commission
2006	Arizona Public Service Company, Docket No. ER07-23-000	Federal Energy Regulatory Commission
2006	Midwest Independent Transmission System Operator, Docket No. ER-05-6-001	Federal Energy Regulatory Commission
2006	Generic Issues, RP-2005-0020/EB-2005-0529, 2006 Distribution Rates	Ontario Energy Board
2005	Investigation of Practices of the California Independent System Operator, Docket No. EL-00-95-000	Federal Energy Regulatory Commission
2005	Investigation of Practices of the California Independent System Operator, Docket No. EL-00-95-000	Federal Energy Regulatory Commission
2005	Application of Southwest Power Pool for a Certificate of Public Convenience and Necessity, Docket No. 04-137-U	Arkansas Public Service Commission
2005	Application of Southwest Power Pool for a Certificate of Convenience, Docket No. 06-SPPE-202	Kansas State Corporation Commission
2005	Policy Issues Related to Southwest Power Pool, Case No. EO-2006-0142	Missouri Public Service Commission
2003	Investigation of Practices of the California Independent System Operator, Docket No. EL-00-95-000	Federal Energy Regulatory Commission
2003	Midwest Independent Transmission System Operator, Docket No. EL02-111-000	Federal Energy Regulatory Commission





## Spurlock Scenario Analysis

Prepared for:

East Kentucky Power Cooperative



***Submitted by:***

Navigant Consulting, Inc.  
1200 19<sup>th</sup> Street, N.W.  
Suite 700  
Washington, DC 20036

[navigant.com](http://navigant.com)

Reference No.: 192676  
April 19, 2017

## TABLE OF CONTENTS

<b>1. Overview .....</b>	<b>1</b>
<b>2. Scenarios .....</b>	<b>3</b>
2.1 Base Case .....	3
2.2 High and Low Fuel Scenarios .....	4
2.3 Carbon Pricing Scenarios.....	6
2.4 Low Load Scenario.....	9
<b>APPENDIX A. Summary Results by Case .....</b>	<b>11</b>

## 1. OVERVIEW

Navigant was retained by East Kentucky Power Cooperative (EKPC) to analyze the economic viability of EKPC's Hugh L. Spurlock (Spurlock) units 1 & 2 under continued coal operation as well as possible conversion to gas or replacement with a new natural gas combined cycle (CC). Spurlock consists of four coal-fired units in Mason County, Kentucky with a combined capacity of 1,346 MW. Unit 1, a 300 MW coal unit built in 1977, and Unit 2, a 510 MW coal unit built in 1981, are the focus of this analysis, and the much newer units 3 and 4 are assumed to continue as coal units for the duration of the analysis.

Navigant considered three alternatives for Spurlock Units 1 and 2:

1. Spurlock Coal: The units remain as-is (coal-fired)
2. Spurlock Gas: The units are converted to steam natural gas-fired units with the same capacity.<sup>1</sup>
3. Spurlock CC: The units are retired and replaced with a new 795 MW CC.<sup>2</sup>

These three alternatives were modeled across five scenarios (*Base Case*, *High Fuel*, *Low Fuel*, *Clean Power Plan (CPP)*, and *Low Load*) as shown in Table 1.

Table 1. Scenarios Analyzed

Scenario	Fuel	CO <sub>2</sub>	Load	Retirements	Notes
<b>Base</b>	Base	Base	Base	Base	Base Case (no carbon price)
<b>High Fuel</b>	High	Base	Base	Base	EIA High Gas & High Coal
<b>Low Fuel</b>	Low	Base	Base	Base	EIA Low Gas & Low Coal
<b>CPP</b>	CPP	CPP	Base	CPP	Carbon prices, more coal retirements
<b>Low Load</b>	Base	Base	Decline	Base	1%/year slower load growth, no new EE

The analysis of Spurlock was conducted using Navigant's Portfolio Optimization Model (POM)<sup>3</sup> and Electric Valuation Model (EVM)<sup>4</sup>. Capacity factors and operating margins for the Spurlock alternatives were examined over the 20-year period from 2018 to 2037.

<sup>1</sup> The *Spurlock Gas* operating parameters are similar to *Spurlock Coal* but use natural gas for generation and startup fuel.

<sup>2</sup> The *Spurlock CC* operating parameters are based on Navigant and publicly available parameters, and capacity and heat rate segments derived from operational patterns at TVA's 2012 John Sevier CC, as reported through hourly CEMS data.

<sup>3</sup> POM is a capacity expansion and system operation forecasting model which allows the system to create an optimal capacity expansion (and corresponding LMP forecast) based on the scenario conditions. POM uses a zonal transmission network and time block aggregation, and so is best suited to capture the effects of broad market shifts in fuel prices, load, or regulatory changes on the buildout and marginal prices on the bulk power system.

<sup>4</sup> EVM is an optimal hourly dispatch model, which dispatches a power plant against a given set of LMPs, fuel prices, and allowance prices. EVM allows more detailed operating parameters than POM or other system models like PROMOD, including detailed seasonal capacity and heat rate curves, detailed start parameters, ramp rates, minimum up and down times, forced outage rates, maintenance schedules, variable O&M (VOM), and emissions rates. For this analysis, a POM run was created for each scenario, and each Spurlock alternative was dispatched in EVM against each resulting set of LMPs, fuel prices, and emissions prices.



Table 2 shows the average 20-year capacity factors and energy market operating margins for each scenario.<sup>5</sup> *Spurlock Coal* has higher average 20-year capacity factors in the *Base*, *Low Load*, and *High Fuel* scenarios, while *Spurlock CC* has higher capacity factors in the *CPP* and *Low Fuel* scenarios. *Spurlock Coal* has a higher average operating margins than *Spurlock CC* in the *Base*, *Low Load*, and *High Fuel* scenarios, while *Spurlock CC* has higher margins in the *CPP* and *Low Fuel* scenarios.

**Table 2. 20-year Average Results for Spurlock Alternatives, 2018-2037**

Capacity Factors (%)					
	Spurlock Coal 1	Spurlock Coal 2	Spurlock Gas 1	Spurlock Gas 2	Spurlock CC
Base	72%	78%	7%	9%	65%
High Fuel	85%	86%	4%	4%	30%
Low Fuel	58%	71%	14%	17%	86%
CPP	59%	70%	7%	8%	69%
Low Load	67%	76%	4%	4%	42%

Energy Market Operating Margins (2017 \$/kW-Year)					
	Spurlock Coal 1	Spurlock Coal 2	Spurlock Gas 1	Spurlock Gas 2	Spurlock CC
Base	\$47.32	\$54.93	\$5.97	\$6.76	\$31.92
High Fuel	\$145.03	\$150.89	\$6.37	\$6.96	\$28.37
Low Fuel	\$23.18	\$30.27	\$8.14	\$9.50	\$47.08
CPP	\$30.71	\$38.68	\$6.89	\$7.79	\$42.82
Low Load	\$29.34	\$36.97	\$3.25	\$3.65	\$17.74

Source: Navigant Analysis

Overall, the operating margins of the Spurlock alternatives are driven by the following factors:

- *Spurlock Coal* starts at relatively low capacity factors, but the capacity factors rise over time particularly after 2020 when *Base Case* gas prices reach \$4.50/mmBTU.
- In the *High* and *Low Fuel* scenarios, gas is more volatile and more commonly sets LMP, resulting in *Spurlock Coal* operating margins being more affected by changes in fuel prices
- The *CPP* scenario, which includes carbon prices starting in 2025 reaching about \$18 per short ton by 2035, results in higher margins for *Spurlock CC* and *Spurlock Gas* and lower margins for *Spurlock Coal* because of the relative carbon emissions rates of the fuels.
- The *Low Load* scenario has significantly lower returns in all scenarios, as the system remains overbuilt and so higher cost units set LMP less frequently.
- Generally, operating margins improve over time because PJM reserve margins tighten.

The energy market operating margins would need to be compared to on-going fixed capital and operating costs to determine the economic value of each Spurlock alternative. The scenarios and results are discussed in more detail in the following sections. See Appendix A for detailed results.

<sup>5</sup> This operating margin includes energy revenue net of fuel costs, allowance costs, variable O&M, and start costs, but does not include capacity revenue, ancillary services revenue, fixed operating costs, or construction or retrofit capitalization.

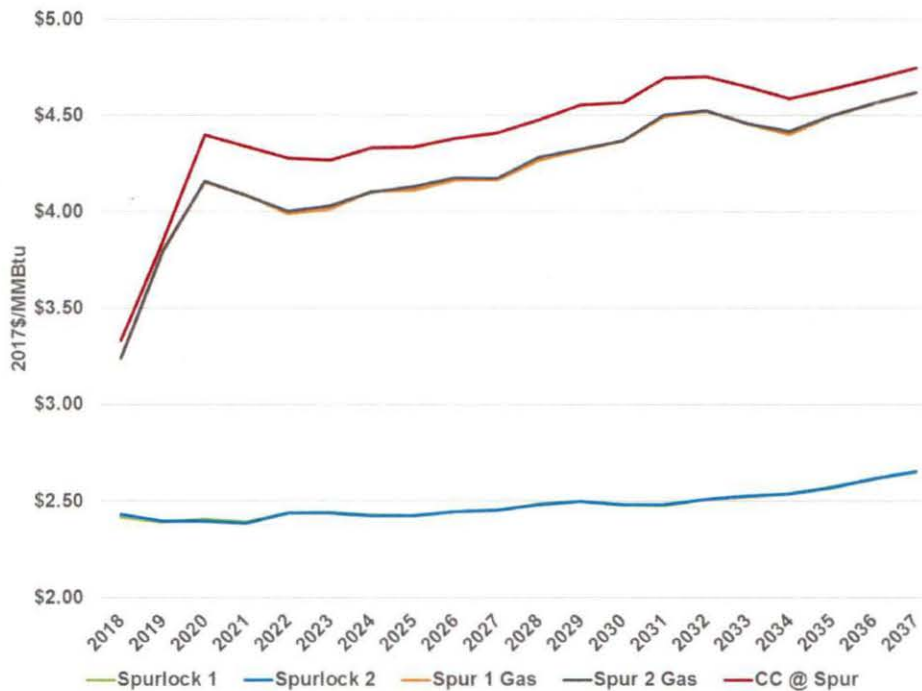
## 2. SCENARIOS

### 2.1 Base Case

The *Base Case* input assumptions are based on Navigant's Fall 2016 Energy Market Outlook, with fuel prices from EIA's 2016 Annual Energy Outlook (AEO) Base Case (so that the *High* and *Low Fuel* EIA scenarios are comparable). In the *Base Case*, PJM remains oversupplied in the near term, as under construction and recently built combined cycles depress the need for new builds in the medium term. POM builds some wind and solar for local Renewable Portfolio Standard (RPS) requirements and to export to New York's RPS, but build is low in the 2020s. PJM does become short on capacity in the 2030s and POM builds a combination of CCs and CTs to meet demand.

Fuel costs as burned (including delivery costs and weighted by monthly burn) for the Spurlock alternatives in the *Base Case* are shown in Figure 1. Gas prices are significantly higher than coal prices in all years in the forecast, and increase more in the near term as supply and demand equilibrate. Gas prices in EKPC are higher than in many areas of PJM because the area is well-served by major interstate pipelines and is not a major source of gas supply, and therefore does not experience the low gas prices in areas in the Marcellus and Utica shale which are not able to fully export their gas to broader markets.<sup>6</sup>

Figure 1. Base Case Fuel Cost as Burned (2017\$/MMBtu)



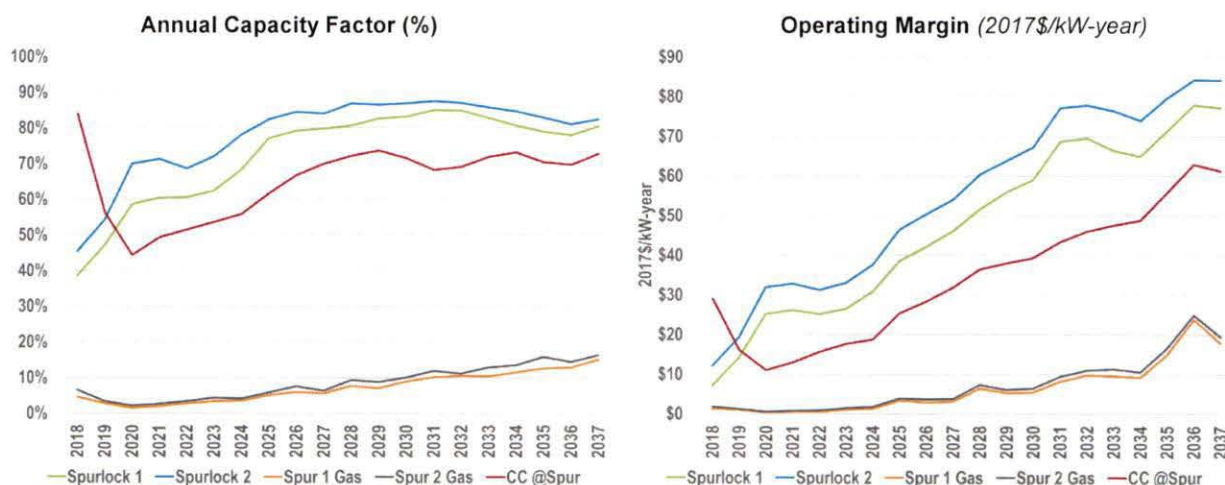
Source: EIA AEO 2016 & Navigant Analysis

<sup>6</sup> Note that a single gas and coal price was assumed for each plant, but the realized price was lower for the Steam Gas conversions than for the CC because the Steam gas conversions had a higher percentage of gas burn in the lower cost summer months.



As shown in Figure 2, capacity factors at the beginning of the *Base Case* forecast are higher at *Spurlock CC* than for *Spurlock Coal*, but as gas prices rise in real terms *Spurlock CC* has more moderate capacity factors. The *Spurlock Gas* units maintain low capacity factors throughout the forecast which rise modestly over time as reserve margins decline. Operating margins are higher for *Spurlock Coal* than for *Spurlock CC*, primarily due to relative fuel costs and the lack of carbon pricing in the *Base Case*.

Figure 2. Base Case: Spurlock Capacity Factor and Operating Margins, 2018-2037

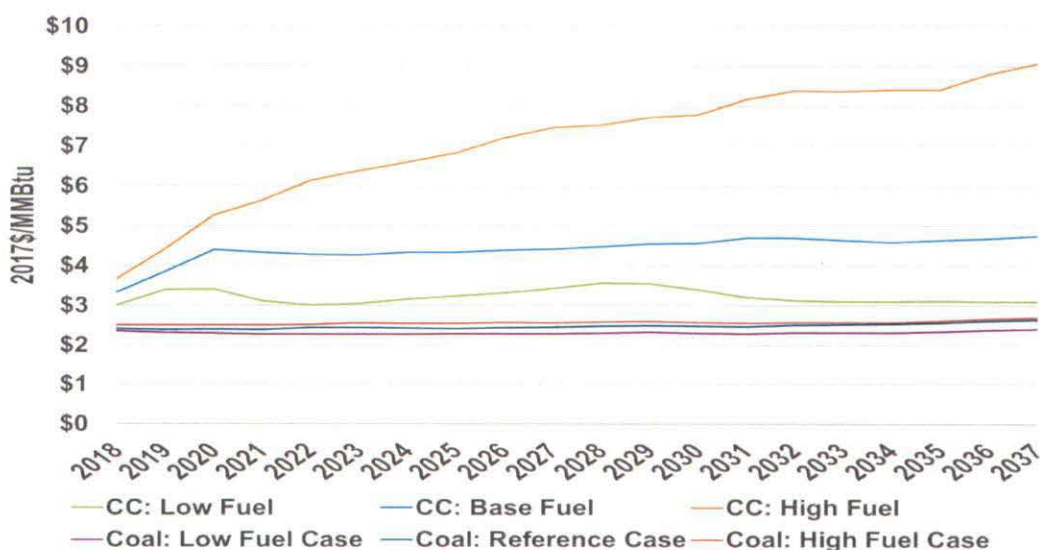


Source: Navigant Analysis

## 2.2 High and Low Fuel Scenarios

High and Low Fuel prices from the 2016 EIA AEO are shown in Figure 3 along with Base Case prices.

Figure 3. Fuel Cost by Scenario (2017\$/MMBtu)

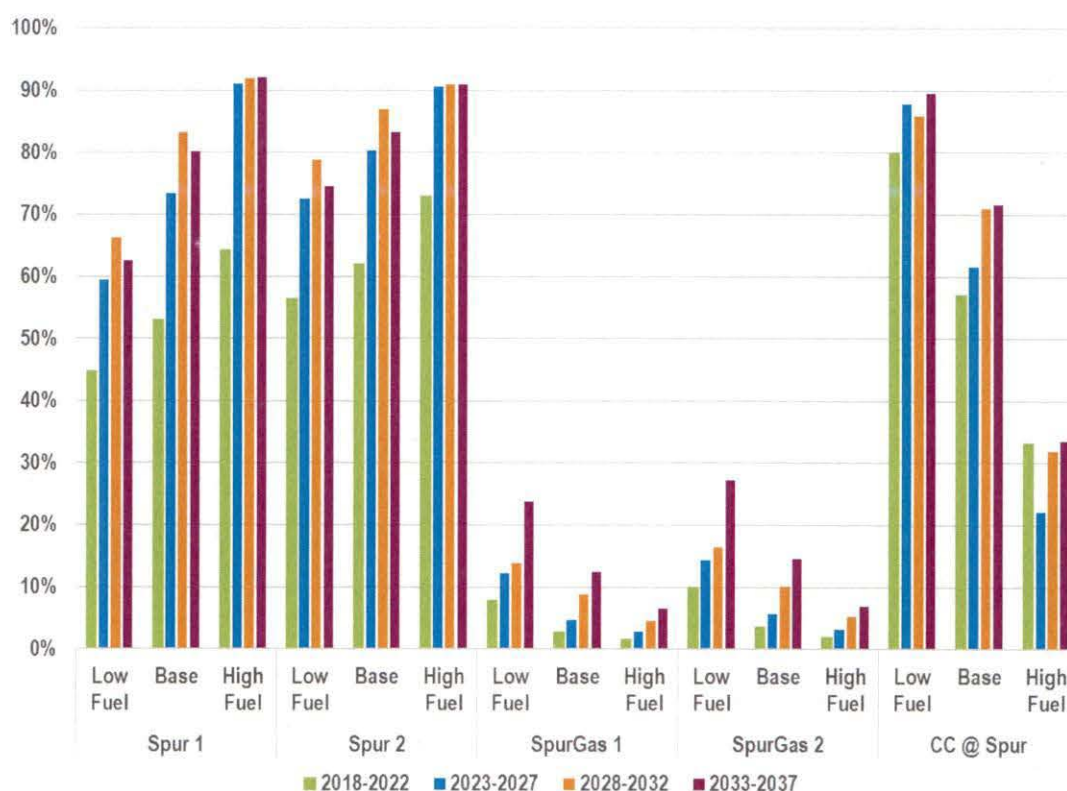


Source: EIA AEO 2016 & Navigant Analysis

New capacity builds are similar in the *Low Fuel* and *Base Case* scenarios in PJM, and are relatively low for all technology types due to high starting reserve margins and relatively low load growth. In the *High Fuel* scenario, POM builds fewer CCs and more renewables due to better economics for renewables on an energy cost basis.

Figure 4 shows average capacity factor by plant and scenario in five year periods over the forecast. Capacity factors generally increase over time as the reserve margin tightens in PJM. *Spurlock Coal* has higher capacity factors with higher fuel prices and *Spurlock CC* has higher capacity factors with lower fuel prices because gas prices change more in the fuel scenarios than coal prices.

Figure 4. Average Capacity Factor by Period, Fuel Scenarios

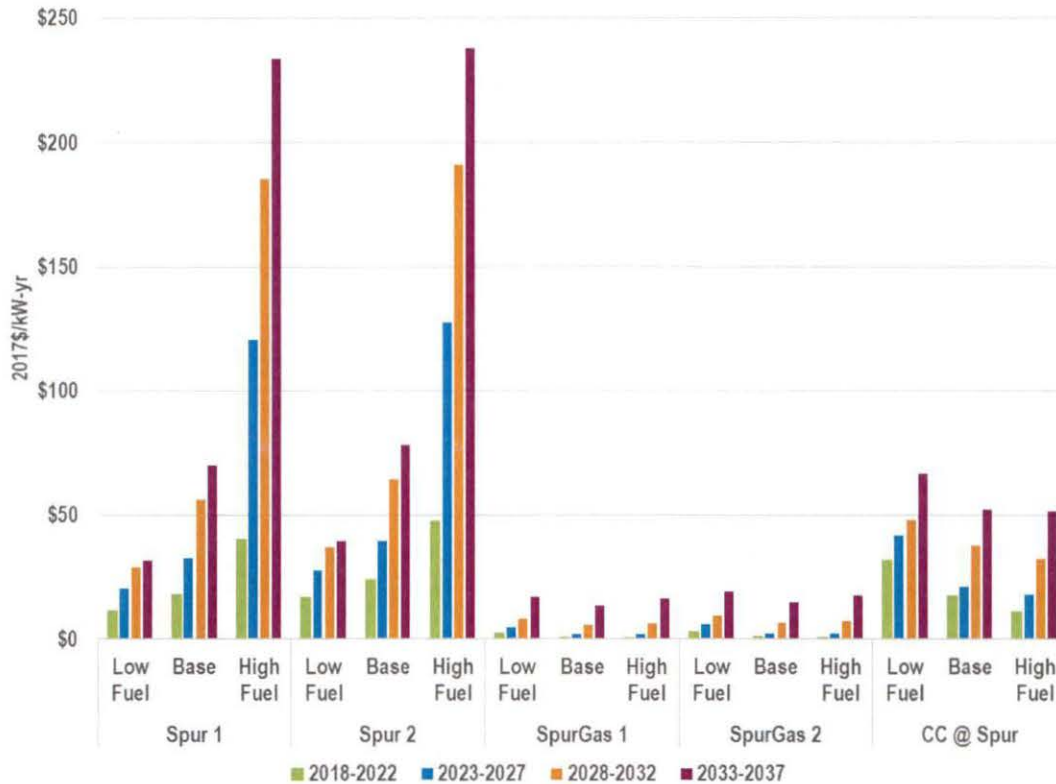


Source: Navigant Analysis

As shown below in Figure 5, energy operating margins are much more volatile at *Spurlock Coal* than at *Spurlock Gas* and *Spurlock CC*, because *Spurlock Coal* has lower fuel volatility and gas more commonly sets the price in the forecast. Between the *Base* and *High Fuel* cases, the large majority of the increases in the dispatch cost of *Spurlock CC* are passed into LMP, so the operating margin of *Spurlock CC* is only slightly lower. *Spurlock Coal*, however, sees relatively little change in dispatch cost so the increases in LMP largely flow into operating margin.

Similarly, in the *Low Fuel* case, *Spurlock CC*'s drop in fuel prices is largely offset by falling LMPs, giving it a relatively modest boost in margins. In contrast, *Spurlock Coal* sees only modest declines in dispatch cost in the low fuel case, which causes most of the decreases in LMP in this case to come out of operating margin.

Figure 5. Operating Margin by Period (2017\$/kW-year), Fuel Scenarios

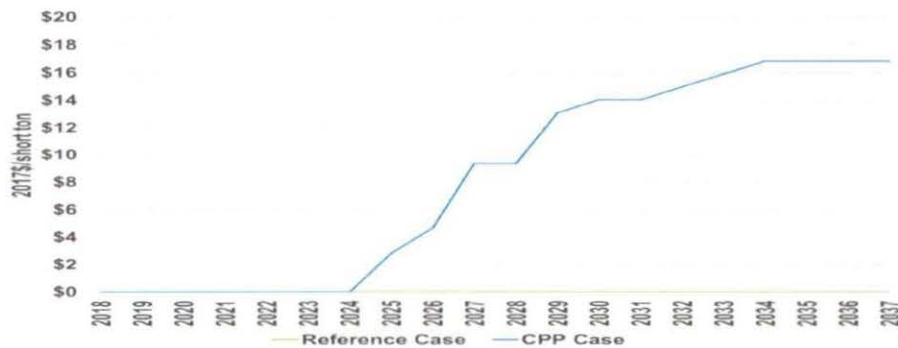


Source: Navigant Analysis

## 2.3 Carbon Pricing Scenarios

In the *Base Case*, it is assumed that there is no long-term carbon pricing in Kentucky. To ascertain the potential impact of carbon pricing, a *Clean Power Plan (CPP) Case* was used.

Figure 6. Carbon Prices in CPP Case (2017\$/short ton)



Source: Navigant Analysis

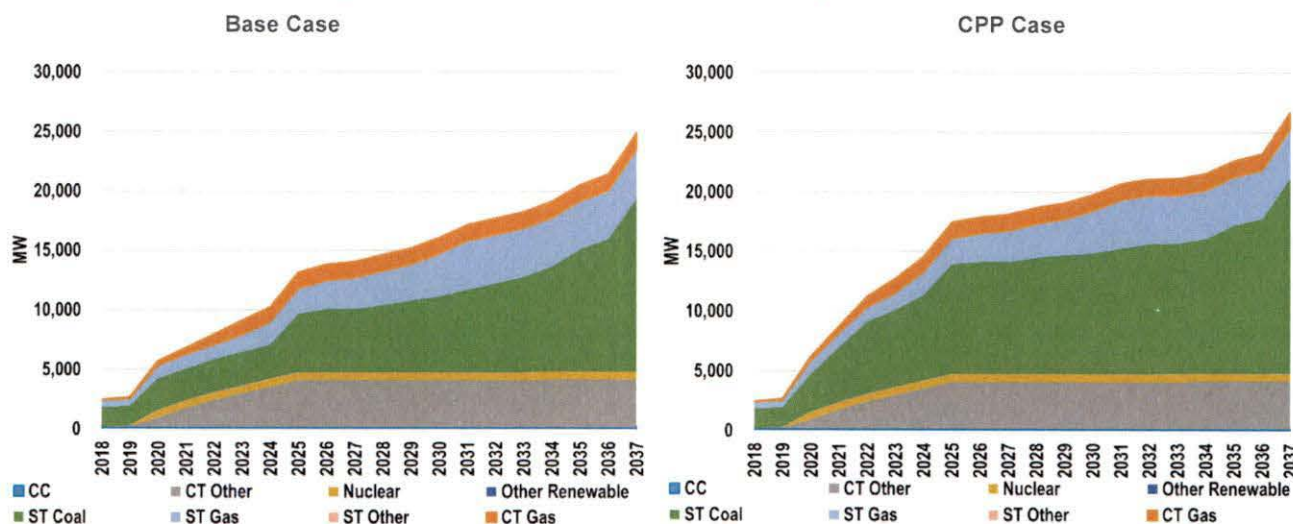


As shown above in Figure 6, recent and forecast coal retirements, renewable builds, and low gas prices keep prices at zero until 2025 despite the Clean Power Plan targets beginning in 2022. Starting in 2025, prices rise rapidly as the most economical carbon reductions are achieved and higher-cost strategies are needed for continued reduction. Prices flatten out in the 2030s as the cap stops declining.

As shown below in Figure 7, retirements are low in PJM in the Base Case relative to recent history. In the past few years, many of the lower-performing PJM coal plants have retired due principally to low gas prices and the Mercury and Air Toxics Standard (MATS). Most of the remaining plants are expected to be profitable until they need major equipment overhauls in the base case, due to gas price increases and the lack of carbon regulation.

Coal retirements are higher in the CPP case, but remain lower than recent history because no regulations are assumed which require capital-intensive retrofits, because real gas and power prices rise in the CPP case, and because carbon prices do not start to pick up until gas prices have risen sufficiently to keep most of the remaining coal economic. The *CPP Case* has slightly more wind and CC construction than the *Base Case*.

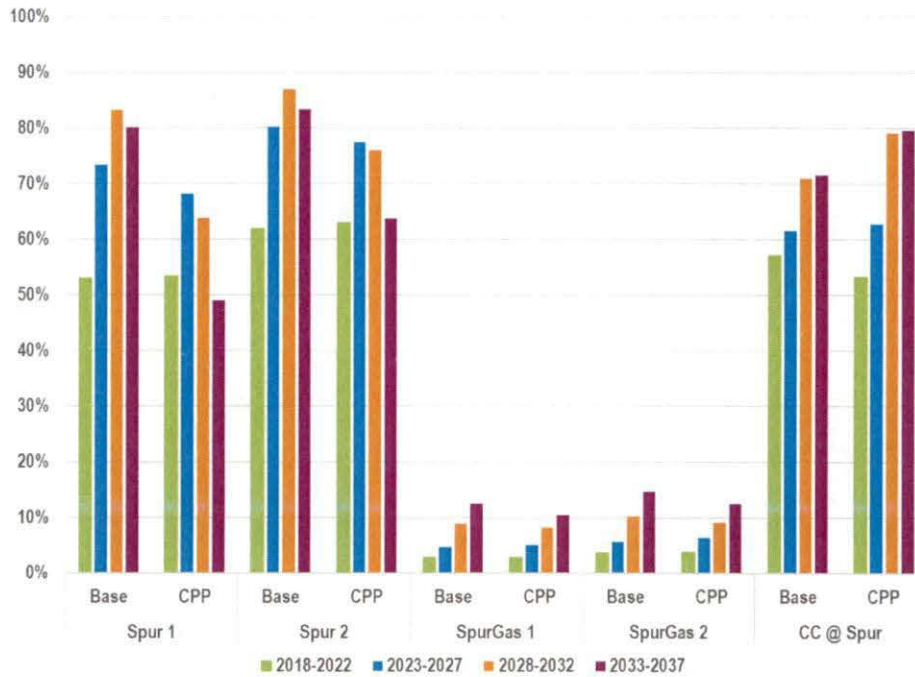
Figure 7. Cumulative Retirements by Category in PJM



Source: Navigant Analysis

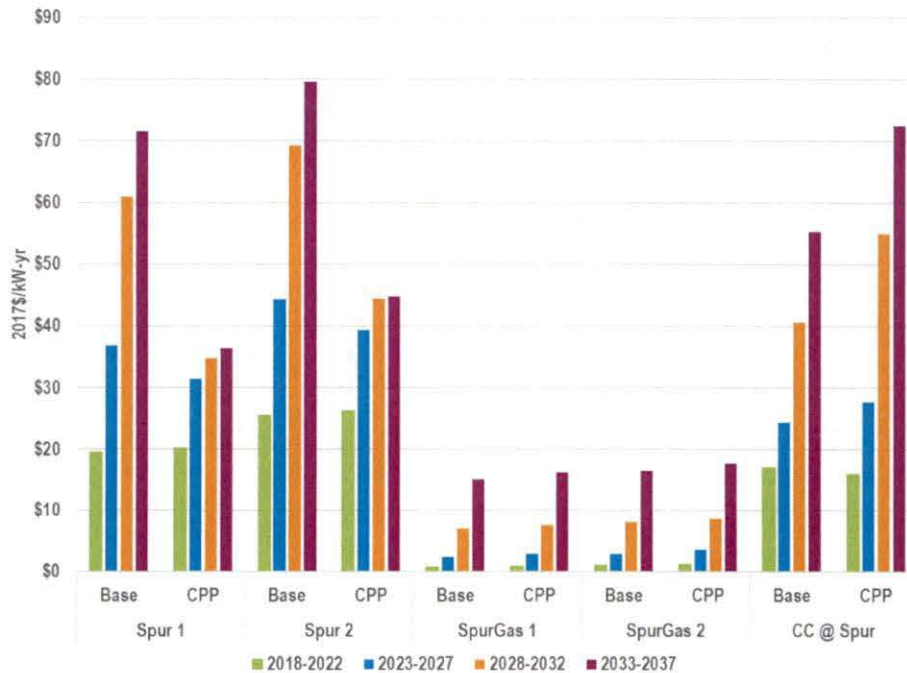
As shown below in Figure 8, in the *CPP Case* capacity factors fall at *Spurlock Coal* and rise at *Spurlock CC* relative to the *Base Case*. Correspondingly, as shown below in Figure 9, operating margins at *Spurlock Coal* under the CPP are significantly lower than in the *Base Case*, and margins at *Spurlock CC* are significantly higher. Margins still increase over time for *Spurlock Coal* under the CPP case due to higher gas prices, but the large majority of the gain from higher LMPs that *Spurlock Coal* would otherwise enjoy go towards purchasing carbon allowances in this case.

Figure 8. Average Capacity Factor by Period (%), Base Case vs. CPP Case



Source: Navigant Analysis

Figure 9. Operating Margin by Period, Base Case vs. CPP Case

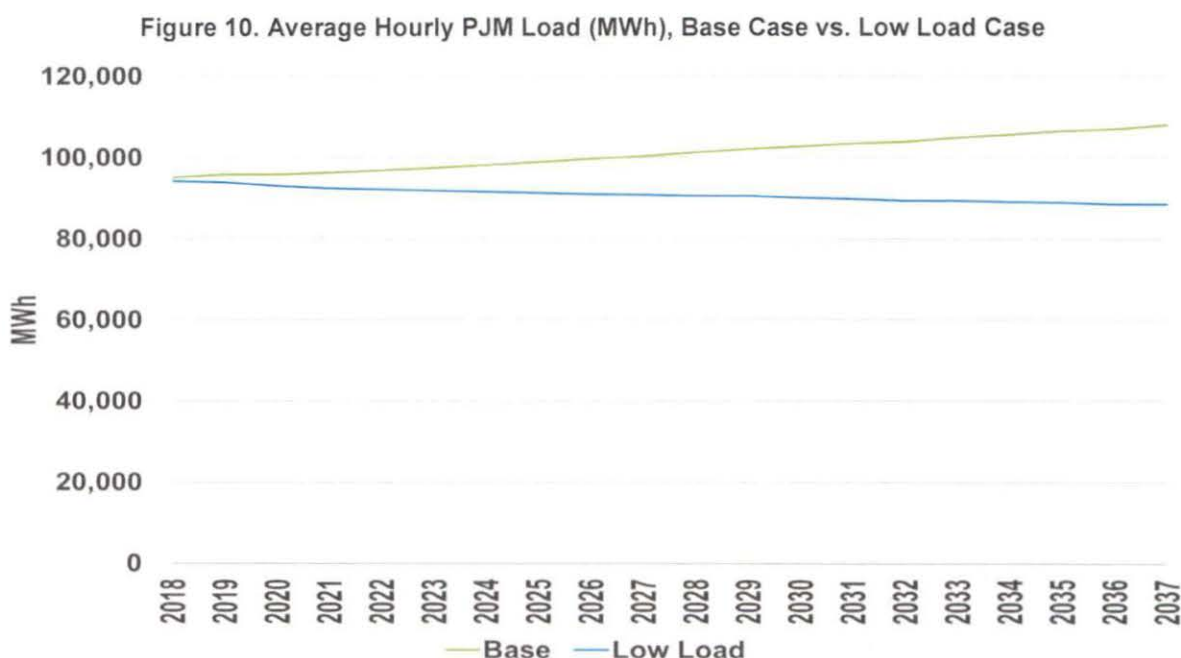


Source: Navigant Analysis



## 2.4 Low Load Scenario

Many areas of the United States have seen flat or declining load in the last few years due to a combination of more energy-efficient appliances, formal energy efficiency programs, distributed and behind-the-meter generation, and economic factors. These changes can significantly reduce the value of any generating resource technology. Navigant's *Base Case* uses the PJM load forecast, and Navigant compared the various options in a scenario with 1% lower load growth per year.<sup>7</sup> As can be seen in Figure 10, this scenario results in declining load over time.



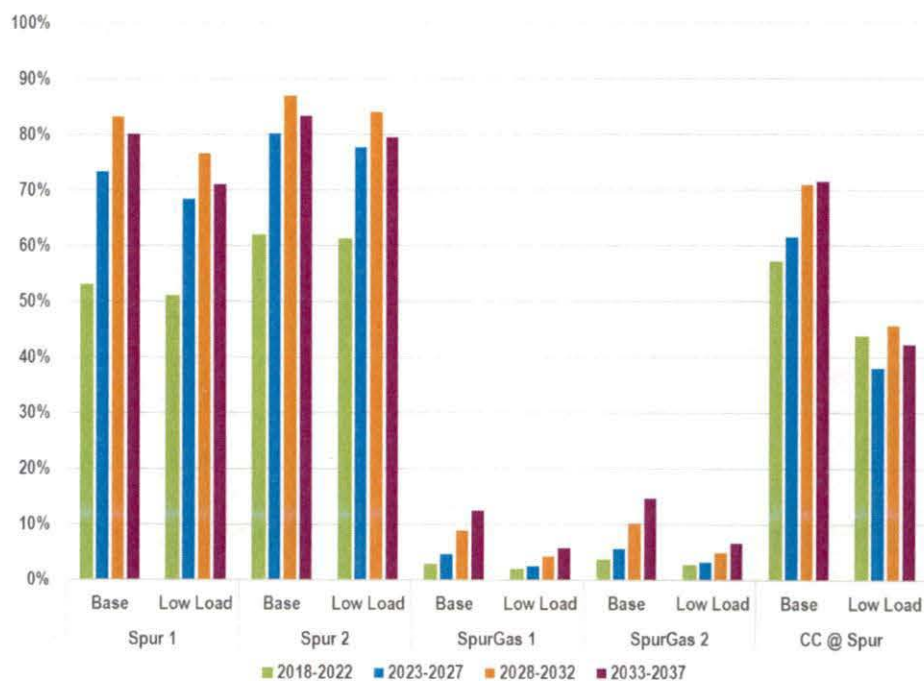
Source: PJM ISO Load Forecast and Navigant Analysis

This scenario results in a higher reserve margin throughout the forecast, but generating unit retirements and low new build help keep reserve margins from increasing much beyond current high levels.

As can be seen below in Figure 11, capacity factors fall for all Spurlock alternatives in the *Low Load* scenario, but they fall more for the *Spurlock Gas* and *Spurlock CC*, which operate less as baseload units than in the *Base Case*. Correspondingly, as shown below in Figure 12, operating margins decline more uniformly in the *Low Load* case across the technologies than capacity factors, and each plant loses about a third of its energy margin in the *Low Load* case. Note that these margins do not include capacity revenues, which would be substantially lower in a scenario with declining load.

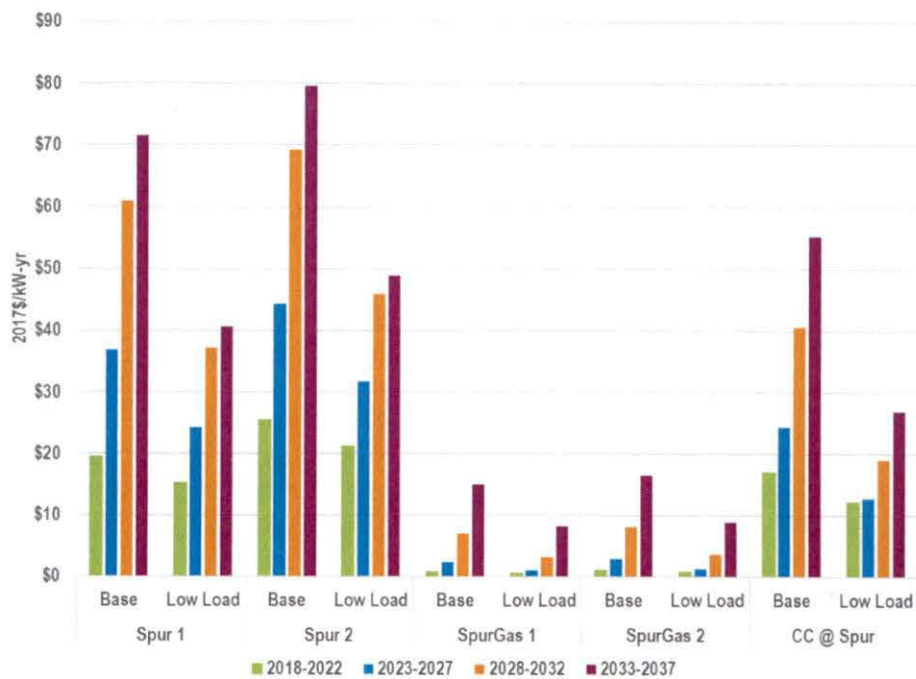
<sup>7</sup> Note that additional Energy Efficiency is removed as a supply option in the *Low Load* case.

Figure 11. Average Capacity Factor by Period, Load Scenarios



Source: Navigant Analysis

Figure 12. Operating Margin by Period (2017\$/kW-year), Load Scenarios



Source: Navigant Analysis

### APPENDIX A. SUMMARY RESULTS BY CASE

#### Base Case Summary

##### Base Case Summary

2015\$ to 2017\$ Conversion 1.0294

##### Generation (GWh)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	922	1,126	1,403	1,446	1,449	1,491	1,639	1,844	1,894	1,909	1,934	1,975	1,989	2,033	2,036	1,979	1,929	1,888	1,871	1,923
Spurlock	2	510	1,815	2,172	2,808	2,856	2,747	2,885	3,135	3,301	3,382	3,364	3,486	3,464	3,479	3,503	3,490	3,430	3,388	3,319	3,255	3,300
SpurGas	1	300	109	66	36	49	65	79	82	122	142	132	184	168	214	243	252	248	276	302	308	362
SpurGas	2	510	265	134	87	105	134	176	163	234	301	254	375	350	403	478	446	517	540	634	583	656
Gas	CC	795	5,564	3,719	2,945	3,267	3,412	3,553	3,705	4,080	4,414	4,633	4,794	4,879	4,735	4,519	4,582	4,758	4,842	4,662	4,625	4,821

##### Capacity Factor

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	39%	47%	59%	60%	61%	62%	68%	77%	79%	80%	81%	83%	83%	85%	85%	83%	81%	79%	78%	80%
Spurlock	2	510	45%	54%	70%	71%	69%	72%	78%	82%	85%	84%	87%	87%	87%	88%	87%	86%	85%	83%	81%	82%
SpurGas	1	300	5%	3%	1%	2%	3%	3%	3%	5%	6%	6%	8%	7%	9%	10%	11%	10%	12%	13%	13%	15%
SpurGas	2	510	7%	3%	2%	3%	3%	4%	4%	6%	8%	6%	9%	9%	10%	12%	11%	13%	13%	16%	15%	16%
Gas	CC	795	84%	56%	44%	49%	52%	54%	56%	62%	67%	70%	72%	74%	72%	68%	69%	72%	73%	70%	70%	73%

##### Revenue (\$/kW-yr)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$100.65	\$127.07	\$166.01	\$170.35	\$171.87	\$177.42	\$195.56	\$223.12	\$232.84	\$238.54	\$248.49	\$257.78	\$261.37	\$274.85	\$278.20	\$270.68	\$265.24	\$269.77	\$277.58	\$284.44
Spurlock	2	510	\$113.98	\$139.19	\$186.06	\$188.78	\$184.36	\$193.46	\$210.43	\$228.07	\$237.62	\$240.77	\$255.48	\$258.84	\$261.98	\$272.98	\$274.99	\$271.63	\$267.72	\$271.96	\$276.00	\$280.63
SpurGas	1	300	\$14.80	\$10.49	\$6.02	\$8.08	\$10.55	\$13.15	\$14.19	\$22.08	\$24.92	\$23.68	\$35.40	\$32.24	\$39.80	\$48.21	\$51.45	\$49.95	\$53.73	\$64.52	\$75.08	\$78.84
SpurGas	2	510	\$20.39	\$12.31	\$8.42	\$10.03	\$12.50	\$16.80	\$16.15	\$24.47	\$30.12	\$26.24	\$40.92	\$37.77	\$43.08	\$53.99	\$52.76	\$58.88	\$60.10	\$75.56	\$79.89	\$81.95
Gas	CC	795	\$202.54	\$152.49	\$133.89	\$147.36	\$154.00	\$160.95	\$170.26	\$191.41	\$209.20	\$222.84	\$236.37	\$244.71	\$241.21	\$241.56	\$247.38	\$253.97	\$256.17	\$257.91	\$265.65	\$274.82

##### ProdCost (\$/kW-yr)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$93.48	\$112.95	\$140.88	\$144.16	\$146.75	\$150.93	\$164.72	\$184.48	\$190.64	\$192.42	\$196.89	\$201.82	\$202.26	\$206.17	\$208.66	\$204.30	\$200.30	\$198.45	\$199.60	\$207.28
Spurlock	2	510	\$101.79	\$119.92	\$154.16	\$156.00	\$153.06	\$160.42	\$172.88	\$181.59	\$187.21	\$186.67	\$195.10	\$194.96	\$194.74	\$195.80	\$197.19	\$195.27	\$193.79	\$192.35	\$191.77	\$196.60
SpurGas	1	300	\$13.50	\$9.51	\$5.60	\$7.49	\$9.93	\$12.01	\$12.81	\$18.71	\$21.98	\$20.51	\$28.96	\$26.90	\$34.32	\$39.95	\$41.63	\$40.35	\$44.52	\$49.61	\$51.26	\$60.88
SpurGas	2	510	\$18.58	\$11.06	\$7.84	\$9.22	\$11.57	\$15.29	\$14.40	\$20.55	\$26.47	\$22.44	\$33.56	\$31.59	\$36.57	\$44.53	\$41.73	\$47.49	\$49.51	\$58.95	\$54.92	\$62.47
Gas	CC	795	\$173.49	\$136.31	\$122.85	\$134.37	\$138.33	\$143.30	\$151.45	\$166.09	\$180.78	\$190.89	\$199.90	\$206.69	\$201.82	\$198.14	\$201.35	\$206.41	\$207.33	\$202.17	\$202.75	\$213.50

##### Operating Margin (\$/kW-yr)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$7.17	\$14.12	\$25.13	\$26.19	\$25.13	\$26.49	\$30.83	\$38.63	\$42.20	\$46.12	\$51.60	\$55.97	\$59.11	\$68.68	\$69.54	\$66.38	\$64.95	\$71.32	\$77.99	\$77.17
Spurlock	2	510	\$12.19	\$19.27	\$31.90	\$32.78	\$31.30	\$33.04	\$37.54	\$46.48	\$50.41	\$54.09	\$60.38	\$63.88	\$67.24	\$77.18	\$77.80	\$76.36	\$73.93	\$79.61	\$84.22	\$84.03
SpurGas	1	300	\$1.30	\$0.98	\$0.42	\$0.58	\$0.62	\$1.14	\$1.38	\$3.37	\$2.94	\$3.17	\$6.44	\$5.34	\$5.48	\$8.26	\$9.82	\$9.60	\$9.21	\$14.92	\$23.82	\$17.96
SpurGas	2	510	\$1.81	\$1.25	\$0.58	\$0.81	\$0.93	\$1.51	\$1.74	\$3.92	\$3.66	\$3.79	\$7.36	\$6.18	\$6.52	\$9.46	\$11.03	\$11.39	\$10.59	\$16.61	\$24.96	\$19.48
Gas	CC	795	\$29.06	\$16.18	\$11.04	\$12.99	\$15.67	\$17.65	\$18.80	\$25.32	\$28.43	\$31.95	\$36.46	\$38.02	\$39.39	\$43.43	\$46.03	\$47.56	\$48.83	\$55.74	\$62.90	\$61.32

##### Fuel (\$/mmBtu)

		Avg HR	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	10.27	\$2.42	\$2.39	\$2.40	\$2.39	\$2.44	\$2.44	\$2.43	\$2.42	\$2.45	\$2.45	\$2.48	\$2.50	\$2.48	\$2.48	\$2.51	\$2.52	\$2.54	\$2.57	\$2.62	\$2.65
Spurlock	2	9.96	\$2.43	\$2.39	\$2.39	\$2.38	\$2.44	\$2.44	\$2.42	\$2.42	\$2.44	\$2.45	\$2.48	\$2.50	\$2.48	\$2.48	\$2.51	\$2.52	\$2.54	\$2.57	\$2.62	\$2.65
SpurGas	1	10.45	\$3.24	\$3.80	\$4.16	\$4.09	\$3.99	\$4.02	\$4.10	\$4.11	\$4.17	\$4.16	\$4.27	\$4.32	\$4.37	\$4.49	\$4.52	\$4.45	\$4.40	\$4.50	\$4.56	\$4.62
SpurGas	2	10.22	\$3.24	\$3.79	\$4.16	\$4.08	\$4.00	\$4.03	\$4.10	\$4.13	\$4.17	\$4.17	\$4.28	\$4.32	\$4.37	\$4.50	\$4.52	\$4.46	\$4.42	\$4.50	\$4.56	\$4.62
Gas	CC	7.09	\$3.33	\$3.85	\$4.40	\$4.34	\$4.28	\$4.27	\$4.33	\$4.33	\$4.38	\$4.41	\$4.48	\$4.55	\$4.57	\$4.69	\$4.70	\$4.65	\$4.59	\$4.64	\$4.69	\$4.75

##### Energy Revenue (\$/MWh)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$32.76	\$33.86	\$35.49	\$35.34	\$35.59	\$35.69	\$35.80	\$36.30	\$36.89	\$37.49	\$38.55	\$39.15	\$39.43	\$40.56	\$40.99	\$41.04	\$41.24	\$42.87	\$44.52	\$44.38
Spurlock	2	510	\$32.02	\$32.69	\$33.80	\$33.71	\$34.23	\$34.20	\$34.24	\$35.24	\$35.83	\$36.50	\$37.38	\$38.11	\$38.41	\$39.75	\$40.18	\$40.38	\$40.30	\$41.79	\$43.24	\$43.37
SpurGas	1	300	\$40.90	\$48.04	\$50.76	\$49.88	\$48.37	\$50.07	\$51.63	\$54.31	\$52.56	\$53.71	\$57.75	\$57.48	\$55.75	\$59.49	\$61.16	\$60.38	\$58.30	\$64.13	\$73.09	\$65.38
SpurGas	2	510	\$39.21	\$46.94	\$49.27	\$48.88	\$47.72	\$48.79	\$50.61	\$53.27	\$51.09	\$52.64	\$55.68	\$55.11	\$54.53	\$57.65	\$60.31	\$58.10	\$56.73	\$60.76	\$69.88	\$63.74
Gas	CC	795	\$28.93	\$32.59	\$36.13	\$35.85	\$35.87	\$36.01	\$36.53	\$37.29	\$37.67	\$38.23	\$39.19	\$39.86	\$40.49	\$42.49	\$42.91	\$42.43	\$42.05	\$43.97	\$45.66	\$45.31

##### Oper Margin (\$/MWh)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$2.33	\$3.76	\$5.37	\$5.43	\$5.20	\$5.33	\$5.65	\$6.29	\$6.69	\$7.25	\$8.00	\$8.50	\$8.92	\$10.14	\$10.25	\$10.06	\$10.10	\$11.34	\$12.51	\$12.04
Spurlock	2	510	\$3.43	\$4.53	\$5.79	\$5.85	\$5.81	\$5.84	\$6.11	\$7.18	\$7.60	\$8.20	\$8.83	\$9.40	\$9.86	\$11.24	\$11.37	\$11.35	\$11.13	\$12.23	\$13.20	\$12.99
SpurGas	1	300	\$3.59	\$4.49	\$3.56	\$3.61	\$2.86	\$4.36	\$5.03	\$8.29	\$6.20	\$7.19	\$10.50	\$9.53	\$7.68	\$10.19	\$11.67	\$11.60	\$9.99	\$14.82	\$23.19	\$14.89
SpurGas	2	510	\$3.47	\$4.75	\$3.39	\$3.96	\$3.53	\$4.39	\$5.47	\$8.54	\$6.20	\$7.61	\$10.02	\$9.02	\$8.25	\$10.10	\$12.61	\$11.24	\$10.00	\$13.36	\$21.84	\$15.15
Gas	CC	795	\$4.15	\$3.46	\$2.98	\$3.16	\$3.65	\$3.95	\$4.03	\$4.93	\$5.12	\$5.48	\$6.05	\$6.19	\$6.61	\$7.64	\$7.98	\$7.95	\$8.02	\$9.50	\$10.81	\$10.11



Low Fuel Case Summary

2015\$ to 2017\$ Conversion 1.0294

Generation (GWh)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	915	1,067	1,089	1,110	1,172	1,228	1,341	1,441	1,510	1,586	1,684	1,679	1,580	1,499	1,477	1,471	1,499	1,540	1,406	1,570
Spurlock	2	510	1,832	2,208	2,364	2,436	2,448	2,658	2,713	2,985	3,072	3,085	3,235	3,184	3,165	3,108	3,102	3,079	3,014	3,002	2,787	3,032
SpurGas	1	300	206	88	98	209	337	334	265	321	292	244	258	248	306	378	471	467	476	576	591	727
SpurGas	2	510	476	197	200	438	689	644	583	588	587	479	517	521	604	756	906	974	1,005	1,102	1,062	1,332
Gas	CC	795	6,019	4,420	4,359	5,674	5,999	5,999	5,846	5,879	5,786	5,569	5,452	5,642	5,612	5,811	5,971	5,914	5,886	5,938	5,946	5,981

Capacity Factor

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	38%	45%	45%	46%	49%	51%	56%	60%	63%	66%	70%	70%	66%	63%	62%	62%	63%	64%	59%	66%
Spurlock	2	510	46%	55%	59%	61%	61%	66%	68%	75%	77%	77%	81%	80%	79%	78%	77%	77%	75%	75%	69%	76%
SpurGas	1	300	9%	4%	4%	9%	14%	14%	11%	13%	12%	10%	11%	10%	13%	16%	20%	20%	20%	24%	25%	30%
SpurGas	2	510	12%	5%	5%	11%	17%	16%	15%	15%	15%	12%	13%	13%	15%	19%	23%	24%	25%	28%	26%	33%
Gas	CC	795	91%	67%	66%	86%	91%	91%	88%	89%	87%	84%	82%	85%	85%	88%	90%	89%	89%	90%	90%	90%

Revenue (\$/kW-yr)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$98.30	\$116.16	\$117.50	\$119.55	\$127.00	\$133.65	\$145.76	\$160.55	\$168.37	\$178.16	\$193.36	\$194.77	\$180.98	\$173.01	\$171.33	\$170.39	\$172.55	\$183.35	\$177.32	\$194.59
Spurlock	2	510	\$112.92	\$135.54	\$142.46	\$146.34	\$148.90	\$160.93	\$165.72	\$185.93	\$192.09	\$195.14	\$209.89	\$209.21	\$202.76	\$199.41	\$199.33	\$199.23	\$194.82	\$201.30	\$195.86	\$210.87
SpurGas	1	300	\$25.76	\$13.00	\$13.55	\$26.39	\$40.94	\$41.24	\$34.35	\$43.86	\$40.16	\$34.42	\$40.30	\$37.69	\$43.90	\$53.97	\$65.66	\$64.92	\$65.61	\$82.30	\$91.31	\$104.49
SpurGas	2	510	\$33.67	\$16.51	\$15.96	\$31.91	\$48.19	\$46.03	\$42.85	\$46.46	\$46.27	\$38.95	\$45.89	\$44.82	\$49.53	\$61.26	\$72.22	\$77.20	\$78.34	\$90.11	\$94.27	\$109.90
Gas	CC	795	\$212.50	\$168.48	\$165.81	\$205.56	\$217.46	\$220.29	\$218.29	\$226.96	\$226.45	\$222.70	\$226.84	\$235.27	\$228.36	\$233.16	\$238.46	\$237.11	\$234.89	\$244.17	\$250.72	\$255.78

ProdCost (\$/kW-yr)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$91.22	\$104.67	\$106.05	\$106.91	\$113.20	\$118.30	\$129.01	\$138.80	\$145.44	\$152.44	\$162.91	\$163.52	\$152.99	\$144.78	\$143.81	\$143.38	\$146.28	\$151.71	\$140.09	\$157.45
Spurlock	2	510	\$100.87	\$118.76	\$125.57	\$127.83	\$129.21	\$139.40	\$142.55	\$156.57	\$161.30	\$161.89	\$170.95	\$169.88	\$166.89	\$163.28	\$164.12	\$163.33	\$160.32	\$161.60	\$152.38	\$166.59
SpurGas	1	300	\$23.60	\$11.74	\$12.43	\$23.71	\$36.85	\$36.58	\$30.12	\$37.47	\$35.09	\$30.16	\$33.28	\$31.67	\$37.64	\$43.94	\$53.69	\$52.47	\$53.92	\$65.90	\$67.65	\$83.11
SpurGas	2	510	\$30.57	\$14.86	\$14.41	\$28.40	\$42.70	\$40.05	\$37.48	\$38.78	\$39.97	\$33.64	\$37.74	\$37.67	\$42.00	\$49.75	\$58.50	\$62.38	\$64.76	\$71.45	\$68.92	\$86.29
Gas	CC	795	\$174.46	\$146.69	\$145.35	\$170.93	\$173.86	\$176.50	\$177.73	\$182.79	\$184.45	\$183.31	\$186.36	\$191.82	\$183.58	\$179.58	\$180.31	\$176.96	\$176.35	\$178.60	\$178.42	\$179.55

Operating Margin (\$/kW-yr)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$7.08	\$11.48	\$11.45	\$12.64	\$13.80	\$15.35	\$16.74	\$21.75	\$22.93	\$25.72	\$30.45	\$31.25	\$27.99	\$28.23	\$27.52	\$27.00	\$26.27	\$31.65	\$37.23	\$37.13
Spurlock	2	510	\$12.05	\$16.77	\$16.89	\$18.51	\$19.68	\$21.53	\$23.17	\$29.36	\$30.79	\$33.25	\$38.94	\$39.33	\$35.87	\$36.13	\$35.20	\$35.90	\$34.50	\$39.70	\$43.49	\$44.28
SpurGas	1	300	\$2.17	\$1.27	\$1.12	\$2.68	\$4.09	\$4.66	\$4.23	\$6.39	\$5.07	\$4.25	\$7.02	\$6.02	\$6.26	\$10.03	\$11.96	\$12.45	\$11.68	\$16.41	\$23.66	\$21.38
SpurGas	2	510	\$3.10	\$1.65	\$1.55	\$3.51	\$5.49	\$5.98	\$5.37	\$7.68	\$6.29	\$5.31	\$8.15	\$7.15	\$7.52	\$11.51	\$13.72	\$14.82	\$13.57	\$18.66	\$25.35	\$23.61
Gas	CC	795	\$38.04	\$21.79	\$20.46	\$34.63	\$43.60	\$43.80	\$40.56	\$44.17	\$42.00	\$39.39	\$40.48	\$43.45	\$44.77	\$53.58	\$58.15	\$60.15	\$58.54	\$65.56	\$72.29	\$76.22

Fuel (\$/mmBtu)

		Avg HR	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	10.32	\$2.37	\$2.32	\$2.30	\$2.28	\$2.29	\$2.28	\$2.28	\$2.29	\$2.30	\$2.29	\$2.32	\$2.34	\$2.31	\$2.30	\$2.32	\$2.32	\$2.33	\$2.35	\$2.39	\$2.41
Spurlock	2	10.01	\$2.38	\$2.32	\$2.29	\$2.26	\$2.28	\$2.27	\$2.28	\$2.28	\$2.28	\$2.28	\$2.31	\$2.33	\$2.29	\$2.28	\$2.30	\$2.31	\$2.31	\$2.34	\$2.38	\$2.40
SpurGas	1	10.41	\$3.03	\$3.46	\$3.33	\$3.03	\$2.94	\$2.96	\$3.07	\$3.16	\$3.25	\$3.34	\$3.49	\$3.46	\$3.34	\$3.15	\$3.10	\$3.05	\$3.07	\$3.11	\$3.12	\$3.12
SpurGas	2	10.13	\$3.03	\$3.46	\$3.35	\$3.06	\$2.96	\$2.97	\$3.08	\$3.16	\$3.26	\$3.36	\$3.50	\$3.47	\$3.34	\$3.16	\$3.10	\$3.08	\$3.09	\$3.12	\$3.13	\$3.13
Gas	CC	7.08	\$3.10	\$3.50	\$3.51	\$3.22	\$3.10	\$3.15	\$3.25	\$3.33	\$3.42	\$3.52	\$3.66	\$3.65	\$3.50	\$3.30	\$3.23	\$3.19	\$3.19	\$3.21	\$3.20	\$3.20

Energy Revenue (\$/MWh)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$32.22	\$32.65	\$32.36	\$32.31	\$32.51	\$32.65	\$32.60	\$33.41	\$33.45	\$33.71	\$34.45	\$34.81	\$34.35	\$34.62	\$34.80	\$34.75	\$34.54	\$35.71	\$37.83	\$37.18
Spurlock	2	510	\$31.44	\$31.30	\$30.74	\$30.63	\$31.02	\$30.88	\$31.16	\$31.77	\$31.89	\$32.26	\$33.09	\$33.51	\$32.67	\$32.72	\$32.77	\$33.00	\$32.97	\$34.20	\$35.84	\$35.47
SpurGas	1	300	\$37.47	\$44.14	\$41.69	\$37.92	\$36.46	\$37.08	\$38.94	\$40.94	\$41.28	\$42.38	\$46.88	\$45.63	\$43.08	\$42.82	\$41.83	\$41.70	\$41.37	\$42.89	\$46.34	\$43.10
SpurGas	2	510	\$36.09	\$42.79	\$40.74	\$37.11	\$35.67	\$36.47	\$37.46	\$40.27	\$40.18	\$41.44	\$45.25	\$43.86	\$41.80	\$41.30	\$40.67	\$40.43	\$39.76	\$41.69	\$45.27	\$42.08
Gas	CC	795	\$28.06	\$30.30	\$30.23	\$28.80	\$28.81	\$29.19	\$29.68	\$30.69	\$31.11	\$31.79	\$33.07	\$33.15	\$32.34	\$31.89	\$31.74	\$31.87	\$31.72	\$32.68	\$33.51	\$33.99

Oper Margin (\$/MWh)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$2.32	\$3.23	\$3.15	\$3.42	\$3.53	\$3.75	\$3.74	\$4.53	\$4.56	\$4.87	\$5.42	\$5.59	\$5.31	\$5.65	\$5.59	\$5.51	\$5.26	\$6.16	\$7.94	\$7.10
Spurlock	2	510	\$3.35	\$3.87	\$3.64	\$3.87	\$4.10	\$4.13	\$4.36	\$5.02	\$5.11	\$5.50	\$6.14	\$6.30	\$5.78	\$5.93	\$5.79	\$5.95	\$5.84	\$6.75	\$7.96	\$7.45
SpurGas	1	300	\$3.15	\$4.30	\$3.44	\$3.85	\$3.64	\$4.19	\$4.79	\$5.97	\$5.21	\$5.24	\$8.17	\$7.29	\$6.14	\$7.96	\$7.62	\$8.00	\$7.37	\$8.55	\$12.01	\$8.82
SpurGas	2	510	\$3.32	\$4.27	\$3.96	\$4.08	\$4.06	\$4.74	\$4.70	\$6.66	\$5.46	\$5.65	\$8.04	\$7.00	\$6.35	\$7.76	\$7.73	\$7.76	\$6.89	\$8.63	\$12.17	\$9.04
Gas	CC	795	\$5.02	\$3.92	\$3.73	\$4.85	\$5.78	\$5.80	\$5.51	\$5.97	\$5.77	\$5.62	\$5.90	\$6.12	\$6.34	\$7.33	\$7.74	\$8.08	\$7.91	\$8.78	\$9.66	\$10.13

# High Fuel Case Summary

## High Fuel Case Summary

2015S to 2017S Conversion 1.0294

### Generation (GWh)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	899	1,249	1,670	1,833	2,032	2,131	2,176	2,195	2,201	2,198	2,207	2,200	2,196	2,200	2,208	2,202	2,201	2,202	2,209	2,203
Spurlock	2	510	1,811	2,633	3,244	3,368	3,535	3,601	3,628	3,641	3,641	3,641	3,652	3,641	3,641	3,641	3,652	3,641	3,641	3,641	3,652	3,641
SpurGas	1	300	62	42	20	29	34	49	52	84	71	81	125	96	98	109	123	128	132	165	165	194
SpurGas	2	510	141	81	56	53	60	98	91	156	139	158	232	188	184	211	239	235	238	287	300	330
Gas	CC	795	4,426	2,654	1,401	1,339	1,152	1,255	1,262	1,425	1,548	1,835	1,733	2,066	2,231	2,218	2,334	2,254	2,367	2,197	2,003	2,292

### Capacity Factor

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	38%	52%	70%	77%	85%	89%	91%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%
Spurlock	2	510	45%	66%	81%	84%	88%	90%	90%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%
SpurGas	1	300	3%	2%	1%	1%	1%	2%	2%	3%	3%	3%	5%	4%	4%	5%	5%	5%	6%	7%	7%	8%
SpurGas	2	510	4%	2%	1%	1%	2%	2%	2%	4%	3%	4%	6%	5%	5%	5%	6%	6%	6%	7%	7%	8%
Gas	CC	795	67%	40%	21%	20%	17%	19%	19%	22%	23%	28%	26%	31%	34%	34%	35%	34%	36%	33%	30%	35%

### Revenue (\$/kW-yr)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$101.49	\$150.34	\$216.31	\$244.89	\$284.38	\$309.25	\$323.82	\$351.03	\$370.23	\$381.88	\$394.77	\$401.12	\$402.84	\$429.95	\$445.86	\$443.63	\$447.14	\$455.12	\$488.44	\$502.30
Spurlock	2	510	\$117.52	\$176.44	\$235.69	\$255.00	\$283.31	\$301.37	\$312.95	\$339.67	\$357.92	\$368.95	\$381.96	\$387.84	\$389.29	\$416.58	\$431.02	\$431.08	\$432.63	\$440.49	\$469.84	\$483.62
SpurGas	1	300	\$9.19	\$7.69	\$4.06	\$6.30	\$7.76	\$11.78	\$13.42	\$23.77	\$20.79	\$23.69	\$39.83	\$30.87	\$30.63	\$39.09	\$45.64	\$46.72	\$47.22	\$64.72	\$81.04	\$81.84
SpurGas	2	510	\$12.05	\$8.59	\$6.55	\$6.69	\$8.08	\$13.70	\$13.73	\$25.61	\$23.37	\$26.73	\$42.57	\$34.74	\$33.14	\$43.26	\$50.53	\$49.99	\$49.31	\$65.58	\$83.96	\$81.42
Gas	CC	795	\$173.47	\$121.98	\$78.88	\$81.68	\$79.49	\$90.12	\$93.95	\$112.09	\$126.66	\$151.95	\$153.65	\$179.28	\$192.42	\$208.04	\$224.67	\$218.04	\$228.46	\$226.11	\$233.16	\$257.38

### ProdCost (\$/kW-yr)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$94.31	\$130.12	\$172.99	\$188.98	\$209.56	\$221.88	\$225.28	\$227.16	\$229.49	\$228.33	\$230.77	\$230.82	\$228.46	\$228.30	\$230.03	\$229.52	\$229.63	\$232.71	\$236.90	\$238.89
Spurlock	2	510	\$105.29	\$150.26	\$183.96	\$190.74	\$200.91	\$207.19	\$207.73	\$208.39	\$210.17	\$209.32	\$211.41	\$211.50	\$209.55	\$209.13	\$210.56	\$210.09	\$210.26	\$213.09	\$216.96	\$218.88
SpurGas	1	300	\$8.44	\$7.02	\$3.74	\$5.86	\$7.45	\$11.17	\$12.32	\$20.65	\$18.22	\$21.18	\$33.39	\$25.88	\$26.88	\$31.23	\$36.20	\$37.57	\$38.98	\$49.09	\$51.14	\$62.14
SpurGas	2	510	\$11.02	\$7.74	\$6.13	\$6.11	\$7.59	\$12.83	\$12.36	\$22.00	\$20.37	\$23.72	\$35.39	\$29.17	\$28.80	\$34.70	\$40.24	\$39.69	\$40.21	\$48.80	\$53.08	\$60.38
Gas	CC	795	\$153.26	\$111.43	\$71.18	\$73.57	\$69.88	\$77.93	\$80.20	\$91.99	\$105.41	\$129.68	\$123.34	\$151.03	\$164.15	\$171.57	\$185.00	\$178.45	\$188.29	\$175.28	\$166.83	\$195.63

### Operating Margin (\$/kW-yr)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$7.18	\$20.23	\$43.32	\$55.90	\$74.82	\$87.37	\$98.54	\$123.87	\$140.74	\$153.55	\$164.00	\$170.30	\$174.38	\$201.65	\$215.83	\$214.11	\$217.51	\$222.41	\$251.55	\$263.41
Spurlock	2	510	\$12.23	\$26.18	\$51.74	\$64.26	\$82.40	\$94.18	\$105.21	\$131.29	\$147.75	\$159.63	\$170.55	\$176.34	\$179.74	\$207.45	\$220.46	\$220.99	\$222.36	\$227.40	\$252.88	\$264.74
SpurGas	1	300	\$0.76	\$0.67	\$0.32	\$0.44	\$0.31	\$0.61	\$1.10	\$3.12	\$2.56	\$2.51	\$6.44	\$4.99	\$3.75	\$7.86	\$9.44	\$9.16	\$8.24	\$15.63	\$29.90	\$19.70
SpurGas	2	510	\$1.03	\$0.85	\$0.42	\$0.58	\$0.49	\$0.87	\$1.37	\$3.60	\$2.99	\$3.02	\$7.18	\$5.57	\$4.33	\$8.56	\$10.29	\$10.31	\$9.10	\$16.77	\$30.88	\$21.04
Gas	CC	795	\$20.21	\$10.55	\$7.70	\$8.11	\$9.61	\$12.19	\$13.75	\$20.10	\$21.24	\$22.27	\$30.32	\$28.26	\$28.27	\$36.47	\$39.67	\$39.59	\$40.17	\$50.83	\$66.32	\$61.75

### Fuel (\$/mmBtu)

		Avg HR	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	10.18	\$2.52	\$2.51	\$2.52	\$2.52	\$2.53	\$2.57	\$2.56	\$2.56	\$2.58	\$2.57	\$2.59	\$2.60	\$2.57	\$2.57	\$2.58	\$2.58	\$2.58	\$2.62	\$2.67	\$2.70
Spurlock	2	9.90	\$2.53	\$2.50	\$2.51	\$2.51	\$2.53	\$2.57	\$2.56	\$2.56	\$2.58	\$2.57	\$2.59	\$2.60	\$2.57	\$2.57	\$2.58	\$2.58	\$2.58	\$2.62	\$2.67	\$2.71
SpurGas	1	10.47	\$3.58	\$4.42	\$5.10	\$5.43	\$5.93	\$6.20	\$6.44	\$6.74	\$7.04	\$7.17	\$7.36	\$7.44	\$7.51	\$7.93	\$8.15	\$8.14	\$8.13	\$8.21	\$8.64	\$8.90
SpurGas	2	10.28	\$3.57	\$4.43	\$5.11	\$5.43	\$5.93	\$6.19	\$6.44	\$6.74	\$7.04	\$7.18	\$7.35	\$7.45	\$7.49	\$7.94	\$8.15	\$8.14	\$8.13	\$8.21	\$8.63	\$8.90
Gas	CC	7.09	\$3.67	\$4.42	\$5.28	\$5.64	\$6.14	\$6.39	\$6.60	\$6.83	\$7.20	\$7.46	\$7.52	\$7.72	\$7.78	\$8.18	\$8.39	\$8.38	\$8.41	\$8.42	\$8.81	\$9.07

### Energy Revenue (\$/MWh)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$33.88	\$36.12	\$38.86	\$40.08	\$41.98	\$43.55	\$44.65	\$47.97	\$50.47	\$52.13	\$53.67	\$54.70	\$55.02	\$58.64	\$60.57	\$60.44	\$60.95	\$62.01	\$66.33	\$68.41
Spurlock	2	510	\$33.09	\$34.17	\$37.05	\$38.61	\$40.87	\$42.68	\$43.99	\$47.58	\$50.13	\$51.68	\$53.34	\$54.32	\$54.53	\$58.35	\$60.19	\$60.38	\$60.60	\$61.70	\$65.62	\$67.74
SpurGas	1	300	\$44.81	\$54.91	\$62.12	\$65.29	\$68.71	\$72.48	\$77.61	\$85.31	\$87.92	\$87.77	\$96.96	\$93.80	\$107.90	\$111.52	\$109.91	\$107.37	\$117.58	\$147.08	\$126.51	
SpurGas	2	510	\$43.53	\$54.11	\$59.58	\$64.52	\$68.29	\$71.46	\$77.11	\$83.89	\$85.88	\$86.46	\$93.61	\$94.12	\$91.75	\$104.54	\$107.95	\$108.32	\$105.76	\$116.41	\$142.58	\$125.75
Gas	CC	795	\$31.15	\$36.54	\$44.75	\$48.47	\$54.84	\$57.10	\$59.17	\$62.53	\$65.02	\$65.80	\$70.49	\$68.96	\$68.55	\$74.56	\$76.50	\$76.90	\$76.71	\$81.80	\$92.53	\$89.24

### Oper Margin (\$/MWh)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$2.40	\$4.86	\$7.78	\$9.15	\$11.05	\$12.30	\$13.59	\$16.93	\$19.19	\$20.96	\$22.30	\$23.22	\$23.82	\$27.50	\$29.32	\$29.17	\$29.65	\$30.30	\$34.16	\$35.88
Spurlock	2	510	\$3.44	\$5.07	\$8.13	\$9.73	\$11.89	\$13.34	\$14.79	\$18.39	\$20.69	\$22.36	\$23.81	\$24.70	\$25.18	\$29.06	\$30.78	\$30.95	\$31.15	\$31.85	\$35.32	\$37.08
SpurGas	1	300	\$3.68	\$4.75	\$4.87	\$4.54	\$2.75	\$3.75	\$6.38	\$11.19	\$10.85	\$9.32	\$15.48	\$15.69	\$11.49	\$21.70	\$23.06	\$21.54	\$18.73	\$28.40	\$54.27	\$30.44
SpurGas	2	510	\$3.71	\$5.35	\$3.84	\$5.60	\$4.11	\$4.53	\$7.72	\$11.81	\$11.00	\$9.75	\$15.79	\$15.10	\$12.00	\$20.70	\$21.99	\$22.33	\$19.51	\$29.78	\$52.44	\$32.50
Gas	CC	795	\$3.63	\$3.16	\$4.37	\$4.81	\$6.63	\$7.72	\$8.66	\$11.21	\$10.91	\$9.64	\$13.91	\$10.87	\$10.07	\$13.07	\$13.51	\$13.96	\$13.49	\$18.39	\$26.32	\$21.41



CPP Case Summary

2015\$ to 2017\$ Conversion 1.0294

Generation (GWh)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	916	1,183	1,425	1,451	1,414	1,477	1,658	1,730	1,688	1,607	1,655	1,567	1,421	1,484	1,521	1,412	1,255	1,129	958	1,105
Spurlock	2	510	1,832	2,314	2,910	2,814	2,749	2,899	3,114	3,124	3,272	3,107	3,201	3,046	2,978	2,967	3,033	2,922	2,897	2,449	2,131	2,369
SpurGas	1	300	90	65	38	61	75	100	94	128	144	133	202	169	168	203	232	248	231	216	256	299
SpurGas	2	510	237	129	101	121	162	202	185	290	289	315	368	313	321	401	439	526	488	448	483	562
Gas	CC	795	5,317	3,320	2,554	3,081	3,374	3,544	3,488	4,087	4,511	5,147	5,189	5,464	5,202	5,009	5,380	5,495	5,587	5,105	5,156	5,015

Capacity Factor

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	38%	49%	59%	61%	59%	62%	69%	72%	71%	67%	69%	66%	59%	62%	63%	59%	53%	47%	40%	46%
Spurlock	2	510	46%	58%	72%	70%	69%	72%	78%	78%	78%	78%	80%	76%	74%	74%	76%	73%	72%	61%	53%	59%
SpurGas	1	300	4%	3%	2%	3%	3%	4%	4%	5%	6%	6%	8%	7%	7%	8%	10%	10%	10%	9%	11%	12%
SpurGas	2	510	6%	3%	3%	3%	4%	5%	5%	7%	7%	8%	9%	8%	8%	10%	11%	13%	12%	11%	12%	14%
Gas	CC	795	80%	50%	38%	47%	51%	54%	53%	62%	68%	78%	78%	83%	79%	76%	81%	83%	84%	77%	78%	76%

Revenue (\$/kW-yr)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$100.00	\$133.89	\$170.06	\$171.77	\$167.03	\$174.61	\$196.11	\$222.83	\$230.94	\$246.81	\$258.09	\$263.48	\$244.94	\$261.67	\$274.27	\$258.70	\$234.38	\$220.42	\$202.75	\$223.92
Spurlock	2	510	\$114.72	\$148.05	\$193.30	\$187.60	\$183.14	\$192.73	\$207.92	\$230.38	\$252.94	\$270.53	\$283.48	\$290.91	\$288.53	\$295.84	\$309.33	\$303.78	\$302.85	\$267.83	\$246.50	\$265.65
SpurGas	1	300	\$12.57	\$10.58	\$6.62	\$10.30	\$12.14	\$16.56	\$16.27	\$24.57	\$27.70	\$28.06	\$44.35	\$38.74	\$37.99	\$49.37	\$57.43	\$60.08	\$56.50	\$60.09	\$78.97	\$81.04
SpurGas	2	510	\$18.47	\$12.08	\$9.93	\$11.78	\$15.01	\$19.21	\$18.41	\$31.15	\$31.75	\$37.12	\$46.86	\$41.42	\$41.74	\$55.47	\$62.28	\$72.42	\$67.32	\$69.42	\$83.72	\$86.84
Gas	CC	795	\$194.76	\$139.30	\$119.28	\$140.88	\$151.32	\$159.42	\$160.70	\$201.58	\$231.28	\$287.98	\$296.20	\$330.13	\$320.33	\$318.75	\$347.50	\$357.13	\$363.31	\$342.23	\$353.63	\$344.72

ProdCost (\$/kW-yr)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$92.66	\$118.31	\$142.73	\$144.90	\$143.14	\$148.85	\$165.34	\$189.25	\$196.77	\$214.02	\$221.35	\$231.84	\$215.48	\$224.16	\$235.85	\$225.36	\$205.15	\$185.60	\$158.50	\$183.27
Spurlock	2	510	\$102.38	\$127.34	\$158.96	\$154.17	\$152.98	\$160.24	\$170.29	\$188.37	\$209.85	\$228.82	\$236.68	\$249.69	\$250.01	\$248.63	\$261.05	\$259.13	\$263.03	\$224.64	\$197.01	\$219.04
SpurGas	1	300	\$11.45	\$9.67	\$6.11	\$9.47	\$11.22	\$15.02	\$14.55	\$20.58	\$24.34	\$24.01	\$37.09	\$32.85	\$33.16	\$40.39	\$46.69	\$49.58	\$46.49	\$44.78	\$52.86	\$61.85
SpurGas	2	510	\$16.93	\$10.91	\$9.24	\$10.67	\$13.75	\$17.19	\$16.27	\$26.52	\$27.61	\$32.28	\$38.56	\$34.62	\$35.98	\$45.32	\$50.16	\$59.51	\$55.80	\$52.62	\$56.55	\$66.18
Gas	CC	795	\$168.90	\$125.48	\$108.58	\$127.60	\$135.14	\$141.24	\$142.51	\$174.30	\$199.84	\$244.26	\$249.77	\$276.79	\$267.26	\$261.35	\$282.62	\$287.13	\$293.32	\$273.09	\$275.88	\$268.94

Operating Margin (\$/kW-yr)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$7.33	\$15.59	\$27.34	\$26.87	\$23.89	\$25.77	\$30.77	\$33.58	\$34.17	\$32.79	\$36.74	\$31.65	\$29.46	\$37.51	\$38.42	\$33.34	\$29.24	\$34.82	\$44.25	\$40.66
Spurlock	2	510	\$12.34	\$20.70	\$34.34	\$33.43	\$30.16	\$32.49	\$37.63	\$42.01	\$43.08	\$41.71	\$46.80	\$41.22	\$38.52	\$47.21	\$48.28	\$44.65	\$39.82	\$43.19	\$49.50	\$46.61
SpurGas	1	300	\$1.12	\$0.91	\$0.50	\$0.83	\$0.92	\$1.55	\$1.72	\$3.99	\$3.36	\$4.05	\$7.25	\$5.89	\$4.83	\$8.98	\$10.74	\$10.50	\$10.01	\$15.31	\$26.11	\$19.19
SpurGas	2	510	\$1.54	\$1.18	\$0.70	\$1.11	\$1.26	\$2.02	\$2.14	\$4.63	\$4.14	\$4.83	\$8.30	\$6.80	\$5.76	\$10.15	\$12.11	\$12.91	\$11.52	\$16.80	\$27.17	\$20.66
Gas	CC	795	\$25.85	\$13.82	\$10.70	\$13.28	\$16.18	\$18.18	\$18.19	\$27.28	\$31.43	\$43.72	\$46.44	\$53.34	\$53.07	\$57.40	\$64.88	\$70.00	\$69.98	\$69.14	\$77.75	\$75.78

Fuel (\$/mmBtu)

		Avg HR	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	10.31	\$2.41	\$2.38	\$2.40	\$2.40	\$2.44	\$2.43	\$2.40	\$2.40	\$2.42	\$2.42	\$2.44	\$2.46	\$2.46	\$2.45	\$2.47	\$2.50	\$2.51	\$2.54	\$2.57	\$2.59
Spurlock	2	10.00	\$2.42	\$2.38	\$2.38	\$2.39	\$2.43	\$2.42	\$2.40	\$2.40	\$2.41	\$2.41	\$2.43	\$2.45	\$2.45	\$2.44	\$2.46	\$2.49	\$2.50	\$2.54	\$2.57	\$2.58
SpurGas	1	10.46	\$3.30	\$3.91	\$4.25	\$4.10	\$3.94	\$3.96	\$4.10	\$4.17	\$4.29	\$4.37	\$4.47	\$4.53	\$4.57	\$4.65	\$4.67	\$4.57	\$4.56	\$4.69	\$4.72	\$4.73
SpurGas	2	10.23	\$3.30	\$3.89	\$4.25	\$4.11	\$3.94	\$3.96	\$4.09	\$4.18	\$4.29	\$4.37	\$4.49	\$4.53	\$4.57	\$4.65	\$4.67	\$4.57	\$4.56	\$4.69	\$4.71	\$4.73
Gas	CC	7.07	\$3.40	\$3.96	\$4.48	\$4.36	\$4.23	\$4.22	\$4.33	\$4.39	\$4.50	\$4.60	\$4.68	\$4.76	\$4.77	\$4.85	\$4.85	\$4.76	\$4.74	\$4.83	\$4.84	\$4.85

Energy Revenue (\$/MWh)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$32.73	\$33.96	\$35.81	\$35.52	\$35.43	\$35.47	\$35.48	\$38.65	\$41.06	\$46.09	\$46.78	\$50.43	\$51.72	\$52.90	\$54.09	\$54.96	\$56.02	\$58.59	\$63.49	\$60.80
Spurlock	2	510	\$31.94	\$32.62	\$33.88	\$34.00	\$33.97	\$33.90	\$34.05	\$37.61	\$39.42	\$44.41	\$45.16	\$48.71	\$49.42	\$50.85	\$52.01	\$53.02	\$53.32	\$55.77	\$58.98	\$57.19
SpurGas	1	300	\$41.90	\$49.00	\$52.13	\$50.55	\$48.59	\$49.57	\$51.96	\$57.73	\$57.54	\$63.47	\$65.85	\$68.64	\$67.89	\$73.14	\$74.30	\$72.65	\$73.45	\$83.38	\$92.52	\$81.38
SpurGas	2	510	\$39.81	\$47.91	\$50.34	\$49.84	\$47.21	\$48.41	\$50.73	\$54.71	\$56.10	\$60.10	\$64.91	\$67.39	\$66.40	\$70.63	\$72.30	\$70.18	\$70.40	\$79.01	\$88.40	\$78.75
Gas	CC	795	\$29.11	\$33.35	\$37.13	\$36.35	\$35.65	\$35.75	\$36.62	\$39.20	\$40.75	\$44.47	\$45.37	\$48.03	\$48.95	\$50.57	\$51.34	\$51.66	\$51.69	\$53.29	\$54.52	\$54.64

Oper Margin (\$/MWh)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$2.40	\$3.95	\$5.76	\$5.56	\$5.07	\$5.23	\$5.57	\$5.82	\$6.07	\$6.12	\$6.66	\$6.06	\$6.22	\$7.58	\$7.58	\$7.08	\$6.99	\$9.26	\$13.86	\$11.04
Spurlock	2	510	\$3.44	\$4.56	\$6.02	\$6.06	\$5.59	\$5.71	\$6.16	\$6.86	\$6.71	\$6.85	\$7.46	\$6.90	\$6.60	\$8.11	\$8.12	\$7.79	\$7.01	\$8.99	\$11.84	\$10.03
SpurGas	1	300	\$3.74	\$4.23	\$3.97	\$4.07	\$3.70	\$4.63	\$5.50	\$6.98	\$6.98	\$9.16	\$10.77	\$10.44	\$8.64	\$13.30	\$13.89	\$12.70	\$13.01	\$21.25	\$30.59	\$19.27
SpurGas	2	510	\$3.32	\$4.66	\$3.53	\$4.68	\$3.96	\$5.10	\$5.89	\$8.13	\$7.31	\$7.83	\$11.50	\$11.06	\$9.16	\$12.93	\$14.06	\$12.51	\$12.04	\$19.12	\$28.69	\$18.74
Gas	CC	795	\$3.86	\$3.31	\$3.33	\$3.43	\$3.81	\$4.08	\$4.14	\$5.30	\$5.54	\$6.75	\$7.11	\$7.76	\$8.11	\$9.11	\$9.59	\$10.12	\$9.96	\$10.77	\$11.99	\$12.01

Low Load Case Summary

Low Load Case Summary

2015\$ to 2017\$ Conversion 1.0294

Generation (GWh)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	876	1,067	1,384	1,406	1,358	1,369	1,520	1,732	1,787	1,780	1,828	1,873	1,767	1,898	1,799	1,775	1,767	1,647	1,582	1,725
Spurlock	2	510	1,833	2,184	2,802	2,791	2,640	2,789	2,999	3,173	3,317	3,292	3,373	3,427	3,315	3,389	3,344	3,323	3,236	3,115	3,010	3,232
SpurGas	1	300	95	50	20	30	25	40	47	75	58	74	107	72	87	102	126	117	115	139	145	168
SpurGas	2	510	236	108	61	66	65	98	103	158	143	153	216	139	168	216	234	235	219	273	281	320
Gas	CC	795	5,381	3,087	1,838	1,904	2,258	2,155	2,009	2,574	2,792	3,082	2,888	3,134	2,994	3,138	2,962	2,806	2,983	2,722	2,451	3,040

Capacity Factor

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	37%	45%	58%	59%	57%	57%	63%	72%	75%	74%	76%	78%	74%	79%	75%	74%	74%	69%	66%	72%
Spurlock	2	510	46%	55%	70%	70%	66%	70%	75%	79%	83%	82%	84%	86%	83%	85%	83%	81%	78%	75%	81%	
SpurGas	1	300	4%	2%	1%	1%	1%	2%	2%	3%	2%	3%	4%	3%	4%	4%	5%	5%	5%	6%	6%	7%
SpurGas	2	510	6%	3%	2%	2%	2%	2%	3%	4%	4%	4%	5%	3%	4%	5%	6%	6%	5%	7%	7%	8%
Gas	CC	795	81%	47%	28%	29%	34%	33%	30%	39%	42%	47%	43%	47%	45%	47%	45%	42%	45%	41%	37%	46%

Revenue (\$/kW-yr)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$95.22	\$118.71	\$159.98	\$160.78	\$155.16	\$156.38	\$173.79	\$200.30	\$208.54	\$208.53	\$219.56	\$224.69	\$214.71	\$237.24	\$228.97	\$223.39	\$219.91	\$213.01	\$214.69	\$233.29
Spurlock	2	510	\$113.95	\$137.16	\$181.52	\$179.45	\$170.69	\$178.91	\$193.15	\$209.27	\$220.18	\$219.34	\$231.12	\$234.25	\$228.07	\$242.51	\$241.33	\$238.46	\$230.27	\$227.78	\$229.17	\$246.37
SpurGas	1	300	\$13.11	\$8.14	\$3.53	\$5.16	\$4.03	\$6.56	\$8.01	\$13.73	\$10.53	\$12.84	\$20.42	\$14.05	\$16.28	\$21.55	\$26.41	\$24.45	\$23.14	\$30.86	\$39.51	\$38.95
SpurGas	2	510	\$18.43	\$10.09	\$5.94	\$6.41	\$6.07	\$9.23	\$10.12	\$16.38	\$14.55	\$15.39	\$23.47	\$15.57	\$18.15	\$25.45	\$28.13	\$28.05	\$25.19	\$34.32	\$42.57	\$41.91
Gas	CC	795	\$196.13	\$126.36	\$84.15	\$85.61	\$100.33	\$96.54	\$92.63	\$118.66	\$129.66	\$141.93	\$139.28	\$148.64	\$144.66	\$159.39	\$152.91	\$144.24	\$148.50	\$143.11	\$140.82	\$166.90

ProdCost (\$/kW-yr)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$88.93	\$107.20	\$139.26	\$140.46	\$137.70	\$138.87	\$152.88	\$173.94	\$180.35	\$180.31	\$186.56	\$192.10	\$181.13	\$193.47	\$185.85	\$184.71	\$184.51	\$174.75	\$170.15	\$186.88
Spurlock	2	510	\$102.76	\$120.58	\$153.85	\$152.67	\$146.99	\$154.96	\$165.65	\$174.86	\$183.68	\$182.85	\$189.05	\$192.89	\$186.14	\$189.74	\$189.44	\$189.51	\$185.60	\$181.46	\$178.27	\$192.70
SpurGas	1	300	\$12.01	\$7.38	\$3.26	\$4.77	\$3.82	\$6.20	\$7.42	\$11.93	\$9.22	\$11.68	\$17.29	\$11.87	\$14.62	\$17.40	\$21.40	\$19.77	\$19.22	\$23.44	\$24.49	\$29.07
SpurGas	2	510	\$16.91	\$9.10	\$5.56	\$5.90	\$5.75	\$8.68	\$9.31	\$14.22	\$12.94	\$13.90	\$19.85	\$13.07	\$16.09	\$20.83	\$22.56	\$22.48	\$20.74	\$26.18	\$26.98	\$31.31
Gas	CC	795	\$170.93	\$114.52	\$76.82	\$77.69	\$91.86	\$87.12	\$82.51	\$104.19	\$114.64	\$127.26	\$120.14	\$132.96	\$128.71	\$137.78	\$130.05	\$121.36	\$127.18	\$117.88	\$107.80	\$134.19

Operating Margin (\$/kW-yr)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$6.28	\$11.50	\$20.72	\$20.32	\$17.46	\$17.52	\$20.91	\$26.36	\$28.20	\$28.22	\$33.00	\$32.59	\$33.58	\$43.78	\$43.13	\$38.68	\$35.40	\$38.26	\$44.55	\$46.41
Spurlock	2	510	\$11.19	\$16.58	\$27.67	\$26.78	\$23.69	\$23.95	\$27.50	\$34.41	\$36.50	\$36.49	\$42.07	\$41.36	\$41.93	\$52.77	\$51.88	\$48.95	\$44.68	\$46.32	\$50.90	\$53.67
SpurGas	1	300	\$1.10	\$0.76	\$0.27	\$0.39	\$0.20	\$0.36	\$0.59	\$1.80	\$1.31	\$1.16	\$3.13	\$2.18	\$1.67	\$4.15	\$5.01	\$4.69	\$3.92	\$7.42	\$15.02	\$9.88
SpurGas	2	510	\$1.52	\$0.99	\$0.38	\$0.52	\$0.32	\$0.55	\$0.81	\$2.16	\$1.61	\$1.50	\$3.62	\$2.50	\$2.06	\$4.62	\$5.57	\$5.57	\$4.45	\$8.15	\$15.60	\$10.60
Gas	CC	795	\$25.20	\$11.85	\$7.33	\$7.92	\$8.47	\$9.42	\$10.13	\$14.47	\$15.02	\$14.67	\$19.14	\$15.68	\$15.95	\$21.60	\$22.86	\$22.87	\$21.32	\$25.23	\$33.02	\$32.71

Fuel (\$/mmBtu)

		Avg HR	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	10.30	\$2.42	\$2.39	\$2.41	\$2.39	\$2.44	\$2.44	\$2.43	\$2.43	\$2.45	\$2.45	\$2.48	\$2.50	\$2.49	\$2.48	\$2.51	\$2.53	\$2.54	\$2.58	\$2.62	\$2.66
Spurlock	2	9.98	\$2.43	\$2.39	\$2.39	\$2.39	\$2.44	\$2.43	\$2.42	\$2.42	\$2.44	\$2.45	\$2.48	\$2.49	\$2.48	\$2.47	\$2.50	\$2.52	\$2.53	\$2.57	\$2.62	\$2.65
SpurGas	1	10.47	\$3.30	\$3.87	\$4.21	\$4.14	\$4.05	\$4.07	\$4.17	\$4.19	\$4.22	\$4.23	\$4.33	\$4.39	\$4.44	\$4.56	\$4.58	\$4.52	\$4.44	\$4.54	\$4.61	\$4.66
SpurGas	2	10.28	\$3.31	\$3.86	\$4.22	\$4.14	\$4.08	\$4.07	\$4.16	\$4.18	\$4.23	\$4.23	\$4.33	\$4.39	\$4.44	\$4.55	\$4.57	\$4.51	\$4.44	\$4.53	\$4.61	\$4.66
Gas	CC	7.09	\$3.40	\$3.89	\$4.39	\$4.28	\$4.28	\$4.25	\$4.33	\$4.29	\$4.36	\$4.39	\$4.44	\$4.52	\$4.56	\$4.68	\$4.68	\$4.61	\$4.55	\$4.60	\$4.68	\$4.71

Energy Revenue (\$/MWh)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$32.60	\$33.37	\$34.67	\$34.30	\$34.27	\$34.26	\$34.30	\$34.70	\$35.01	\$35.14	\$36.04	\$36.00	\$36.44	\$37.49	\$38.19	\$37.75	\$37.34	\$38.81	\$40.71	\$40.57
Spurlock	2	510	\$31.70	\$32.03	\$33.04	\$32.79	\$32.97	\$32.71	\$32.84	\$33.64	\$33.85	\$33.98	\$34.94	\$34.86	\$35.09	\$36.50	\$36.81	\$36.59	\$36.30	\$37.29	\$38.83	\$38.88
SpurGas	1	300	\$41.45	\$48.94	\$51.76	\$50.84	\$48.63	\$49.01	\$51.18	\$54.64	\$54.36	\$52.39	\$57.27	\$58.52	\$55.92	\$63.19	\$62.92	\$62.48	\$60.23	\$66.66	\$82.02	\$69.40
SpurGas	2	510	\$39.80	\$47.58	\$49.72	\$49.62	\$47.59	\$47.88	\$49.90	\$52.88	\$51.83	\$51.31	\$55.34	\$57.04	\$55.02	\$59.97	\$61.27	\$60.90	\$58.69	\$64.20	\$77.33	\$66.86
Gas	CC	795	\$28.97	\$32.53	\$36.40	\$35.73	\$35.31	\$35.60	\$36.66	\$36.64	\$36.91	\$36.60	\$38.34	\$37.70	\$38.41	\$40.37	\$41.03	\$40.86	\$39.56	\$41.79	\$45.66	\$43.64

Oper Margin (\$/MWh)

		MW	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Spurlock	1	300	\$2.15	\$3.23	\$4.49	\$4.34	\$3.86	\$3.84	\$4.13	\$4.57	\$4.73	\$4.76	\$5.42	\$5.22	\$5.70	\$6.92	\$7.19	\$6.54	\$6.01	\$6.97	\$8.45	\$8.07
Spurlock	2	510	\$3.11	\$3.87	\$5.04	\$4.89	\$4.58	\$4.38	\$4.68	\$5.53	\$5.61	\$5.65	\$6.36	\$6.16	\$6.45	\$7.94	\$7.91	\$7.51	\$7.04	\$7.58	\$8.62	\$8.47
SpurGas	1	300	\$3.47	\$4.58	\$3.96	\$3.80	\$2.44	\$2.69	\$3.75	\$7.18	\$6.78	\$4.71	\$8.77	\$9.09	\$5.72	\$12.16	\$11.93	\$11.97	\$10.20	\$16.02	\$31.18	\$17.61
SpurGas	2	510	\$3.28	\$4.69	\$3.18	\$4.00	\$2.50	\$2.85	\$3.98	\$6.97	\$5.73	\$4.99	\$8.54	\$9.15	\$6.23	\$10.89	\$12.14	\$12.09	\$10.38	\$15.24	\$28.33	\$16.91
Gas	CC	795	\$3.72	\$3.05	\$3.17	\$3.31	\$2.98	\$3.47	\$4.01	\$4.47	\$4.27	\$3.78	\$5.27	\$3.98	\$4.24	\$5.47	\$6.13	\$6.48	\$5.68	\$7.37	\$10.71	\$8.55

**COMMONWEALTH OF KENTUCKY**  
**BEFORE THE PUBLIC SERVICE COMMISSION**

**IN THE MATTER OF:**

<b>THE APPLICATION OF EAST KENTUCKY</b>	<b>)</b>	
<b>POWER COOPERATIVE, INC. FOR APPROVAL</b>	<b>)</b>	
<b>TO AMEND ITS ENVIRONMENTAL</b>	<b>)</b>	
<b>COMPLIANCE PLAN AND RECOVER COSTS</b>	<b>)</b>	<b>CASE NO. 2017-00376</b>
<b>PURSUANT TO ITS ENVIRONMENTAL</b>	<b>)</b>	
<b>SURCHARGE, SETTLEMENT OF CERTAIN</b>	<b>)</b>	
<b>ASSET RETIREMENT OBLIGATIONS AND</b>	<b>)</b>	
<b>ISSUANCE OF A CERTIFICATE OF PUBLIC</b>	<b>)</b>	
<b>CONVENIENCE AND NECESSITYAND</b>	<b>)</b>	
<b>OTHER RELIEF</b>	<b>)</b>	

**DIRECT TESTIMONY OF TOM STACHNIK**  
**ON BEHALF OF EAST KENTUCKY POWER COOPERATIVE, INC.**

**Filed: November 20, 2017**



- 1   **Q.    Please state your name, position, and business address.**
- 2   A.    My name is Tom Stachnik and my business address is East Kentucky Power  
3       Cooperative, Inc. ("EKPC"), 4775 Lexington Road, Winchester, Kentucky 40391.  
4       I am Vice President of Finance and Treasurer at EKPC.
- 5   **Q.    Please briefly describe your education and professional experience.**
- 6   A.    I have a Bachelor's degree in Chemical Engineering from the University of Illinois  
7       and an MBA from the University of Chicago and hold the Chartered Financial  
8       Analyst and Certified Treasury Professional designations. After a ten-year  
9       engineering career, I made the switch to Finance. I had worked in the Treasury  
10      Department of Brown-Forman Corporation for 13 years before joining EKPC in  
11      August 2015. In 2017, I was promoted from Treasurer and Director of Finance to  
12      Vice President of Finance and Treasurer at EKPC. I report to the Chief Financial  
13      Officer.
- 14   **Q.    Please briefly describe your duties at EKPC.**
- 15   A.    At EKPC I am responsible for the management and direction of the treasury area  
16       including borrowing, investing, and cash management. I also oversee the financial  
17       forecasting, budgeting, and risk management functions.
- 18   **Q.    What is the purpose of your testimony in this proceeding?**
- 19   A.    I will describe EKPC's plan to finance the CCR/ELG Project as well as describe  
20       the methodology by which EKPC's average weighted cost of debt is calculated. I  
21       have provided that calculation to Mr. Scott to use in his calculations and testimony  
22       regarding the impact of the proposed CCR/ELG Project upon EKPC's rates.
- 23   **Q.    Are you sponsoring any exhibits?**

1 A. Yes. I am sponsoring Exhibit TS-1, which is the worksheet showing EKPC's  
2 average cost of debt. This exhibit was prepared by me or under my direct  
3 supervision and I ask that it be incorporated into my testimony by reference.

4 **Q. Please generally describe EKPC's financial performance during the most**  
5 **recent year.**

6 A. EKPC has enjoyed several years of excellent performance which benefitted from  
7 weather patterns, cost control, and advantages from its membership in PJM  
8 Interconnection, LLC ("PJM"). For the year ended December 31, 2016, EKPC had  
9 sales to Owner-Member Cooperatives ("owner-members") of 12,866,735 MWh  
10 resulting in total operating revenue of \$887 million. EKPC earned a net margin of  
11 \$54 million and ended the year with \$576 million in Members' Equities. EKPC's  
12 equity-to-assets ratio was 15.5%. EKPC's Debt Service Coverage ("DSC") ratio  
13 was 1.33 and its Times Interest Earned Ratio ("TIER") was 1.48.

14 **Q. What are some of EKPC's long-term strategic objectives with regard to its**  
15 **financial position?**

16 A. EKPC always seeks to balance three goals: financial strength, financial flexibility  
17 and affordability to our system. To assure financial strength, EKPC seeks to  
18 maintain appropriate ratios for DSC and TIER metrics. Likewise, our equity is  
19 managed to assure adequacy for anticipated major investments such as the  
20 CCR/ELG Project while also allowing for the eventual return of excess equity to  
21 owner-members through the payment of capital credits. We maintain our financial  
22 flexibility by paying attention and tracking liquidity measures that are in line with  
23 "A" credit rated generation and transmission cooperatives around the country.



1 Finally, we seek to be affordable to our owner-members by striving to keep their  
2 cost as low as possible while continuing to safely provide reliable service.

3 **Q. What resources does EKPC have available to it to fund large capital projects?**

4 A. EKPC always has the option to pay some of the cost of construction of capital  
5 projects with working capital funds that are available. However, in most cases  
6 where a capital investment is significant, EKPC will use the proceeds of its existing  
7 Credit Facility to finance the construction of a project. The Credit Facility is  
8 essentially a line of credit in the amount of \$600 million that is available to EKPC.  
9 It was approved by the Commission in Case No. 2013-00306 and reauthorized in  
10 Case No. 2016-00116.<sup>1</sup>

11 EKPC does not want to have the entire Credit Facility tied up in construction  
12 debt, however. Accordingly, EKPC will routinely roll short-term indebtedness into  
13 long-term indebtedness in accordance with the terms of its Trust Indenture. The  
14 Trust Indenture was approved by the Commission in Case No. 2012-00249.<sup>2</sup>

15 **Q. How much of the \$600 million authorized under the Credit Facility is currently**  
16 **available to EKPC?**

17 A. As of November 7, 2017, \$275,000,000 is available under our credit facility.

18 **Q. Please explain how the Credit Facility works?**

---

<sup>1</sup> See *In the Matter of East Kentucky Power Cooperative, Inc. Application for Approval of the Issuance of Up to \$200,000,000 of Secured Private Placement Debt, for the Amendment and Extension of an Unsecured Revolving Credit Agreement in an Amount Up to \$500,000,000, and for the Use of Interest-Rate Management Instruments*, Order, Case No. 2013-00306, (Ky. P.S.C. Sep. 27, 2013); *In the Matter of Application of East Kentucky Power Cooperative, Inc. for Approval of the Amendment and Extension or Refinancing of an Unsecured Revolving Credit Agreement in an Amount Up to \$800,000,000 of Which Up to \$100,000,000 May Be in the Form of an Unsecured Renewable Term Loan and \$200,000,000 of Which Will Be in the Form of a Future Increase Option*, Order, Case No. 2016-00116, (Ky. P.S.C. Apr. 11, 2016).

<sup>2</sup> See *In the Matter of Application of East Kentucky Power Cooperative, Inc. for Approval to Obtain a Trust Indenture*, Order, Case No. 2012-00249 (Ky. P.S.C. Aug. 9, 2012).

1 A. The credit facility allows us to borrow, with as little as one day notice, up to the  
2 available amount. Our existing rate under the credit facility is LIBOR + 95 bps,  
3 currently about 2.2%. Loans under the credit facility are fully pre-payable, and this  
4 can be replaced by other debt or paid with operational cash.

5 **Q. Please describe the process for converting short-term debt to long-term debt**  
6 **through the Trust Indenture?**

7 A. Our two main forms of borrowing under the Trust Indenture are the Private  
8 Placement market and the Rural Utilities Service ("RUS") and Federal Financing  
9 Bank. Proceeds from the issuance of long-term debt can be used to pay down the  
10 credit facility, thus replacing the credit facility debt.

11 **Q. Does the Trust Indenture have a limit as to the amount that EKPC can**  
12 **borrow?**

13 A. Yes. EKPC must show sufficient bondable additions or principal repayments for  
14 the Trustee to authorize new debt under the Indenture. The current amount that we  
15 could borrow after certifying available bondable additions is at least \$700 million,  
16 so these requirements will not constrain us from borrowing what is necessary to  
17 fund this project.

18 **Q. What are the advantages of having the Credit Facility and Trust Indenture**  
19 **available to EKPC?**

20 A. The credit facility allows us to borrow to fund short-term needs or to temporarily  
21 finance long-term projects until we can put into place long-term financing. For RUS  
22 borrowing, we generally need to pay for the project this way as we generally cannot  
23 receive RUS funds until the asset is on our books. The advantage of the Trust

1 Indenture is that it allows us to borrow on a secured basis from different lenders  
2 without having to seek permission from other lenders. Prior to the indenture, any  
3 non-RUS debt would require a Lien Accommodation. The Indenture effectively  
4 opened up the Private Placement market to us. The Private Placement market,  
5 while incrementally more expensive than RUS, offers much more flexibility and  
6 will sometimes finance items (such as regulatory assets) for which RUS funding is  
7 not available.

8 **Q. Are you familiar with the CCR/ELG Project?**

9 A. Yes. I have been involved in several meetings and conversations relating to the  
10 financing of the CCR/ELG Project.

11 **Q. How does EKPC intend to finance the construction of the proposed CCR/ELG**  
12 **Project?**

13 A. EKPC will be able to use its working capital and Credit Facility to finance the initial  
14 construction of the CCR/ELG Project. Over the long-term, EKPC may convert that  
15 short-term debt to a long-term debt – primarily placed by RUS through EKPC's  
16 existing Trust Indenture.

17 **Q. Since the CCR/ELG Project will take several years to complete, how will the**  
18 **duration of the CCR/ELG Project effect EKPC's financial planning?**

19 A. According to the estimates prepared by Burns and McDonnell, the total cost of the  
20 CCR/ELG Project will be paid for over the course of the seven years of  
21 development, planning and construction. Burns and McDonnell estimates that  
22 EKPC will spend the following approximate amounts during this time: \$40 million  
23 through the end of 2018; \$96 million in 2019; \$70 million in 2020; \$18 million in

1           2021; \$12 million in 2022; \$20 million in 2023; and \$6 million in 2024. EKPC has  
2           used these numbers in its budgeting and financial planning processes.

3       **Q.     Will the Credit Facility and Trust Indenture be sufficient to accommodate the**  
4           **borrowing needs of EKPC during the development, planning and construction**  
5           **of the CCR/ELG Project?**

6       A.     Yes.

7       **Q.     Will the CCR/ELG Project have any adverse impact upon EKPC's credit**  
8           **ratings?**

9       A.     I would not expect it to have any impact on our ratings.

10      **Q.     Do you have any concern as to whether EKPC will see its financial position**  
11           **deteriorate as a result of the CCR/ELG Project?**

12      A.     No. Of course, one of the most important facets of the financial aspects of the  
13           CCR/ELG Project is that it is eligible for cost recovery under KRS 278.183, the  
14           environmental surcharge statute.

15      **Q.     Why is it important that EKPC must be able to recover the costs of the**  
16           **CCR/ELG Project under the environmental surcharge statute?**

17      A.     The environmental surcharge statute allows EKPC to recover its costs incurred in  
18           complying with local, state and federal mandates relating to the generation of  
19           electricity from coal fired resources on a close to real-time basis.

20      **Q.     Okay. Why is it important that EKPC be allowed to recover its costs on a near**  
21           **real-time basis?**

22      A.     By recovering our costs more quickly, we are able to avoid the regulatory lag often  
23           associated with large capital investments by utilities. Also, we are able to avoid

1 many of the costs associated with a base rate case by having a case focused  
2 exclusively upon satisfying our environmental obligations. I would add that the  
3 environmental surcharge statute helps keep the total costs of a project such as the  
4 CCR/ELG Project lower. If EKPC had to carry the capital costs of the project over  
5 a period of several years, the interest payments and other carrying costs would  
6 increase the total cost of a project. By allowing for recovery on a timely basis,  
7 EKPC's owner-members will pay less over the long-term.

8 **Q. How does EKPC recover its costs under the environmental surcharge statute?**

9 A. Mr. Scott answers that question in detail, so I will let him do that. What I can tell  
10 you is that one of the components of the environmental surcharge is the return that  
11 is allowed on the utility's investment. For investor owned utilities, this return is  
12 based upon their overall capital structure. For cooperatives such as EKPC, the  
13 return is a function of the utilities average cost of debt and an appropriate TIER  
14 ratio.

15 **Q. What is EKPC proposing to use for its average cost of debt and TIER in this**  
16 **case?**

17 A. The settlement agreement approved in Case No. 2004-00321 provided that EKPC's  
18 rate of return would be based on a weighted average cost of debt issuances directly  
19 related to the projects in its environmental compliance plan ("average cost of debt")  
20 multiplied by a TIER factor.<sup>3</sup> The average cost of debt could be updated to reflect  
21 current average debt cost as of the end of each six-month environmental surcharge

---

<sup>3</sup> See *In the Matter of Application of East Kentucky Power Cooperative, Inc. for Approval of an Environmental Compliance Plan and Authority to Implement an Environmental Surcharge*, Order, Case No. 2004-00321, (Ky. P.S.C., Mar. 17, 2005).



1 review period. EKPC is proposing that this approach be continued. If the  
2 Commission grants the requested CPCN for the CCR/ELG Project and approves  
3 EKPC's request to amend its environmental compliance plan to include the  
4 CCR/ELG Project, EKPC would propose that the return authorized for the other  
5 projects in the amended environmental compliance plan be applied to this project  
6 as well. In other words, EKPC is not seeking a separate or distinct return on the  
7 Project.

8 EKPC is proposing an average cost of debt factor equal to 4.05% be used in  
9 this case as this figure is based upon the Company's average cost of debt as of May  
10 31, 2017 and is demonstrated on Exhibit TS-1. This calculation is the same one  
11 that EKPC is using in its pending environmental surcharge review case, Case No.  
12 2017-00326.<sup>4</sup> As for TIER, EKPC proposes to keep the 1.50 TIER that is currently  
13 in place. That TIER was approved for use in environmental surcharges cases in  
14 Case No. 2011-00032.<sup>5</sup> This would result in an overall return of 6.075%. Although  
15 EKPC's preferred metric for measuring financial strength is the DSC ratio, TIER  
16 closely approximates the DSC calculation and is an acceptable method for  
17 calculating the return.

18 **Q. What is the difference between TIER and DSC?**

---

<sup>4</sup> See *In the Matter of An Examination by the Public Service Commission of the Environmental Surcharge Mechanism of East Kentucky Power Cooperative, Inc. for the Two-Year Billing Period Ending June 30, 2017, and the Pass-Through Mechanism for Its Sixteen Member Distribution Cooperatives*, Case No. 2017-00326.

<sup>5</sup> See *In the Matter of An Examination by the Public Service Commission of the Environmental Surcharge Mechanism of East Kentucky Power Cooperative, Inc. for the Six-Month Billing Period Ending December 31, 2010; and the Pass-Through Mechanism for Its Sixteen Member Distribution Cooperatives*, Order, Case No. 2011-00032, (Ky. P.S.C., Aug. 2, 2011).

1 A. TIER measures the amount of income that is available to cover interest expenses;  
2 DSC measures the amount of cash flow that is available to cover debt service  
3 (principal and interest payments). While they are both similar measures, the rating  
4 agencies tend to concentrate on DSC.

5 **Q. Why do you believe that a 1.50 TIER is still appropriate?**

6 A. Achieving a 1.50 TIER results in nearly the same result as achieving our target  
7 DSC. This has been shown in our Environmental Surcharge cases, most recently  
8 in Isaac Scott's testimony in response to the Commission Staff's initial data request  
9 in Case No. 2017-00326.

10 **Q. Do you believe that EKPC's plan to finance the development and construction**  
11 **of the CCR/ELG Project is reasonable and will result in the lowest possible**  
12 **cost to EKPC's owner-members?**

13 A. Yes.

14 **Q. Does this conclude your testimony?**

15 A. Yes.

**COMMONWEALTH OF KENTUCKY**  
**BEFORE THE PUBLIC SERVICE COMMISSION**

**IN THE MATTER OF:**

**THE APPLICATION OF EAST KENTUCKY )  
POWER COOPERATIVE, INC. FOR APPROVAL )  
TO AMEND ITS ENVIRONMENTAL )  
COMPLIANCE PLAN AND RECOVER COSTS )  
PURSUANT TO ITS ENVIRONMENTAL )  
SURCHARGE, SETTLEMENT OF CERTAIN )  
ASSET RETIREMENT OBLIGATIONS AND )  
ISSUANCE OF A CERTIFICATE OF PUBLIC )  
CONVENIENCE AND NECESSITY AND )  
OTHER RELIEF )**

**CASE NO. 2017-00376**

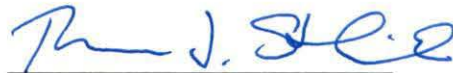
---

**VERIFICATION OF THOMAS STACHNIK**

---

COMMONWEALTH OF KENTUCKY )  
 )  
COUNTY OF CLARK )

Thomas Stachnik, Vice President of Finance and Treasurer at East Kentucky Power Cooperative, Inc., being duly sworn, states that he has read the foregoing prepared direct testimony and that he would respond in the same manner to the questions if so asked upon taking the stand, and that the matters and things set forth therein are true and correct to the best of his knowledge, information and belief.



Thomas Stachnik

The foregoing Verification was signed, acknowledged and sworn to before me this 20<sup>th</sup> day of November, 2017 by Thomas Stachnik.

  
NOTARY PUBLIC

Commission No. 500144

My Commission Expires: 11/30/17



## Weighted Average Cost of Debt

	Loan Source	CWIP	NBV 5/31/2017	Cost	Weights	Rate of Return
	(1)		(2)	(3)	(4)=(2)*(3)	(5) = (4)*
Compliance Project						
1 Gilbert (Environmental Portion)	Z-8		\$47,925,451	4.71%	0.345%	
2 Spurlock 1 - Precipitator	Y-8		\$14,340,653	4.92%	0.108%	
3 Spurlock 1 - SCR	Y-8		\$47,596,042	4.92%	0.358%	
4 Spurlock 2 - SCR	Y-8		\$23,182,738	4.92%	0.174%	
5 Dale 1&2 - Low Nox Burners	AH-8		\$0	0.00%	0.000%	
6 Spurlock 1 Low Nox Burners	AH-8		\$2,318,521	2.51%	0.009%	
7 Spurlock #2 Scrubber	AG-8		\$155,772,341	4.39%	1.044%	
8 Spurlock #1 Scrubber	AG-8		\$114,182,501	4.29%	0.748%	
9 Spurlock #4 (Environmental Portion)	AD-8		\$67,769,772	4.49%	0.465%	
9 Spurlock #4 (Ash Silo Portion)	AH-8		\$9,810,308	2.51%	0.038%	
10 Spurlock, Cooper & Dale CEM Equip	AH-8		\$2,050,473	2.51%	0.008%	
11 Air Quality Control System (CRP)	AL-8		\$163,619,029	2.92%	0.730%	
12 Spurlock Landfill Expansion	AH-8		\$6,046,319	2.51%	0.023%	
14 Cooper 1 Tie in to Cooper Air Quality	AN-8	\$0	\$0	0.00%	0.000%	
15 Smith Special Waste Landfill	AN-8	\$0	\$0	0.00%	0.000%	
		<u>\$0</u>	<u>\$654,614,148</u>		4.050%	6.075%

The debt cost for each debt issuance directly related to the projects in the approved compliance plan are at fixed interest rates.

### NOTES:

Project #13 Spurlock 2 Ductwork Replacement WO OS312 was funded with general funds.

Project #14 Cooper 1 tie in to Cooper 2 Air Quality Control System to be funded with new RUS loan AN8 but currently general funded

Project #15 Smith Special Waste Landfill to be funded with new RUS loan AN8 but currently general funded

<u>Y-8 30 year</u>	<u>Note Number</u>	<u>Current liability 05-31-17</u>	<u>Interest Rate</u>	<u>Yearly Interest</u>
	H0720	17,570,659	4.460%	783,651
	H0725	17,833,029	4.819%	859,374
	H0730	17,784,008	4.950%	880,308
	H0750	18,028,214	5.091%	917,816
	H0755	18,069,424	5.149%	930,395
	H0760	18,009,693	5.065%	912,191
	H0765	17,971,135	5.011%	900,534
	H0770	19,514,978	5.149%	1,004,826
	H0885	4,759,800	4.890%	232,754
	H0960	8,232,259	4.338%	357,115
	H1005	3,196,089	4.306%	137,624
	11	160,969,288	4.92%	7,916,588

<u>Z-8 30 year</u>	<u>Note Number</u>	<u>Current liability 05-31-17</u>	<u>Interest Rate</u>	<u>Yearly Interest</u>
	H0810	40,456,238	4.744%	1,919,244
	H0815	40,565,239	4.825%	1,957,273
	H0820	40,726,464	4.946%	2,014,331
	H0825	20,169,785	4.658%	939,509
	H0830	20,059,279	4.497%	902,066
	H0835	20,201,725	4.705%	950,491
	H0840	19,944,279	4.332%	863,986
	H0845	15,153,381	4.324%	655,232
	H0855	24,047,034	4.468%	1,074,421
	H0860	24,048,698	4.470%	1,074,977
	H0870	24,293,983	4.769%	1,158,580
	H0890	12,453,377	5.345%	665,633
	H0895	8,299,284	5.333%	442,601
	H0915	18,993,514	4.776%	907,130
	H0920	19,216,979	4.812%	924,721
	H1025	2,992,653	3.801%	113,751
	16	351,621,912	4.71%	16,563,946

<u>AD-8 30 year</u>	<u>Note Number</u>	<u>Current liability 05-31-17</u>	<u>Interest Rate</u>	<u>Yearly Interest</u>
---------------------	------------------------	---	--------------------------	----------------------------



H0925	43,346,775	4.821%	2,089,748
H0930	21,630,120	4.736%	1,024,402
H0935	43,191,465	4.669%	2,016,610
H0940	21,446,658	4.384%	940,221
H0945	43,169,805	4.648%	2,006,533
H0955	43,125,301	4.605%	1,985,920
H0965	6,864,969	4.396%	301,784
H0975	17,144,988	4.355%	746,664
H0980	17,150,524	4.368%	749,135
H0985	21,522,023	4.527%	974,302
H0990	21,639,316	4.754%	1,028,733
H0995	21,571,978	4.623%	997,273
H1000	6,762,648	4.298%	290,659
H1010	21,426,973	4.347%	931,431
H1015	21,457,797	4.405%	945,216
H1020	6,087,039	2.846%	173,237
H1030	21,010,214	3.651%	767,083
H1065	12,530,174	4.252%	532,783
H1215	1,599,271	3.954%	63,235
H1275	1,468,379	2.369%	34,786
20	414,146,417	4.49%	18,599,754

<u>AG-8 30 year</u> <u>Spurlock #2 Scrubber</u>	<u>Note</u> <u>Number</u>	<u>Current</u> <u>liability</u> <u>05-31-17</u>	<u>Interest</u> <u>Rate</u>	<u>Yearly</u> <u>Interest</u>
	H1035	30,351,126	3.988%	1,210,403
	H1040	21,861,740	4.374%	956,233
	H1045	21,869,605	4.391%	960,294
	H1050	21,967,411	4.605%	1,011,599
	H1055	35,147,858	4.605%	1,618,559
	H1060	21,965,151	4.600%	1,010,397
Split between Spur 1 & 2	H1070	9,905,079	4.262%	422,154
Split between Spur 1 & 2	H1115	1,429,642	4.175%	59,688
	H1130	5,203,281	3.990%	207,611
Split between Spur 1 & 2	H1170	9,438,881	4.508%	425,505
	H1190	789,754	3.922%	30,974
Split between Spur 1 & 2	H1220	2,891,518	3.954%	114,331
	H1320	381,524	2.432%	9,279
	13	183,202,570	4.39%	8,037,026

<u>AG-8 30 year</u> <u>Spurlock #1 Scrubber</u>	<u>Note</u> <u>Number</u>	<u>Current</u> <u>liability</u> <u>05-31-17</u>	<u>Interest</u> <u>Rate</u>	<u>Yearly</u> <u>Interest</u>
Split between Spur 1 & 2	H1070	11,904,493	4.262%	507,369

Split between Spur 1  
Split between Spur 1  
Split between Spur 1 &2  
Split between Spur 1 &2  
Split between Spur 1 &2  
Split between Spur 1 &2

H1075	21,733,036	4.100%	891,054
H1085	21,903,218	4.464%	977,760
H1100	21,951,113	4.569%	1,002,946
H1095	21,869,143	4.390%	960,055
H1105	6,316,845	4.142%	261,644
H1110	513,707	4.194%	21,545
H1115	15,985,261	4.175%	667,385
H1170	3,238,278	4.508%	145,982
H1220	4,150,595	3.954%	164,115
H1320	2,205,879	2.432%	53,647
11	131,771,568	<b>4.29%</b>	5,653,502

AH-8 30 year

<u>Note Number</u>	<u>Current liability 05-31-17</u>	<u>Interest Rate</u>	<u>Yearly Interest</u>
H1200	372,294	3.913%	14,568
H1280	21,817,923	2.302%	502,249
H1285	21,101,194	2.338%	493,346
H1305	11,472,430	2.510%	287,958
H1310	6,254,738	2.393%	149,676
H1325	3,487,760	3.338%	116,421
H1345	5,540,868	3.513%	194,651
6	70,047,207	<b>2.51%</b>	1,758,868

AL-8 30 year

<u>Note Number</u>	<u>Current liability 05-31-17</u>	<u>Interest Rate</u>	<u>Yearly Interest</u>
H1210	21,769,243	4.067%	885,355
H1245	26,922,236	2.791%	751,400
H1250	27,024,078	2.916%	788,022
H1255	27,081,627	3.094%	837,906
H1265	17,139,761	2.928%	501,852
H1270	26,554,133	2.495%	662,526
H1290	24,563,534	2.724%	669,111
H1315	12,549,012	2.573%	322,886
H1355	20,521,150	2.656%	545,042
9	204,124,774	<b>2.92%</b>	5,964,099

**COMMONWEALTH OF KENTUCKY**  
**BEFORE THE PUBLIC SERVICE COMMISSION**

**IN THE MATTER OF:**

<b>THE APPLICATION OF EAST KENTUCKY</b>	<b>)</b>	
<b>POWER COOPERATIVE, INC. FOR APPROVAL</b>	<b>)</b>	
<b>TO AMEND ITS ENVIRONMENTAL</b>	<b>)</b>	
<b>COMPLIANCE PLAN AND RECOVER COSTS</b>	<b>)</b>	<b>CASE NO. 2017-00376</b>
<b>PURSUANT TO ITS ENVIRONMENTAL</b>	<b>)</b>	
<b>SURCHARGE, SETTLEMENT OF CERTAIN</b>	<b>)</b>	
<b>ASSET RETIREMENT OBLIGATIONS AND</b>	<b>)</b>	
<b>ISSUANCE OF A CERTIFICATE OF PUBLIC</b>	<b>)</b>	
<b>CONVENIENCE AND NECESSITY AND</b>	<b>)</b>	
<b>OTHER RELIEF</b>	<b>)</b>	

**DIRECT TESTIMONY OF ISAAC S. SCOTT**  
**ON BEHALF OF EAST KENTUCKY POWER COOPERATIVE, INC.**

**Filed: November 20, 2017**

1 **Q. Please state your name, business address, and occupation.**

2 A. My name is Isaac S. Scott and my business address is East Kentucky Power Cooperative,  
3 Inc. ("EKPC"), 4775 Lexington Road, Winchester, Kentucky 40391. I am the Manager of  
4 Pricing for EKPC.

5 **Q. Please state your education and professional experience.**

6 A. I received a B.S. degree in Accounting, with distinction, from the University of Kentucky  
7 in 1979. After graduation I was employed by the Kentucky Auditor of Public Accounts,  
8 where I performed audits of numerous state agencies. In December 1985, I transferred to  
9 the Kentucky Public Service Commission ("Commission") as a public utilities financial  
10 analyst, concentrating on the electric and natural gas industries. In August 2001, I became  
11 manager of the Electric and Gas Revenue Requirements Branch in the Division of Financial  
12 Analysis at the Commission. In this position, I supervised the preparation of revenue  
13 requirement determinations for electric and natural gas utilities as well as determined the  
14 revenue requirements for the major electric and natural gas utilities in Kentucky. I retired  
15 from the Commission effective August 1, 2008. In November 2008, I became the Manager  
16 of Pricing at EKPC.

17 **Q. Please provide a brief description of your duties at EKPC.**

18 A. As Manager of Pricing, I am responsible for rate-making activities which include designing  
19 and developing wholesale and retail electric rates and developing pricing concepts and  
20 methodologies. I report directly to the Director of Regulatory and Compliance Services.

21 **Q. What is the purpose of your testimony in this proceeding?**

22 A. The purpose of my testimony is to describe the cost of constructing a series of  
23 improvements to the Hugh L. Spurlock Generation Station ("Spurlock Station") that will  
24 enable Spurlock Unit #1 ("Spurlock 1") and Spurlock Unit #2 ("Spurlock 2") to meet the

existing mandates set forth in the Disposal of Coal Combustion Residuals (“CCR”) from Electric Utilities Rule (“CCR Rule”), the Effluent Limitation Guidelines and Standards for the Steam Electric Power Generating Point Source Category (“ELG Rule”) . I will also discuss how EKPC’s Environmental Compliance Plan will be implemented on a monthly basis and the rate impact at the wholesale and retail levels. Finally, I will describe the proposed revisions to EKPC’s monthly environmental surcharge reporting forms.

**Q. Are you sponsoring any exhibits?**

A. Yes. I am sponsoring the following exhibits, which I ask be incorporated into my testimony by reference:

- Exhibit ISS-1: A schedule showing the current Environmental Compliance Plan and the addition of the CCR/ELG Project.
- Exhibit ISS-2: A sample copy of the monthly environmental surcharge reporting formats which reflect the inclusion of the CCR/ELG Project.
- Exhibit ISS-3: A schedule showing the determination of the Base Environmental Surcharge Factor (“BESF”) reflecting Spurlock Station utility plant retirements and replacements associated with the Project.
- Exhibit ISS-4: A summary of the asset retirement obligation (“ARO”) and regulatory asset settlements relating to the Spurlock Station ash pond’s closure;
- Exhibit ISS-5: An estimate of revenue increases resulting from the inclusion of the CCR/ELG Project and the estimated bill impact on retail customers; and
- Exhibit ISS-6: Revision to Rate ES-Environmental Surcharge tariff.

**Q. Please describe the estimated cost of the CCR/ELG Project.**

A. EKPC estimates the total cost of the Project at \$262.4 million. According to the Burns and McDonnell Scoping Report, this figure includes total direct costs of \$188.9 million, total



indirect costs of \$41.9 million, contingency costs totaling \$23.1 million, and owner's costs of \$8.5 million. It is important to note, however, that this cost estimate does not include financing fees that accrue during construction. A detailed projected cost estimate, which is incorporated herein by reference, is contained in Appendix F of Exhibit SY-2 to the Direct Testimony of Mr. Sam Yoder.

**Q. How does EKPC plan to finance the total cost of the project?**

A. Mr. Stachnik addresses this question more fully in his testimony and so I will defer to him on the details, but, generally speaking, EKPC will use credit available through its short term Credit Facility to finance the construction of the CCR/ELG Project before transitioning that debt to long-term debt issuance, which will most likely be primarily funded by the United States Department of Agriculture's Rural Utilities Service, in accordance with EKPC's Trust Indenture.

**Q. What does EKPC anticipate will be the operations and maintenance costs associated with the CCR/ELG Project once completed?**

A. EKPC anticipates that the incremental operations and maintenance expense associated with the CCR/ELG Project will be \$4.2 million in 2017 dollars. Again, this figure is based upon the estimate included in Burns and McDonnell's Scoping Report.

**Q. Please provide a brief description of EKPC's current environmental compliance plan.**

A. EKPC currently has 15 projects in its Environmental Compliance Plan.<sup>1</sup> Exhibit ISS-1 lists each of the projects, the pollutant or waste/by-product to be controlled, the control facility,

---

<sup>1</sup> In conjunction with the establishment of a regulatory asset for the undepreciated balance of the William C. Dale Generating Station assets that were being retired early, EKPC was required to remove the costs associated with Project 5, Dale Low Nitrogen Oxide Burners, and the Dale portion of Project 10, Continuous Monitoring Equipment, from the environmental surcharge mechanism. However, EKPC has not amended its environmental compliance plan to remove these two projects. See *In the Matter of Application of East Kentucky Power Cooperative, Inc. for an Order Approving the Establishment of a Regulatory Asset for the Undepreciated Balance of the William C. Dale Generating Station*, Order, Case No. 2015-00302, (Ky. P.S.C., Feb. 11, 2016).

1 the generating station, the applicable environmental regulation addressed by the project,  
2 the applicable environmental permit, the completion date of the project, and the project  
3 cost. Projects 1 through 4 were approved by the Commission in Case No. 2004-00321.<sup>2</sup>  
4 Projects 5 through 10 were approved by the Commission in Case No. 2008-00115.<sup>3</sup>  
5 Projects 7 through 9 were amended by and Projects 11 through 13 were approved by the  
6 Commission in Case No. 2010-00083.<sup>4</sup> Project 14 was approved by the Commission in  
7 Case No. 2013-00259.<sup>5</sup> Project 15 was approved by the Commission in Case No. 2014-  
8 00252.<sup>6</sup> The CCR/ELG Project is designated as Project 16 in EKPC's proposed  
9 Environmental Compliance Plan.

10 **Q. Does the CCR/ELG Project meet the requirements of KRS 278.183, and thus qualify**  
11 **for environmental surcharge recovery?**

12 A. Yes. I am not an attorney, of course, and cannot make any statements that would be  
13 construed to be legal conclusions, but based upon the facts as I know them and my own  
14 plain readings of KRS 278.183, the CCR/ELG Project satisfies the statutory requirements

---

<sup>2</sup> See *In the Matter of Application of East Kentucky Power Cooperative, Inc. for Approval of an Environmental Compliance Plan and Authority to Implement an Environmental Surcharge*, Order, Case No. 2004-00321, (Ky. P.S.C., Mar. 17, 2005).

<sup>3</sup> See *In the Matter of Application of East Kentucky Power Cooperative, Inc. for Approval of an Amendment to Its Environmental Compliance Plan and Environmental Surcharge*, Order, Case No. 2008-00115, (Ky. P.S.C., Sep. 29, 2008).

<sup>4</sup> See *In the Matter of Application of East Kentucky Power Cooperative, Inc. for Approval of an Amendment to Its Environmental Compliance Plan and Environmental Surcharge*, Order, Case No. 2010-00083, (Ky. P.S.C., Sep. 24, 2010).

<sup>5</sup> See *In the Matter of Application of East Kentucky Power Cooperative, Inc. for a Certificate of Public Convenience and Necessity for Alteration of Certain Equipment at the Cooper Station and Approval of a Compliance Plan Amendment for Environmental Surcharge Cost Recovery*, Order, Case No. 2013-00259, (Ky. P.S.C., Feb. 20, 2014).

<sup>6</sup> See *In the Matter of Application of East Kentucky Power Cooperative, Inc. for a Certificate of Public Convenience and Necessity for Construction of an Ash Landfill at J.K. Smith Station, the Removal of Impounded Ash from William C. Dale Station for Transport to J.K. Smith and Approval of a Compliance Plan Amendment for Environmental Surcharge Recovery*, Order, Case No. 2014-00252, (Ky. P.S.C., Mar. 6, 2015).

1 and therefore qualifies for environmental surcharge recovery. The environmental  
2 surcharge statute, KRS 278.183, was enacted “to promote the use of high sulfur Kentucky  
3 coal by permitting utilities to surcharge their customers for the cost of a scrubber which is  
4 part of a power plant that cleans high sulfur coal in order to meet the acid rain provisions  
5 of the Federal Clean Air Act amendments of 1990.”<sup>7</sup> Section 1 of the statute contains the  
6 guarantee of cost recovery for such environmental compliance costs:

7 Notwithstanding any other provision of this chapter, effective  
8 January 1, 1993, a utility shall be entitled to the current recovery of  
9 its costs of complying with the Federal Clean Air Act as amended  
10 and those federal, state, or local environmental requirements which  
11 apply to coal combustion wastes and by-products from facilities  
12 utilized for production of energy from coal in accordance with the  
13 utility's compliance plan as designated in subsection (2) of this  
14 section. These costs shall include a reasonable return on  
15 construction and other capital expenditures and reasonable  
16 operating expenses for any plant, equipment, property, facility, or  
17 other action to be used to comply with applicable environmental  
18 requirements set forth in this section. Operating expenses include all  
19 costs of operating and maintaining environmental facilities, income  
20 taxes, property taxes, other applicable taxes, and depreciation  
21 expenses as these expenses relate to compliance with the  
22 environmental requirements set forth in this section.<sup>8</sup>

23 The CCR Rule and the ELG Rule would both qualify as a “federal...environmental  
24 requirement[] which app[ies] to coal combustion wastes and by products from facilities  
25 utilized for production of energy from coal....” Moreover, the Kentucky Division of Water  
26 permitting requirements that Mr. Purvis addresses in his testimony would be a “state or  
27 local... environmental requirement[] which app[ies] to coal combustion wastes and by  
28 products from facilities utilized for production of energy from coal....” Thus, KRS  
29 278.183 is applicable to the CCR/ELG Project.

---

<sup>7</sup> *Kentucky Indus. Utility Customers, Inc. v. Kentucky Utilities Co.*, 983 S.W.2d 493, 496 (Ky. 1998).

<sup>8</sup> KRS 278.183(1).

1           Of course, the statute goes on to describe the process by which a utility may recover  
2           its environmental compliance costs through the environmental surcharge. For instance, a  
3           utility must “submit to the commission a plan, including any application required by KRS  
4           278.020(1), for complying with the applicable environmental requirements set forth in  
5           [KRS 278.183(1)].” Following that:

6                     ...[T]he commission shall conduct a hearing to: (a) Consider and  
7                     approve the plan and rate surcharge if the commission finds the plan  
8                     and rate surcharge reasonable and cost-effective for compliance  
9                     with the applicable environmental requirements set forth in  
10                    subsection (1) of this section; (b) Establish a reasonable return on  
11                    compliance-related capital expenditures; and (c) Approve the  
12                    application of the surcharge.<sup>9</sup>

13           The Kentucky Supreme Court characterized KRS 278.183 as “a new right” that  
14           “did not exist before the enactment of the surcharge.”<sup>10</sup> Thus, the Kentucky General  
15           Assembly has chosen to encourage the use of coal by enacting a surcharge mechanism that  
16           guarantees a utility the ability to recover costs associated with compliance with  
17           environmental mandates. The Commission has itself commented upon the prescriptive  
18           nature of KRS 278.183 by observing that it “must consider the plan and the proposed rate  
19           surcharge, and approve them if [the Commission] finds the plan and rate surcharge to be  
20           reasonable and cost effective.”<sup>11</sup> The environmental surcharge statute, therefore, relates to  
21           and is an important adjunct to the traditional CPCN analysis required by KRS 278.020(1).  
22           Again, from this perspective, the CCR/ELG Rule would clearly appear to qualify for cost  
23           recovery under the environmental surcharge statute as set forth in KRS 278.183.

---

<sup>9</sup> KRS 278.183(2).

<sup>10</sup> *Kentucky Indus. Utility Customers, Inc.*, at 500.

<sup>11</sup> See *In the Matter of the Application of Big Rivers Electric Corporation for Approval of its 2012 Environmental Compliance Plan*, Order, Case No. 2012-00063, p. 16, (Ky. P.S.C., Oct. 1, 2012).

1 **Q. Please discuss the return EKPC would propose for the CCR/ELG Project.**

2 A. As described by Mr. Stachnik in his testimony, EKPC is proposing an overall rate of return  
3 of 6.075%, which is the product of applying a 4.05% average cost of debt to a 1.50 TIER.<sup>12</sup>

4 **Q. Please discuss how the project would be reflected in EKPC's environmental**  
5 **surcharge mechanism.**

6 A. The expenditures anticipated under the CCR/ELG Project fall into two specific categories:  
7 the construction of additional facilities at Spurlock and the closure of the Spurlock ash  
8 pond. For the construction of the additional facilities, EKPC is proposing that it be  
9 permitted to earn a return on the monthly Construction Work In Progress ("CWIP")  
10 balance. This request is consistent with the treatment approved in Case No. 2008-00115.  
11 Upon completion, EKPC is proposing that it be permitted to begin recovery of depreciation,  
12 return, insurance expense, taxes, and operation and maintenance expenses associated with  
13 the CCR/ELG Project.

14 For the expenditures associated with the closure of the Spurlock ash pond, EKPC  
15 is proposing the recovery of those costs be expensed and recovered through the  
16 environmental surcharge as they are incurred. EKPC believes this cost recovery approach  
17 will enable the corresponding regulatory asset to be amortized as the ARO settlement  
18 activities take place, which would result in the ARO and the regulatory asset balances  
19 clearing within the same timeframe. In addition, EKPC believes this approach is consistent  
20 with the Commission's decision in Case No. 2014-00252 concerning the rate-making  
21 treatment of the Dale ash hauling costs. In that case, the Commission found that the Dale

---

<sup>12</sup> See *In the Matter of An Examination by the Public Service Commission of the Environmental Surcharge Mechanism of East Kentucky Power Cooperative, Inc. for the Two-Year Billing Period Ending June 30, 2017, and the Pass-Through Mechanism for Its Sixteen Member Distribution Cooperatives*, Case No. 2017-00326. In its response to Request 5 of the Commission Staff's First Request for Information, EKPC proposed a weighted average cost of debt of 4.05% based on the debt cost for each debt issuance directly related to the projects in the environmental compliance plan as of May 31, 2017.



1 ash hauling costs did not extend the life of the existing Dale Ash Ponds or add value to the  
2 new Smith landfill. In the CCR/ELG Project, while a small portion of the Spurlock ash  
3 pond site will be repurposed, the closure activities are related to the settlement of the ARO  
4 and do not extend the life of the ash pond or add value to the ash pond site. Therefore,  
5 EKPC believes the appropriate rate-making treatment for the ash pond closure expenditures  
6 is to expense and recover those costs through the environmental surcharge as the costs are  
7 incurred.

8 **Q. Will the CCR/ELG Project have any impact upon the ARO that EKPC established**  
9 **for the Spurlock Station's ash pond or the regulatory asset that covers the accretion**  
10 **and depreciation expense associated with the ARO?**

11 A. Yes. The completion of the CCR/ELG Project within the amended Environmental  
12 Compliance Plan will serve settle (eliminate) the ARO associated with the Spurlock ash  
13 pond. The current cost is estimated at \$41.8 million as of April 30, 2017. Under the  
14 accounting rules applicable to EKPC, the precise amount of the ARO will be determined  
15 as EKPC expends dollars towards the ash pond closure. These expenditures will also  
16 reduce the value of the ARO on a dollar for dollar basis until such time as the closure is  
17 complete and the ARO is eliminated entirely, with any gain or loss transferred to the  
18 regulatory asset. Since the regulatory asset for accretion and depreciation expense  
19 approved in Case No. 2014-00432<sup>13</sup> is associated with the ARO, the completion of the  
20 CCR/ELG Project will also afford EKPC the opportunity to amortize and recover the cost  
21 of the regulatory asset and eventually eliminate it from its balance sheet. EKPC is

---

<sup>13</sup> See *In the Matter of An Application of East Kentucky Power Cooperative, Inc. for an Order Approving the Establishment of Regulatory Assets for the Depreciation and Accretion Expenses Associated with Asset Retirement Obligations*, Orders, Case No. 2014-00432, (Ky. P.S.C., Mar. 6, 2015 and Jul. 21, 2015).

proposing to allow the revenues from the amended Environmental Compliance Plan to offset the amortization of the regulatory asset associated with the CCR/ELG Project.

**Q. Will any revisions to the monthly environmental surcharge reporting forms be necessary?**

A. Yes. The proposed revisions to the monthly reporting formats are shown in Exhibit ISS-2. EKPC believes that some revisions will be needed to the monthly environmental surcharge reporting formats. EKPC is proposing the following revisions:

- ES Form 2.0 – Under the Determination of Pollution Control Operating Expenses section, EKPC is proposing to add one line item, which will be titled “Monthly Project 16 Related Spurlock Ash Pond Closure – ARO”. This will present the monthly costs incurred to close the Spurlock ash pond closure as reported on the new ES Form 2.12. In addition, EKPC is proposing to delete the line titled “Monthly Project 15 Related Dale Ash Hauling Expenses”. The ash hauling activity should be completed by the end of 2017 and no additional expenses should be incurred.
- ES Form 2.1 – EKPC is proposing to add at the bottom of the format Project 16 – Spurlock CCR/ELG. In addition, EKPC is proposing to remove Project 5 from this format and delete the reference to “Dale” in the description for Project 10. EKPC does not include these Dale-related projects in its monthly surcharge calculations pursuant to the Commission’s February 11, 2016 Order in Case No. 2015-00302. EKPC also proposes to remove the note at the bottom of the format.
- ES Form 2.11 – EKPC proposes to delete the section titled “Project 15 Related Dale Ash Hauling Expenses” from this format as no additional costs should be incurred related to this activity after the end of 2017.

- ES Form 2.12 – EKPC is proposing this new format to report the monthly Spurlock ash pond closure costs to be expensed as incurred.

**Q. Will inclusion of the project in EKPC's approved environmental surcharge compliance plan require any revisions to EKPC's Rate ES-Environmental Surcharge?**

A. Yes. The Rate ES-Environmental Surcharge tariff currently defines monthly pollution control operating expenses as the average of the twelve month operating and maintenance expense; depreciation expense, property taxes, insurance expense, emission allowance expense, and consulting fees. The definition needs to be expanded to include the ash pond closure costs, which EKPC is proposing to expense as incurred. Copies of the revisions to the existing tariff are included in Exhibit ISS-6.

**Q. Will the CCR/ELG Project result in the retirement or abandonment of any existing utility plant assets prior to the expected retirement date of the assets?**

A. Yes. There is no way to comply with the CCR Rule and ELG Rule that does not involve some stranded assets or premature plant retirements. The CCR/ELG Project minimizes the amount of stranded assets, which is one of the reasons that it emerged as the preferred compliance solution. That being said, however, EKPC must retire and remove certain equipment that is not yet fully depreciated and the costs of which are already being recovered in either EKPC's existing base rates or environmental surcharge.

**Q. What is the approximate undepreciated value of these stranded assets?**

A. EKPC anticipates the early retirement or abandonment of existing utility plant assets will occur throughout the year 2020. EKPC estimates that the undepreciated value of these assets by the end of 2020 to be \$3,117,497. EKPC has determined that of this total, \$2,141,127 is related to assets currently recovered through base rates while the balance of \$976,370 is related to assets currently recovered through the environmental surcharge.

1 **Q. How does EKPC plan to account for these stranded assets?**

2 A. Accounting requirements dictate that EKPC remove these stranded assets from utility plant  
3 in service when retirement becomes probable or likely to occur, which could result in  
4 EKPC's recording a loss on its books in the retirement year of 2020. This result would  
5 reduce EKPC's margins and equity, unless EKPC seeks a deferral of the loss from the early  
6 retirement by requesting the Commission to establish a regulatory asset for the  
7 undepreciated balance. While EKPC will be evaluating this situation during the coming  
8 months, it anticipates it will seek a deferral of the loss and the creation of a regulatory asset.  
9 At that time, EKPC will submit an application requesting the establishment of a regulatory  
10 asset for the undepreciated balance in a timely manner.

11 **Q. Will EKPC continue to recover the cost of the stranded assets through its**  
12 **environmental surcharge?**

13 A. Concerning the stranded assets currently being recovered through the environmental  
14 surcharge, EKPC would prefer to continue recovery through the surcharge. In its  
15 application to establish a regulatory asset, EKPC will propose the stranded assets currently  
16 recovered through the environmental surcharge be reclassified as a regulatory asset in the  
17 environmental surcharge mechanism. EKPC would further propose that the regulatory  
18 asset be amortized over a reasonable period of time and the amortization expense be  
19 included in the surcharge calculations. Concerning the stranded assets currently being  
20 recovered through base rates, EKPC would suggest that the recovery of any regulatory  
21 asset established for those stranded assets be addressed in a base rate case proceeding.

22 **Q. Will the CCR/ELG Project result in an amount to be recognized in the BESF**  
23 **component of the surcharge mechanism?**

1 A. As noted previously, the majority of the utility plant assets retired early or abandoned  
2 because of the CCR/ELG Project are currently recovered through EKPC's base rates.  
3 Therefore, the possibility exists that a BESF component would be necessary. EKPC has  
4 reviewed its accounting records and determined the original cost and accumulated  
5 depreciation for these early retired or abandoned utility plant assets. Consequently, there  
6 would be corresponding depreciation expense, property taxes, and property insurance  
7 expense. EKPC was not able to identify any operating or maintenance expense associated  
8 with these utility plant assets, as most of the assets reflect components rather than entire  
9 operational units. The determination of a BESF is complicated by the fact EKPC  
10 anticipates the early retirements or abandonments will likely occur at three different times  
11 during 2020. The expected dates are March 31, September 30, and December 31, 2020.  
12 Exhibit ISS-3 is a calculation of the possible BESF component based on the accounting  
13 information at each of the anticipated retirement dates. EKPC believes that the resulting  
14 BESF of 0.015%, 0.025%, and 0.053% should be recognized in the environmental  
15 surcharge mechanism at the appropriate expense month.

16 **Q. What would be the appropriate expense months to recognize the BESF components**  
17 **EKPC has determined?**

18 A. Assuming the retirements or abandonments occur by the expected dates, EKPC would  
19 propose that the BESF components be included in the surcharge mechanism in the first  
20 expense month after the retirement. Based on the expected retirement or abandonment  
21 dates, the appropriate expense months to include the BESF would be April 2020, October  
22 2020, and January 2021. EKPC would recognize the appropriate BESF component when  
23 it prepared the monthly surcharge report and note the inclusion in the cover letter. If the  
24 retirements or abandonments did not occur by the expected dates, EKPC would note this



fact in the monthly surcharge report cover letter. EKPC would recalculate the BESF component for the appropriate expense month and include the revised BESF calculations with the monthly surcharge report.

**Q. Please describe how the inclusion of the project in EKPC's environmental surcharge will impact the bills of EKPC's wholesale and retail customers.**

A. The CCR/ELG Project is expected to be completed by the end of 2024. Because the new plant will go into service at various times during the construction period, the annual revenue requirement impact will fluctuate year to year. In addition, EKPC is proposing to expense the ash pond closure costs as incurred, which will also cause the annual revenue requirement to fluctuate. EKPC has estimated the annual revenue requirements as of the end of each calendar year from 2018 through 2025. EKPC has included 2025 as this will be the first full year after the completion of all the construction associated with the CCR/ELG Project. The table below shows the estimated annual revenue requirement, the approximate increase in the environmental surcharge for all customer classes at wholesale, the approximate increase passed through to retail customers, and the estimated increase in an average residential customer's monthly bill. The calculation of these estimates is provided on Exhibit ISS-5.

Year Ending	Estimated Annual Revenue Requirement	Percentage Increase Wholesale	Percentage Increase Retail	Estimated Increase in Average Residential Monthly Bill
2018	\$2,412,150	0.29%	0.21%	\$0.17
2019	\$8,601,481	1.03%	0.74%	\$0.59
2020	\$18,780,917	2.26%	1.63%	\$1.29
2021	\$30,894,044	3.71%	2.67%	\$2.12
2022	\$36,165,621	4.35%	3.13%	\$2.48
2023	\$38,490,186	4.63%	3.33%	\$2.64
2024	\$30,432,513	3.66%	2.64%	\$2.09
2025	\$24,094,760	2.90%	2.09%	\$1.66

1 **Q. Did EKPC provide advanced notice of its intent to file an Application to amend its**  
2 **Environmental Compliance Plan and environmental surcharge?**

3 A. Yes. Pursuant to KRS 278.183(2), EKPC has given at least thirty (30) days' advanced  
4 notice of its intent to file its Application to Amend its Environmental Compliance Plan and  
5 Environmental Surcharge. On September 15, 2017, EKPC provided such notice to the  
6 Commission, a copy of which is attached as Exhibit E to the Application submitted by  
7 EKPC in this matter. EKPC's also provided notice to its member distribution cooperatives  
8 on or about November 20, 2017, which notice is attached as Exhibit F to the Application  
9 submitted by EKPC in this matter.

10 **Q. Please summarize your testimony.**

11 A. Based on its understanding of KRS 278.183, EKPC believes the costs of the CCR/ELG  
12 Project are eligible for, and should be recovered through, the environmental surcharge.  
13 EKPC is requesting that during construction it be allowed to earn a return on the  
14 appropriate balance of CWIP and that the rate of return utilized to determine that return be  
15 the rate of return established for its other environmental compliance plan projects. EKPC  
16 is also requesting that it be permitted to recover the ash pond closure costs as incurred and  
17 amortize the corresponding ARO regulatory assets for accretion and depreciation,  
18 accordingly. I have described the impact the CCR/ELG Project would have on retail  
19 residential customers' bills. I recommend that the Commission approve EKPC's request  
20 to amend its Environmental Compliance Plan to include the CCR/ELG Project and include  
21 the CCR/ELG Project for recovery through the surcharge mechanism.

22 **Q. Does this conclude your testimony?**

23 A. Yes.

**COMMONWEALTH OF KENTUCKY**  
**BEFORE THE PUBLIC SERVICE COMMISSION**

**IN THE MATTER OF:**

**THE APPLICATION OF EAST KENTUCKY )  
POWER COOPERATIVE, INC. FOR APPROVAL )  
TO AMEND ITS ENVIRONMENTAL )  
COMPLIANCE PLAN AND RECOVER COSTS )  
PURSUANT TO ITS ENVIRONMENTAL )  
SURCHARGE, SETTLEMENT OF CERTAIN )  
ASSET RETIREMENT OBLIGATIONS AND )  
ISSUANCE OF A CERTIFICATE OF PUBLIC )  
CONVENIENCE AND NECESSITY AND )  
OTHER RELIEF )**

**CASE NO. 2017-00376**

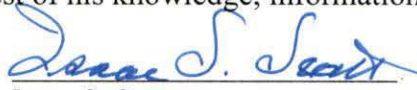
---

**VERIFICATION OF ISAAC S. SCOTT**

---

COMMONWEALTH OF KENTUCKY )  
COUNTY OF CLARK )

Isaac S. Scott, Manager of Pricing at East Kentucky Power Cooperative, Inc., being duly sworn, states that he has read the foregoing prepared direct testimony and that he would respond in the same manner to the questions if so asked upon taking the stand, and that the matters and things set forth therein are true and correct to the best of his knowledge, information and belief.

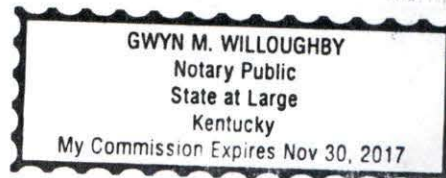
  
Isaac S. Scott

The foregoing Verification was signed, acknowledged and sworn to before me this 20<sup>th</sup> day of November, 2017 by Isaac S. Scott.

  
NOTARY PUBLIC

Commission No. 500144

My Commission Expires: 11/30/17



**EAST KENTUCKY POWER COOPERATIVE, INC  
ENVIRONMENTAL COMPLIANCE PLAN  
PURSUANT TO ENVIRONMENTAL SURCHARGE LAW**

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Project	Pollutant or Waste/By-Product To be Controlled	Control Facility	Generating Station	Environmental Regulation	Environmental Permit	Actual or Scheduled Completion	Actual (A) or Estimated (E) Project Cost
1.	Fly Ash/Particulate NOx & SO2	Boiler SNCR Baghouse Flash Dry Absorber	Gilbert	401 KAR Sec. 45 CAAA Sec.404 40 CFR Part 72 401 KAR 50:035 CAAA Sec.407 40 CFR Part 76	081-0005 V-97-050 (Rev. 1)	2005	\$69.6 M (A)
2.	Particulate	Precipitator	Spurlock 1	401 KAR 61:015	V-95-050 (Rev. 1)	2003	\$24.3 (A)
3.	NOx	SCR	Spurlock 1	CAAA Sec. 407 40 CFR Part 76	V-97-050	2003	\$84.4 M (A)
4.	NOx	SCR	Spurlock 2	CAAA Sec. 407 40 CFR Part 76	V-97-050	2002 Fall 2007 & Spring 2008	\$47.2 (A)
5.	NOx	Low NOx Burner	Dale	CAN:06-cv-00211 40 CFR Part 76.7 Title IV-A, 42 USC 7651-7651o, Sect 502, 401 KAR 51:160	V-04-038	Fall 2007	\$2.0 M (A)
6.	NOx	NOx Reduction Equipment	Spurlock 1	40 CFR Part 76.7 CAN 04-34-KSF	V-06-007	Spring 2009	\$3.09 M (A)
7.	SO2	Scrubber	Spurlock 2	CAN 04-34-KSF CAAA Sec 405	V-97-050 Rev. 1	Oct. 2008	\$194.1 M (A)
		Switchyard Improvements				In Svce	\$8.396 M (A)
		Isolation Valve	Spurlock 2 Scrubber	40 CFR Part 76.7 CAN 04-34-KSF CAAA Sec 405 CAAA Sec 404	V-06-007, Rev 2	Fall 2010	\$787,793 (A)
8.	SO2	Scrubber	Spurlock 1	CAN 04-34-KSF CAAA Sec 404	V-97-050 Rev. 1	Spring 2009	\$145.8 M (A)
		Switchyard Improvements				In Svce	\$1.26 M (A)
		Isolation Valve	Spurlock 1 Scrubber	40 CFR Part 76.7 CAN 04-34-KSF CAAA Sec 405 CAAA Sec 404	V-06-007, Rev 2	Spring 2011	\$677,992 (A)
9.	Fly Ash/Particulate NOx & SO2	Boiler SNCR Baghouse Flash Dry Absorber	Spurlock 4	401 KAR Sec. 45 CAAA Sec.404 40 CFR Part 72 401 KAR 50:035 CAAA Sec.407 40 CFR Part 76	V-06-007	April 2009	\$84.8 M (A)
		Ash Silos	Spurlock 4	401 KAR 63:010	V-06-007	Summer 2010	\$11.7 M (A)

**EAST KENTUCKY POWER COOPERATIVE, INC  
ENVIRONMENTAL COMPLIANCE PLAN  
PURSUANT TO ENVIRONMENTAL SURCHARGE LAW**

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Project	Pollutant or Waste/By-Product To be Controlled	Control Facility	Generating Station	Environmental Regulation	Environmental Permit	Actual or Scheduled Completion	Actual (A) or Estimated (E) Project Cost
10.	PM & Mercury CEMS	Stack Emissions Monitoring	Spurlock Dale Cooper	40 CFR Part 60 App. B, PS 11, & App. F Proced. 2. CD para 97-102. 40 CFR 75	CAN 04-34-KSF	Spring 2010	\$2.9 M (A)
11	NOx and SO2, Particulate Matter	Air Quality Control System	Cooper 2	Consent Decree CAN 04-34-KSF KY BART SIP	V-05-082 R1	Summer 2012	\$222 M (A)
12	Coal Combustion by-products (CCB)	Landfill Area C Expansion and Sediment Pond Construction	Spurlock 1, 2, 4, Gilbert; Spur 1, 2 Scrubbers	Clean Water Act (CWA) Section 404	KPDES No. KY0022250	Fall 2010	\$6.5 M (E)
13	SOx, H2SO4, Mercury	Replacement of Retired Ductwork	Spurlock Unit #2	CFR Title 40, Part 51 CFR Title 40, Part 52 (New Source Review)	V-06-007	Spring 2010	\$2.8 M (A)
14	Nox and SO2, Particulate Matter	Ductwork to Connect to Existing Air Quality Control System	Cooper 1	Mercury Air Toxics Rule, 40 CFR Parts 60 & 63 EPA BART & KY BART SIP; 40 CFR Parts 51 & 52	V-05-082R1	Summer 2016	\$15 M (E)
15	Coal Combustion by-products (CCB)	Ash Special Waste Landfill Construction	Smith	Regulations proposed at 75 Fed. Reg. 35128 (June 21, 2010) that are anticipated to be finalized in 40 CFR Parts 257, 261, 264, 265, 268, 271, and 302; 401 KAR Sec. 45; 401 KAR 5:055; 401 KAR 63:010	USACE Individual 404 Permit # LRL-2012-455-mdh; KY Division of Water (KDOW) KPDES Permit # KY0055972; KDOW 401 Water Quality Certification # 2012-049-7R; KY Division of Waste Permit # 025-00022	Nov. 2017	\$27 M (E)
16	Non-hazardous Waste and Steam Effluent Water Quality Standards	Coal Combustion Residuals (CCR) Rule units and Industrial Water Discharges	Spurlock	40 CFR 257; 40 CFR 261; 40 CFR 423; 401 KAR Sec. 46; KRS Chap. 224	Permit Revision forthcoming for KPDES Permit No. KY0022250; KDWM Waste Permit #SW08100005; #SW08100019	Nov. 2024	\$262.4 M (E)

Please note that the Dale Station has been retired. The Commission's February 11, 2016 Order in Case No. 2015-00302 authorized the creation of regulatory assets for the undepreciated balance of the Dale Station assets. Consequently, costs associated with Project 5 and the Dale portion of Project 10 are no longer included in the environmental surcharge.



**East Kentucky Power Cooperative, Inc.  
Environmental Surcharge Report**

Form 2.0

Revenue Requirements of Environmental Compliance Costs  
For the Expense Month Ending {Date}

**Determination of Environmental Compliance Rate Base**

Eligible Pollution Control Plant (Gross Plant)	\$0
Eligible Pollution CWIP net of AFUDC	\$0
Subtotal	\$0
<i>Additions:</i>	
Inventory - Spare Parts	\$0
Inventory - Limestone	\$0
Inventory - Emission Allowances	\$0
Project 15 Related Capital Expenditures, Net	\$0
Cash Working Capital Allowance	\$0
Subtotal	\$0
<i>Deductions</i>	
Accumulated Depreciation on Eligible Pollution Control Plant	\$0
Subtotal	\$0
Environmental Compliance Rate Base	\$0

**Determination of Pollution Control Operating Expenses**

Monthly O&M Expense	\$0
Monthly Depreciation and Amortization Expense	\$0
Monthly Project 15 Related Amortization Expense	\$0
<del>Monthly Project 15 Related Dale Ash Hauling Expenses</del>	\$0
<i>Monthly Project 16 Related Spurlock Ash Pond Closure - ARO</i>	\$0
Monthly Taxes Other Than Income Taxes	\$0
Monthly Insurance Expense	\$0
Monthly Emission Allowance Expense	\$0
Monthly Surcharge Consultant Fee	\$0
Total Pollution Control Operating Expense	\$0

**Gross Proceeds from By-Product and Emission Allowance Sales**

Total Proceeds from By-Product and Allowance Sales	\$0
--	-----

**One-month True-up Adjustment**

1	Authorized Recovery Amount: Current Month MESF x Avg. Monthly Wholesale Revenue for the 12-months ending with the Current Expense Month (Form 3.0)	\$0
2	Revenues Subject to Surcharge: Form 3.0, Col 6 (Current Month)	\$0
3	Environmental Surcharge Revenues Billed: Previous Month's MESF x Line 2	\$0
4	Previous Month's Authorized Recovery Amount Form 2.0, Line 1 from the Previous Month {Date}	\$0
5	Monthly (Over)/Under = Line 4 minus Line 3 To be included in Form 1.1, Line 13 in the Subsequent Month {Date}	\$0

**East Kentucky Power Cooperative, Inc.**  
**Environmental Surcharge Report**  
**Plant, CWIP, Depreciation, & Taxes and Insurance Expenses**  
**For the Expense Month Ending {Date}**

Form 2.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Project No.	Description	Eligible Gross Plant in Service	Eligible Accumulated Depreciation	CWIP Amount Net of AFUDC	Eligible Net Plant in Service	Monthly Depreciation Expense	Monthly Tax Expense	Monthly Insurance Expense
					(2)-(3)=(5)			
1	Gilbert	\$0	\$0		\$0	\$0	\$0	\$0
2	Spurlock 1 Precipitator	\$0	\$0		\$0	\$0	\$0	\$0
3	Spurlock 1 SCR	\$0	\$0		\$0	\$0	\$0	\$0
4	Spurlock 2 - SCR	\$0	\$0		\$0	\$0	\$0	\$0
5	<del>Dale 1 &amp; 2 - Low NOx Burners</del>	\$0	\$0		\$0	\$0	\$0	\$0
6	Spurlock 1 - Low NOx Burners	\$0	\$0		\$0	\$0	\$0	\$0
7	Spurlock 2 - Scrubber	\$0	\$0		\$0	\$0	\$0	\$0
8	Spurlock 1 - Scrubber	\$0	\$0		\$0	\$0	\$0	\$0
9	Spurlock 4	\$0	\$0		\$0	\$0	\$0	\$0
10	<del>Spurlock, and Cooper &amp; Dale: Continuous Monitoring Eqpt.</del>	\$0	\$0		\$0	\$0	\$0	\$0
11	Cooper 2 - Air Quality Control System	\$0	\$0		\$0	\$0	\$0	\$0
12	Spurlock - Landfill Area C Expansion (Land Cost Only)	\$0			\$0		\$0	\$0
13	Spurlock 2 - Replace Ductwork	\$0	\$0		\$0	\$0	\$0	\$0
14	Cooper 1 - Ductwork	\$0	\$0		\$0	\$0	\$0	\$0
15	Smith Special Waste Landfill	\$0	\$0		\$0	\$0	\$0	\$0
16	Spurlock CCR/ELG	\$0	\$0		\$0	\$0	\$0	\$0
	Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Project 5 and the Dale portion of Project 10 have been removed from this schedule pursuant to the Commission's February 11, 2016 Order in Case No. 2015-00302.

**East Kentucky Power Cooperative, Inc.**  
**Environmental Surcharge Report**  
**Project 15 Related Capital Expenditures and Amortization Expense**  
**For the Expense Month Ending {Date}**

Form 2.11

(1)	(2)	(3)	(4)	(5)
Description	Eligible Gross Capital Expenditure	Eligible Accumulated Amortization	Eligible Net Capital Expenditure	Monthly Amortization Expense
			(2) - (3) = (4)	
Reclamation of Dale Ash Pond Site	\$0	\$0	\$0	\$0
Totals	\$0	\$0	\$0	\$0

Pursuant to the Commission's March 6, 2015 Order in Case No. 2014-00252, the amortization of the reclamation costs will be over a 10-year period. Amortization will not begin until the completion of the reclamation activities.

**Project 15 Related Dale Ash Hauling Expenses**

Monthly Expense to haul ash from Dale to the Smith Special Waste Landfill \$0

Pursuant to the Commission's March 6, 2015 Order in Case No. 2014-00252, the ash transfer costs are to be expensed and recovered as incurred through the environmental surcharge.

*East Kentucky Power Cooperative, Inc.  
Environmental Surcharge Report  
Project 16 - Spurlock Ash Pond Closure - ARO  
For the Expense Month Ending {Date}*

*Form 2.12*

(1)	(2)	(3)	(4)
Description	Prior Cumulative Costs Incurred	Costs Incurred this Expense Month	Current Cumulative Costs Incurred
			(2) + (3) = (4)
Spurlock Ash Pond Closure	\$0	\$0	\$0

**East Kentucky Power Cooperative, Inc.  
Environmental Surcharge Report**

Form 2.0

Revenue Requirements of Environmental Compliance Costs  
For the Expense Month Ending {Date}

**Determination of Environmental Compliance Rate Base**

Eligible Pollution Control Plant (Gross Plant)	\$0
Eligible Pollution CWIP net of AFUDC	\$0
Subtotal	\$0
<i>Additions:</i>	
Inventory - Spare Parts	\$0
Inventory - Limestone	\$0
Inventory - Emission Allowances	\$0
Project 15 Related Capital Expenditures, Net	\$0
Cash Working Capital Allowance	\$0
Subtotal	\$0
<i>Deductions</i>	
Accumulated Depreciation on Eligible Pollution Control Plant	\$0
Subtotal	\$0
Environmental Compliance Rate Base	\$0

**Determination of Pollution Control Operating Expenses**

Monthly O&M Expense	\$0
Monthly Depreciation and Amortization Expense	\$0
Monthly Project 15 Related Amortization Expense	\$0
Monthly Project 16 Related Spurlock Ash Pond Closure - ARO	\$0
Monthly Taxes Other Than Income Taxes	\$0
Monthly Insurance Expense	\$0
Monthly Emission Allowance Expense	\$0
Monthly Surcharge Consultant Fee	\$0
Total Pollution Control Operating Expense	\$0

**Gross Proceeds from By-Product and Emission Allowance Sales**

Total Proceeds from By-Product and Allowance Sales	\$0
--	-----

**One-month True-up Adjustment**

1	Authorized Recovery Amount: Current Month MESF x Avg. Monthly Wholesale Revenue for the 12-months ending with the Current Expense Month (Form 3.0)	\$0
2	Revenues Subject to Surcharge: Form 3.0, Col 6 (Current Month)	\$0
3	Environmental Surcharge Revenues Billed: Previous Month's MESF x Line 2	\$0
4	Previous Month's Authorized Recovery Amount Form 2.0, Line 1 from the Previous Month {Date}	\$0
5	Monthly (Over)/Under = Line 4 minus Line 3 To be included in Form 1.1, Line 13 in the Subsequent Month {Date}	\$0



**East Kentucky Power Cooperative, Inc.**  
**Environmental Surcharge Report**  
**Plant, CWIP, Depreciation, & Taxes and Insurance Expenses**  
**For the Expense Month Ending {Date}**

Form 2.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Project No.	Description	Eligible Gross Plant in Service	Eligible Accumulated Depreciation	CWIP Amount Net of AFUDC	Eligible Net Plant in Service	Monthly Depreciation Expense	Monthly Tax Expense	Monthly Insurance Expense
					(2)-(3)=(5)			
1	Gilbert	\$0	\$0		\$0	\$0	\$0	\$0
2	Spurlock 1 Precipitator	\$0	\$0		\$0	\$0	\$0	\$0
3	Spurlock 1 SCR	\$0	\$0		\$0	\$0	\$0	\$0
4	Spurlock 2 - SCR	\$0	\$0		\$0	\$0	\$0	\$0
6	Spurlock 1 - Low NOx Burners	\$0	\$0		\$0	\$0	\$0	\$0
7	Spurlock 2 - Scrubber	\$0	\$0		\$0	\$0	\$0	\$0
8	Spurlock 1 - Scrubber	\$0	\$0		\$0	\$0	\$0	\$0
9	Spurlock 4	\$0	\$0		\$0	\$0	\$0	\$0
10	Spurlock and Cooper: Continuous Monitoring Eqpt.	\$0	\$0		\$0	\$0	\$0	\$0
11	Cooper 2 - Air Quality Control System	\$0	\$0		\$0	\$0	\$0	\$0
12	Spurlock - Landfill Area C Expansion (Land Cost Only)	\$0			\$0		\$0	\$0
13	Spurlock 2 - Replace Ductwork	\$0	\$0		\$0	\$0	\$0	\$0
14	Cooper 1 - Ductwork	\$0	\$0		\$0	\$0	\$0	\$0
15	Smith Special Waste Landfill	\$0	\$0		\$0	\$0	\$0	\$0
16	Spurlock CCR/ELG	\$0	\$0		\$0	\$0	\$0	\$0
	Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0

East Kentucky Power Cooperative, Inc.  
Environmental Surcharge Report  
Project 15 Related Capital Expenditures and Amortization Expense  
For the Expense Month Ending {Date}

Form 2.11

(1)	(2)	(3)	(4)	(5)
Description	Eligible Gross Capital Expenditure	Eligible Accumulated Amortization	Eligible Net Capital Expenditure  (2) - (3) = (4)	Monthly Amortization Expense
Reclamation of Dale Ash Pond Site	\$0	\$0	\$0	\$0
Totals	\$0	\$0	\$0	\$0

Pursuant to the Commission's March 6, 2015 Order in Case No. 2014-00252, the amortization of the reclamation costs will be over a 10-year period. Amortization will not begin until the completion of the reclamation activities.

East Kentucky Power Cooperative, Inc.  
Environmental Surcharge Report  
Project 16 - Spurlock Ash Pond Closure - ARO  
For the Expense Month Ending {Date}

Form 2.12

(1)	(2)	(3)	(4)
Description	Prior Cumulative Costs Incurred	Costs Incurred this Expense Month	Current Cumulative Costs Incurred
			(2) + (3) = (4)
Spurlock Ash Pond Closure	\$0	\$0	\$0

**Determination of BESF  
Retirements and Replacements Associated with the  
Spurlock CCR/ELG Project**

	@ 03/31/2020	@ 09/30/2020	@ 12/31/2020	
<u>Expenses</u>				
1. Depreciation Expense	\$26,016	\$15,443	\$50,692	
2. Operation & Maintenance	\$0	\$0	\$0	No O&M specifically associated with the plant components to be retired or replaced.
3. Property Tax and Insurance	\$34,766	\$24,496	\$65,400	
4. Total Expenses	\$60,782	\$39,939	\$116,092	
<u>Return on Rate Base</u>				
5. Rate Base				
Original Book Cost	\$2,599,821	\$591,970	\$4,194,346	
Less Accumulated Depreciation	\$1,777,924	\$12,869	\$2,648,237	
Subtotal	\$821,897	\$579,101	\$1,546,109	
Plus Cash Working Capital	\$0	\$0	\$0	1/8 of O&M, line 2
Total Rate Base	\$821,897	\$579,101	\$1,546,109	
7. Apply rate of return to Rate Base	6.786%	6.786%	6.786%	Authorized in Case No. 2011-00032.
8. Return on Rate Base	\$55,774	\$39,298	\$104,919	
9. Total Revenue Requirement:				
Total Expenses	\$60,782	\$39,939	\$116,092	
Return on Rate Base	\$55,774	\$39,298	\$104,919	
Total Revenue Requirement	\$116,556	\$79,237	\$221,011	
<u>Determination of Member System Allocation Percentage</u>				
Revenues from December 2011 Environmental Surcharge filing; last month of forecasted test year of last rate case.				
10. Member System Revenues	\$754,300,857	\$754,300,857	\$754,300,857	96.50%
Off System Sales Revenues	\$27,324,301	\$27,324,301	\$27,324,301	3.50%
Total Revenues	\$781,625,158	\$781,625,158	\$781,625,158	100.00%
11. Total Revenue Requirement	\$116,556	\$79,237	\$221,011	
Member System Allocation Percentage	96.50%	96.50%	96.50%	
Jurisdictional Revenue Requirement	\$112,481	\$76,467	\$213,285	
<u>Calculation of BESF Related to Spurlock CCR/ELG</u>				
12. Jurisdictional Revenue Requirement	\$112,481	\$76,467	\$213,285	
13. Member System Revenues	\$754,300,857	\$754,300,857	\$754,300,857	December 2011 Filing, Form 3.0; excludes Environmental Surcharge Revenues
BESF [Line 12 divided by Line 13]	0.015%	0.010%	0.028%	
Cumulative BESF		0.025%	0.053%	

Supporting Calculations for Exhibit ISS-3

Unit/Work Description	Asset ID	Description	Recovered through Base Rates			Recovered through Environmental Surcharge			Monthly Depreciation Expense		Period	Year	
			Cost	Accum. Deprec.	Net Book Value	Cost	Accum. Deprec.	Net Book Value	Base Rates	Surcharge			
Retirements/Replacements @ March 31, 2020													
1. Unit 3 Dry Scrubber (FDA/NID Mods)	000000124547	Feeder, Recycle Rotary	\$501,408.36	\$189,234.69	\$312,173.67				\$1,030.28		3	2020	
2. Unit 3 Fly Ash Silo Pugmill Repl	000000124801	Mixers,Paddle-Fly Ash Syst.				\$12,500.00	\$4,717.59	\$7,782.42		\$25.69	3	2020	
	000000124813	Motor, Fly Ash Silo-Paddle				\$12,500.00	\$4,717.59	\$7,782.42		\$25.69	3	2020	
5. Bottom Ash Handling-Unit 1	000000011830	Pump, Ash Water Trasfer * B10F	\$16,206.17	\$16,206.17	\$0.00				\$0.00		3	2020	
	000000147347	Screen, Ash Water Pump	\$8,689.86	\$7,377.97	\$1,311.89				\$5.40		3	2020	
	000000147400	Pump, Ash Water Transfer #1 2	\$22,622.71	\$20,200.04	\$2,422.67				\$9.97		3	2020	
	000000147412	Pump, Ash Water #1, I-R#Apkt	\$26,862.60	\$23,985.87	\$2,876.73				\$11.84		3	2020	
	000000147424	Pump, Ash Water #2,IR#APKT	\$30,700.33	\$27,412.64	\$3,287.69				\$13.53		3	2020	
	000000147434	Hopper, Bottom Ash Removal Sys	\$42,609.47	\$38,046.44	\$4,563.03				\$18.78		3	2020	
	000000147454	Pyrite System (Ash Removal Sys	\$65,773.15	\$58,729.49	\$7,043.66				\$28.99		3	2020	
	000000147492	Piping, Ash Removal	\$182,907.44	\$163,319.72	\$19,587.72				\$80.61		3	2020	
	000000147503	Piping, Misc. Ash	\$436,233.48	\$389,516.83	\$46,716.65				\$192.25		3	2020	
	000000147514	Piping System, Ash	\$881,849.04	\$787,410.89	\$94,438.15				\$388.63		3	2020	
	000000011823	Flyash Handling Control System	\$190,345.51	\$101,175.37	\$89,170.14				\$294.29		3	2020	
	6. Fly Ash Handling Transfer Station-Unit 1	000000147388	Exhauster/Separator, Fly Ash	\$18,286.11	\$16,327.84	\$1,958.27				\$8.06		3	2020
000000147240		Decking, Transfer House	\$1,505.82	\$1,505.82	\$0.00				\$0.00		3	2020	
000000147282		Fan, Vent., Transfer House, #4C	\$3,842.60	\$3,842.59	\$0.01				\$0.00		3	2020	
000000147233		Louver, Transfer House	\$1,032.26	\$1,032.26	\$0.00				\$0.00		3	2020	
000000147287		Transfer House	\$4,023.21	\$4,023.21	\$0.00				\$0.00		3	2020	
000000010412		Transfer House Addition	\$64,383.90	\$53,432.35	\$10,951.55				\$41.02		3	2020	
000000147435		Crusher Acc., Ash Removal Sy	\$43,980.31	\$39,270.41	\$4,709.90				\$19.38		3	2020	
000000147446		Conveyor, Fly Ash	\$56,558.33	\$50,501.48	\$6,056.85				\$24.93		3	2020	
Total Retirements/Replacements @ March 31, 2020			\$2,599,820.66	\$1,992,552.08	\$607,268.58	\$25,000.00	\$9,435.17	\$15,564.83	\$2,167.96	\$51.37			
Retirements/Replacements @ September 30, 2020													
3. Unit 4 Dry Scrubber (FDA/NID Mods)	000000142616	Feeder & Mixer, Rec RotaryMtr				\$1,345,127.16	\$384,322.04	\$960,805.12		\$2,784.94	9	2020	
4. Unit 4 Fly Ash Silo Pugmill Repl	000000145769	Mixers	\$591,970.07	\$147,992.50	\$443,977.57				\$1,286.89		9	2020	
Total Retirements/Replacements @ September 30, 2020			\$591,970.07	\$147,992.50	\$443,977.57	\$1,345,127.16	\$384,322.04	\$960,805.12	\$1,286.89	\$2,784.94			
Retirements/Replacements @ December 31, 2020													
7. Fly Ash Silo U1&2 Pugmill Repl	000000012072	Ash Handling Equipment	\$549,474.71	\$459,160.93	\$90,313.78				\$350.05		12	2020	
	000000012073	Fly Ash Handling Equipment	\$1,279,735.67	\$1,069,393.38	\$210,342.29				\$815.28		12	2020	
	000000012074	Foundation, Fly Ash Transf.Bld	\$209,831.53	\$175,342.84	\$34,488.69				\$133.68		12	2020	
	000000012078	Ash Water Syst., Class DI150M	\$89,289.67	\$74,613.66	\$14,676.01				\$56.88		12	2020	
	000000012079	Floatation, Ash Piping	\$194,780.63	\$162,765.73	\$32,014.90				\$124.09		12	2020	
	000000012081	Piping System, Ash Water	\$99,717.73	\$83,327.74	\$16,389.99				\$63.53		12	2020	
	000000012095	Building, Fly Ash Transfe	\$56,656.51	\$47,344.22	\$9,312.29				\$36.09		12	2020	
	000000012100	Silo, Fly Ash	\$51,885.06	\$43,357.01	\$8,528.05				\$33.05		12	2020	
	000000012933	Pump, Vacuum; Nash AT3004E	\$272,115.26	\$227,389.35	\$44,725.91				\$173.36		12	2020	
	000000013266	Transf., Step-dwn S/N L252193B	\$113,821.83	\$95,113.65	\$18,708.18				\$72.51		12	2020	
	8. Bottom Ash Handling-Unit 2	000000012085	Valve, Ash Water Plug,6", 150#	\$4,544.20	\$4,544.20	\$0.00				\$0.00		12	2020
		000000113878	Hopper, Bottom Ash	\$1,272,493.37	\$662,112.74	\$610,380.63				\$2,365.82		12	2020
Total Retirements/Replacements @ December 31, 2020			\$4,194,346.17	\$3,104,465.45	\$1,089,880.72	\$0.00	\$0.00	\$0.00	\$4,224.34	\$0.00			
Totals All Retirements/Replacements in 2020			\$7,386,136.90	\$5,245,010.03	\$2,141,126.87	\$1,370,127.16	\$393,757.21	\$976,369.95	\$7,679.19	\$2,836.31			



**Calculations for BESF - Restating Accumulated Depreciation and Net Book Value to December 31, 2011:**

(Only Retirements/Replacements Currently Recovered through Base Rates)

Unit/Work Description	Asset ID	Descr	Original Cost	Accum. Deprec. at Retirement	Adjust Accum. Deprec. To 12/31/2011			Accum. Deprec. at 12/31/2011	Net Book Value at 12/31/2011
					Mon. Deprec.	Months	Adjustment		
1. Unit 3 Dry Scrubber (FDA/NID Mods)	000000124547	Feeder, Recycle Rotary	\$501,408.36	\$189,234.69	\$1,030.28	99	\$101,997.72	\$87,236.97	\$414,171.39
5. Bottom Ash Handling-Unit 1	00000011830	Pump, Ash Water Trasfer * B10F	\$16,206.17	\$16,206.17	\$0.00	99	\$0.00	\$16,206.17	\$0.00
	000000147347	Screen, Ash Water Pump	\$8,689.86	\$7,377.97	\$5.40	99	\$534.60	\$6,843.37	\$1,846.49
	000000147400	Pump, Ash Water Transfer #1 2	\$22,622.71	\$20,200.04	\$9.97	99	\$987.03	\$19,213.01	\$3,409.70
	000000147412	Pump, Ash Water #1, I-R#Apkt	\$26,862.60	\$23,985.87	\$11.84	99	\$1,172.16	\$22,813.71	\$4,048.89
	000000147424	Pump, Ash Water #2,IR#APKT	\$30,700.33	\$27,412.64	\$13.53	99	\$1,339.47	\$26,073.17	\$4,627.16
	000000147434	Hopper, Bottom Ash Removal Sys	\$42,609.47	\$38,046.44	\$18.78	99	\$1,859.22	\$36,187.22	\$6,422.25
	000000147454	Pyrite System (Ash Removal Sys	\$65,773.15	\$58,729.49	\$28.99	99	\$2,870.01	\$55,859.48	\$9,913.67
	000000147492	Piping, Ash Removal	\$182,907.44	\$163,319.72	\$80.61	99	\$7,980.39	\$155,339.33	\$27,568.11
	000000147503	Piping, Misc. Ash	\$436,233.48	\$389,516.83	\$192.25	99	\$19,032.75	\$370,484.08	\$65,749.40
	000000147514	Piping System, Ash	\$881,849.04	\$787,410.89	\$388.63	99	\$38,474.37	\$748,936.52	\$132,912.52
	000000011823	Flyash Handling Control System	\$190,345.51	\$101,175.37	\$294.29	99	\$29,134.71	\$72,040.66	\$118,304.85
6. Fly Ash Handling Transfer Station-Unit 1	000000147388	Exhauster/Separator, Fly Ash	\$18,286.11	\$16,327.84	\$8.06	99	\$797.94	\$15,529.90	\$2,756.21
	000000147240	Decking, Transfer House	\$1,505.82	\$1,505.82	\$0.00	99	\$0.00	\$1,505.82	\$0.00
	000000147282	Fan, Vent., Transfer House, #4C	\$3,842.60	\$3,842.59	\$0.00	99	\$0.00	\$3,842.59	\$0.01
	000000147233	Louver, Transfer House	\$1,032.26	\$1,032.26	\$0.00	99	\$0.00	\$1,032.26	\$0.00
	000000147287	Transfer House	\$4,023.21	\$4,023.21	\$0.00	99	\$0.00	\$4,023.21	\$0.00
	000000010412	Transfer House Addition	\$64,383.90	\$53,432.35	\$41.02	99	\$4,060.98	\$49,371.37	\$15,012.53
	000000147435	Crusher Acc., Ash Removal Sy	\$43,980.31	\$39,270.41	\$19.38	99	\$1,918.62	\$37,351.79	\$6,628.52
	000000147446	Conveyor, Fly Ash	\$56,558.33	\$50,501.48	\$24.93	99	\$2,468.07	\$48,033.41	\$8,524.92
Total Retirements/Replacements @ March 31, 2020			\$2,599,820.66	\$1,992,552.08	\$2,167.96		\$214,628.04	\$1,777,924.04	\$821,896.62
4. Unit 4 Fly Ash Silo Pugmill Repl	000000145769	Mixers	\$591,970.07	\$147,992.50	\$1,286.89	105	\$135,123.45	\$12,869.05	\$579,101.02
Total Retirements/Replacements @ September 30, 2020			\$591,970.07	\$147,992.50	\$1,286.89		\$135,123.45	\$12,869.05	\$579,101.02
7. Fly Ash Silo U1&2 Pugmill Repl	000000012072	Ash Handling Equipment	\$549,474.71	\$459,160.93	\$350.05	108	\$37,805.40	\$421,355.53	\$128,119.18
	000000012073	Fly Ash Handling Equipment	\$1,279,735.67	\$1,069,393.38	\$815.28	108	\$88,050.24	\$981,343.14	\$298,392.53
	000000012074	Foundation, Fly Ash Transf Bld	\$209,831.53	\$175,342.84	\$133.68	108	\$14,437.44	\$160,905.40	\$48,926.13
	000000012078	Ash Water Syst., Class Di150M	\$89,289.67	\$74,613.66	\$56.88	108	\$6,143.04	\$68,470.62	\$20,819.05
	000000012079	Floatation, Ash Piping	\$194,780.63	\$162,765.73	\$124.09	108	\$13,401.72	\$149,364.01	\$45,416.62
	000000012081	Piping System, Ash Water	\$99,717.73	\$83,327.74	\$63.53	108	\$6,861.24	\$76,466.50	\$23,251.23
	000000012095	Building, Fly Ash Transfe	\$56,656.51	\$47,344.22	\$36.09	108	\$3,897.72	\$43,446.50	\$13,210.01
	000000012100	Silo, Fly Ash	\$51,885.06	\$43,357.01	\$33.05	108	\$3,569.40	\$39,787.61	\$12,097.45
	000000012933	Pump, Vacuum; Nash AT3004E	\$272,115.26	\$227,389.35	\$173.36	108	\$18,722.88	\$208,666.47	\$63,448.79
	000000013266	Transf., Step-dwn S/N L252193B	\$113,821.83	\$95,113.65	\$72.51	108	\$7,831.08	\$87,282.57	\$26,539.26
	000000012085	Valve, Ash Water Plug;6", 150#	\$4,544.20	\$4,544.20	\$0.00	108	\$0.00	\$4,544.20	\$0.00
	000000113878	Hopper, Bottom Ash	\$1,272,493.37	\$662,112.74	\$2,365.82	108	\$255,508.56	\$406,604.18	\$865,889.19
Total Retirements/Replacements @ December 31, 2020			\$4,194,346.17	\$3,104,465.45	\$4,224.34		\$456,228.72	\$2,648,236.73	\$1,546,109.44
Totals for all Retirements/Replacements at 2020 Currently Recovered in Base Rates			\$7,386,136.90	\$5,245,010.03	\$7,679.19		\$805,980.21	\$4,439,029.82	\$2,947,107.08

## Calculations for BESF - Depreciation, Property Insurance, and Property Taxes:

	@ 03/31/2020	@ 09/30/2020	@ 12/31/2020
<u>Annual Depreciation Expense</u>			
Monthly Depreciation Expense	\$2,167.96	\$1,286.89	\$4,224.34
12 Months	12	12	12
Annual Depreciation Expense	<u>\$26,016.00</u>	<u>\$15,443.00</u>	<u>\$50,692.00</u>
<u>Property Insurance Expense</u>			
Net Book Value	\$821,896.62	\$579,101.02	\$1,546,109.44
Rate effective June 1, 2011 (within forecasted test year last case)	0.04080	0.04080	0.04080
Calculated Property Insurance	<u>\$33,533.00</u>	<u>\$23,627.00</u>	<u>\$63,081.00</u>
<u>Property Tax Expense</u>			
Net Book Value	\$821,896.62	\$579,101.02	\$1,546,109.44
Rate	0.0015	0.0015	0.0015
Calculated Property Taxes	<u>\$1,233.00</u>	<u>\$869.00</u>	<u>\$2,319.00</u>

**Asset Retirement Obligation Settlement  
Spurlock Ash Pond Closure**

Year	Costs Incurred to Settle ARO	
	Annual	Cumulative
2019	\$319,505	\$319,505
2020	\$4,550,108	\$4,869,613
2021	\$6,756,699	\$11,626,312
2022	\$10,936,429	\$22,562,741
2023	\$13,430,516	\$35,993,257
2024	\$5,806,744	\$41,800,001

**East Kentucky Power Cooperative, Inc.**  
**Estimated Increase in Revenues and Estimated Bill Impact on Residential Customers**

**Revenue Information as of December 31, 2016 Billings**

Rate Schedule	Total Revenues	Base Rate & FAC Revenues	Environmental Surcharge	Allocation Percentage
Rate E	\$662,871,829	\$567,268,550	\$95,603,279	79.615%
Rate B	\$63,083,178	\$54,126,267	\$8,956,911	7.597%
Rate C	\$21,245,035	\$18,220,440	\$3,024,595	2.557%
Rate G	\$25,270,513	\$21,691,227	\$3,579,286	3.045%
Int. Paper Steam	\$11,112,099	\$9,501,058	\$1,611,041	1.333%
Nucor Gallatin	\$39,580,702	\$33,904,562	\$5,676,140	4.758%
Tenn Gas Pipeline	\$8,552,269	\$7,801,354	\$750,915	1.095%
<b>Totals</b>	<b>\$831,715,625</b>	<b>\$712,513,458</b>	<b>\$119,202,167</b>	<b>100.000%</b>

Note: Allocation Percentage is calculated off of Base Rate and FAC Revenues.

**Rate Impacts**

	2018	2019	2020	2021	2022	2023	2024	2025
<b>Percentage Increase at Wholesale</b>								
Est. Annual Revenue Requirement	\$2,431,603	\$8,670,848	\$19,128,169	\$31,559,994	\$36,874,083	\$39,217,395	\$31,094,740	\$24,705,877
Less: BESF Revenue Requirement	\$0	\$0	\$195,793	\$416,804	\$416,804	\$416,804	\$416,804	\$416,804
Subtotal	\$2,431,603	\$8,670,848	\$18,932,376	\$31,143,190	\$36,457,279	\$38,800,591	\$30,677,936	\$24,289,073
Member System Allocation Ratio	99.20%	99.20%	99.20%	99.20%	99.20%	99.20%	99.20%	99.20%
Net Est. Annual Revenue Requirement	\$2,412,150	\$8,601,481	\$18,780,917	\$30,894,044	\$36,165,621	\$38,490,186	\$30,432,513	\$24,094,760
Total Revenues as of Dec. 31, 2016	\$831,715,625	\$831,715,625	\$831,715,625	\$831,715,625	\$831,715,625	\$831,715,625	\$831,715,625	\$831,715,625
Percentage Increase at Wholesale	0.29%	1.03%	2.26%	3.71%	4.35%	4.63%	3.66%	2.90%
<b>Percentage Increase at Retail</b>								
Percentage Increase at Wholesale	0.29%	1.03%	2.26%	3.71%	4.35%	4.63%	3.66%	2.90%
Historic relationship between Retail and Wholesale	72.00%	72.00%	72.00%	72.00%	72.00%	72.00%	72.00%	72.00%
Percentage Increase at Retail	0.21%	0.74%	1.63%	2.67%	3.13%	3.33%	2.64%	2.09%

Based on historical billing information, the retail Environmental Surcharge has been approximately 72% of the wholesale Environmental Surcharge.

**Impact on Average Residential Bill at Retail**

Net Est. Annual Revenue Requirement	\$2,412,150	\$8,601,481	\$18,780,917	\$30,894,044	\$36,165,621	\$38,490,186	\$30,432,513	\$24,094,760
Allocation Percentage - Rate E	79.615%	79.615%	79.615%	79.615%	79.615%	79.615%	79.615%	79.615%
Allocated Net Est. Annual Revenue Requirement - Rate E	\$1,920,433	\$6,848,069	\$14,952,427	\$24,596,293	\$28,793,259	\$30,643,962	\$24,228,845	\$19,183,043
2016 Billed kWh Sales - Rate E (kWh)	9,610,443,720	9,610,443,720	9,610,443,720	9,610,443,720	9,610,443,720	9,610,443,720	9,610,443,720	9,610,443,720
Wholesale Rate E Revenue Requirement per kWh	\$0.00020	\$0.00071	\$0.00156	\$0.00256	\$0.00300	\$0.00319	\$0.00252	\$0.00200
Average Residential Bill in kWh	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150
Impact on Average Residential Bill at Wholesale	\$0.230	\$0.817	\$1.794	\$2.944	\$3.450	\$3.669	\$2.898	\$2.300
Historic relationship between Retail and Wholesale	72.00%	72.00%	72.00%	72.00%	72.00%	72.00%	72.00%	72.00%
Impact on Aver. Residential Bill at Retail	\$0.17	\$0.59	\$1.29	\$2.12	\$2.48	\$2.64	\$2.09	\$1.66

**Notes:** BESF Revenue Requirement from Exhibit ISS-3.  
Member System Allocation Ratio from the December 31, 2016 monthly surcharge filing.

**Estimated Annual Revenue Requirements**

	2018	2019	2020	2021	2022	2023	2024	2025
<b><i>Return on Environmental Compliance Rate Base</i></b>								
Plant in Service	\$0	\$2,494,000	\$77,434,726	\$212,599,999	\$212,599,999	\$220,599,999	\$220,599,999	\$220,599,999
Construction Work in Progress	\$39,986,355	\$133,462,193	\$124,406,415	\$0	\$1,090,071	\$0	\$0	\$0
Subtotal	\$39,986,355	\$135,956,193	\$201,841,141	\$212,599,999	\$213,690,070	\$220,599,999	\$220,599,999	\$220,599,999
Cash Working Capital Allowance	\$0	\$0	\$93,125	\$530,875	\$530,875	\$530,875	\$530,875	\$530,875
Subtotal	\$39,986,355	\$135,956,193	\$201,934,266	\$213,130,874	\$214,220,945	\$221,130,874	\$221,130,874	\$221,130,874
Less: Accumulated Depreciation and Amortization	\$0	\$66,024	\$1,615,057	\$9,470,317	\$18,638,980	\$27,807,643	\$36,976,306	\$46,144,969
Total Environmental Compliance Rate Base	\$39,986,355	\$135,890,169	\$200,319,209	\$203,660,557	\$195,581,965	\$193,323,231	\$184,154,568	\$174,985,905
Rate of Return on Environmental Compliance Rate Base	6.075%	6.075%	6.075%	6.075%	6.075%	6.075%	6.075%	6.075%
Annual Return on Environmental Compliance Rate Base	\$2,429,171	\$8,255,328	\$12,169,392	\$12,372,379	\$11,881,604	\$11,744,386	\$11,187,390	\$10,630,394
<b><i>Operating Expenses</i></b>								
Depreciation and Amortization Expense	\$0	\$66,024	\$1,549,033	\$7,855,260	\$9,168,663	\$9,168,663	\$9,168,663	\$9,168,663
Operation and Maintenance Expense	\$0	\$0	\$745,000	\$4,247,000	\$4,247,000	\$4,247,000	\$4,247,000	\$4,247,000
Property Taxes	\$2,432	\$29,991	\$111,625	\$234,640	\$388,505	\$386,319	\$445,881	\$432,128
Property Insurance	\$0	\$0	\$3,011	\$94,016	\$251,882	\$240,511	\$239,062	\$227,692
Ash Pond Closure - ARO - Expensed	\$0	\$319,505	\$4,550,108	\$6,756,699	\$10,936,429	\$13,430,516	\$5,806,744	\$0
Total Operating Expenses	\$2,432	\$415,520	\$6,958,777	\$19,187,615	\$24,992,479	\$27,473,009	\$19,907,350	\$14,075,483
Estimated Annual Revenue Requirements	\$2,431,603	\$8,670,848	\$19,128,169	\$31,559,994	\$36,874,083	\$39,217,395	\$31,094,740	\$24,705,877



**Annual Incremental Cost by Project Components**

Project Component	Expected In-Service Date	Completion of Component	Incremental Cost Balance as of December each Year							Total by Component
			2018	2019	2020	2021	2022	2023	2024	
Waste Water Treatment	Apr-21	Dec-21	\$9,949,454	\$51,954,613	\$53,347,091	\$2,254,839	\$0	\$0	\$0	\$117,505,997
Unit 3 NIDS/Ash Mixing	Apr-19	Dec-21	\$897,000	\$300,000	\$0	\$0	\$0	\$0	\$0	\$1,197,000
Unit 4 NIDS/Ash Mixing	Jun-19	Dec-21	\$897,000	\$300,000	\$0	\$0	\$0	\$0	\$0	\$1,197,000
Unit 3 Ash Mixing	May-20	Dec-21	\$347,000	\$100,000	\$30,000	\$0	\$0	\$0	\$0	\$477,000
Unit 4 Ash Mixing	May-20	Dec-21	\$347,000	\$100,000	\$30,000	\$0	\$0	\$0	\$0	\$477,000
Unit 3 NIDS Demolition			\$0	\$50,000	\$0	\$0	\$0	\$0	\$0	\$50,000
Unit 4 NIDS Demolition			\$0	\$50,000	\$0	\$0	\$0	\$0	\$0	\$50,000
Unit 3 Ash Mixing Demolition			\$0	\$0	\$20,000	\$0	\$0	\$0	\$0	\$20,000
Unit 4 Ash Mixing Demolition			\$0	\$0	\$20,000	\$0	\$0	\$0	\$0	\$20,000
Total Waste Water Treatment			\$12,437,454	\$52,854,613	\$53,447,091	\$2,254,839	\$0	\$0	\$0	\$120,993,997
Fly Ash - Spurlock 1	May-20	Dec-21	\$5,826,070	\$9,156,900	\$1,659,757	\$210,273	\$0	\$0	\$0	\$16,853,000
Fly Ash - Spurlock 2	Dec-20	Dec-21	\$5,826,070	\$9,156,900	\$1,659,757	\$210,273	\$0	\$0	\$0	\$16,853,000
Fly Ash Demolition Unit 1			\$0	\$0	\$400,000	\$250,000	\$0	\$0	\$0	\$650,000
Fly Ash Demolition Unit 2			\$0	\$0	\$400,000	\$250,000	\$0	\$0	\$0	\$650,000
Total Fly Ash			\$11,652,140	\$18,313,800	\$4,119,514	\$920,546	\$0	\$0	\$0	\$35,006,000
Pond Chemical Feed	Dec-23	Dec-23	\$0	\$0	\$0	\$0	\$1,090,071	\$6,909,929	\$0	\$8,000,000
Water Mass Balance	Dec-21	Dec-21	\$0	\$800,000	\$2,000,000	\$6,400,000	\$0	\$0	\$0	\$9,200,000
Bottom Ash - Spurlock 1	May-20	Dec-21	\$6,594,219	\$11,076,823	\$2,059,594	\$569,365	\$0	\$0	\$0	\$20,300,001
Bottom Ash - Spurlock 2	Dec-20	Dec-21	\$6,594,219	\$11,076,823	\$2,059,594	\$569,365	\$0	\$0	\$0	\$20,300,001
Bottom Ash Demolition Unit 1			\$0	\$0	\$200,000	\$0	\$0	\$0	\$0	\$200,000
Bottom Ash Demolition Unit 2			\$0	\$0	\$200,000	\$0	\$0	\$0	\$0	\$200,000
Total Bottom Ash			\$13,188,438	\$22,153,646	\$4,519,188	\$1,138,730	\$0	\$0	\$0	\$41,000,002
Balance of Plant	Apr-21	Dec-21	\$2,708,323	\$1,847,779	\$1,799,155	\$44,743	\$0	\$0	\$0	\$6,400,000
Ash Pond Closure - ARO	Dec-24	Dec-24	\$0	\$319,505	\$4,550,108	\$6,756,699	\$10,936,429	\$13,430,516	\$5,806,744	\$41,800,001
Annual Totals			\$39,986,355	\$96,289,343	\$70,435,056	\$17,515,557	\$12,026,500	\$20,340,445	\$5,806,744	\$262,400,000
Cumulative Annual Totals				\$136,275,698	\$206,710,754	\$224,226,311	\$236,252,811	\$256,593,256	\$262,400,000	

Note: The Ash Pond Closure - ARO will be expensed as incurred rather than deferred and amortized after project completion.  
The Demolition Costs associated with Waste Water Treatment, Fly Ash, and Bottom Ash will be capitalized as part of the new construction.

**Environmental Compliance Rate Base**

**A. Construction Work in Progress (CWIP)**

Project Component	Cumulative Balances as of December each Year								
	2018	2019	2020	2021	2022	2023	2024	2025	
Waste Water Treatment	\$9,949,454	\$61,904,067	\$115,251,158	\$0	\$0	\$0	\$0	\$0	balance moved to plant in service April 2021
Unit 3 NIDS/Ash Mixing	\$897,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	balance moved to plant in service April 2019
Unit 4 NIDS/Ash Mixing	\$897,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	balance moved to plant in service June 2019
Unit 3 Ash Mixing	\$347,000	\$447,000	\$0	\$0	\$0	\$0	\$0	\$0	balance moved to plant in service May 2020
Unit 4 Ash Mixing	\$347,000	\$447,000	\$0	\$0	\$0	\$0	\$0	\$0	balance moved to plant in service May 2020
Total Waste Water Treatment	\$12,437,454	\$62,798,067	\$115,251,158	\$0	\$0	\$0	\$0	\$0	
Fly Ash - Spurlock 1	\$5,826,070	\$14,982,970	\$0	\$0	\$0	\$0	\$0	\$0	balance moved to plant in service May 2020
Fly Ash - Spurlock 2	\$5,826,070	\$14,982,970	\$0	\$0	\$0	\$0	\$0	\$0	balance moved to plant in service December 2020
Total Fly Ash	\$11,652,140	\$29,965,940	\$0	\$0	\$0	\$0	\$0	\$0	
Pond Chemical Feed	\$0	\$0	\$0	\$0	\$1,090,071	\$0	\$0	\$0	balance moved to plant in service December 2023
Water Mass Balance	\$0	\$800,000	\$2,800,000	\$0	\$0	\$0	\$0	\$0	balance moved to plant in service December 2021
Bottom Ash - Spurlock 1	\$6,594,219	\$17,671,042	\$0	\$0	\$0	\$0	\$0	\$0	balance moved to plant in service May 2020
Bottom Ash - Spurlock 2	\$6,594,219	\$17,671,042	\$0	\$0	\$0	\$0	\$0	\$0	balance moved to plant in service December 2020
Total Bottom Ash	\$13,188,438	\$35,342,084	\$0	\$0	\$0	\$0	\$0	\$0	
Balance of Plant	\$2,708,323	\$4,556,102	\$6,355,257	\$0	\$0	\$0	\$0	\$0	balance moved to plant in service April 2021
Total Annual CWIP Balances	\$39,986,355	\$133,462,193	\$124,406,415	\$0	\$1,090,071	\$0	\$0	\$0	

**B. Plant in Service**

Project Component	Total Original Cost as of December each Year							
	2018	2019	2020	2021	2022	2023	2024	2025
Waste Water Treatment	\$0	\$0	\$0	\$117,505,997	\$117,505,997	\$117,505,997	\$117,505,997	\$117,505,997
Unit 3 NIDS/Ash Mixing	\$0	\$1,247,000	\$1,247,000	\$1,247,000	\$1,247,000	\$1,247,000	\$1,247,000	\$1,247,000
Unit 4 NIDS/Ash Mixing	\$0	\$1,247,000	\$1,247,000	\$1,247,000	\$1,247,000	\$1,247,000	\$1,247,000	\$1,247,000
Unit 3 Ash Mixing	\$0	\$0	\$497,000	\$497,000	\$497,000	\$497,000	\$497,000	\$497,000
Unit 4 Ash Mixing	\$0	\$0	\$497,000	\$497,000	\$497,000	\$497,000	\$497,000	\$497,000
Total Waste Water Treatment	\$0	\$2,494,000	\$3,488,000	\$120,993,997	\$120,993,997	\$120,993,997	\$120,993,997	\$120,993,997
Fly Ash - Spurlock 1	\$0	\$0	\$17,042,727	\$17,503,000	\$17,503,000	\$17,503,000	\$17,503,000	\$17,503,000
Fly Ash - Spurlock 2	\$0	\$0	\$17,042,727	\$17,503,000	\$17,503,000	\$17,503,000	\$17,503,000	\$17,503,000
Total Fly Ash	\$0	\$0	\$34,085,454	\$35,006,000	\$35,006,000	\$35,006,000	\$35,006,000	\$35,006,000
Pond Chemical Feed	\$0	\$0	\$0	\$0	\$0	\$8,000,000	\$8,000,000	\$8,000,000
Water Mass Balance	\$0	\$0	\$0	\$9,200,000	\$9,200,000	\$9,200,000	\$9,200,000	\$9,200,000
Bottom Ash - Spurlock 1	\$0	\$0	\$19,930,636	\$20,500,001	\$20,500,001	\$20,500,001	\$20,500,001	\$20,500,001
Bottom Ash - Spurlock 2	\$0	\$0	\$19,930,636	\$20,500,001	\$20,500,001	\$20,500,001	\$20,500,001	\$20,500,001
Total Bottom Ash	\$0	\$0	\$39,861,272	\$41,000,002	\$41,000,002	\$41,000,002	\$41,000,002	\$41,000,002
Balance of Plant	\$0	\$0	\$0	\$6,400,000	\$6,400,000	\$6,400,000	\$6,400,000	\$6,400,000
Total Plant in Service Balances	\$0	\$2,494,000	\$77,434,726	\$212,599,999	\$212,599,999	\$220,599,999	\$220,599,999	\$220,599,999

**Environmental Compliance Rate Base****C. Accumulated Depreciation and Amortization**

Project Component	Total Accumulated Depreciation and Amortization as of December each Year							
	2018	2019	2020	2021	2022	2023	2024	2025
Waste Water Treatment	\$0	\$0	\$0	\$3,736,691	\$8,718,945	\$13,701,199	\$18,683,453	\$23,665,707
Unit 3 NIDS/Ash Mixing	\$0	\$39,655	\$92,528	\$145,401	\$198,274	\$251,147	\$304,020	\$356,893
Unit 4 NIDS/Ash Mixing	\$0	\$26,369	\$71,573	\$116,777	\$161,981	\$207,185	\$252,389	\$297,593
Unit 3 Ash Mixing	\$0	\$0	\$14,049	\$35,122	\$56,195	\$77,268	\$98,341	\$119,414
Unit 4 Ash Mixing	\$0	\$0	\$12,011	\$30,027	\$48,043	\$66,059	\$84,075	\$102,091
Total Waste Water Treatment	\$0	\$66,024	\$190,161	\$4,064,018	\$9,183,438	\$14,302,858	\$19,422,278	\$24,541,698
Fly Ash - Spurlock 1	\$0	\$0	\$563,433	\$1,431,407	\$2,299,381	\$3,167,355	\$4,035,329	\$4,903,303
Fly Ash - Spurlock 2	\$0	\$0	\$65,799	\$876,713	\$1,687,627	\$2,498,541	\$3,309,455	\$4,120,369
Total Fly Ash	\$0	\$0	\$629,232	\$2,308,120	\$3,987,008	\$5,665,896	\$7,344,784	\$9,023,672
Pond Chemical Feed	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Water Mass Balance	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bottom Ash - Spurlock 1	\$0	\$0	\$714,978	\$1,818,083	\$2,921,188	\$4,024,293	\$5,127,398	\$6,230,503
Bottom Ash - Spurlock 2	\$0	\$0	\$80,686	\$1,076,576	\$2,072,466	\$3,068,356	\$4,064,246	\$5,060,136
Total Bottom Ash	\$0	\$0	\$795,664	\$2,894,659	\$4,993,654	\$7,092,649	\$9,191,644	\$11,290,639
Balance of Plant	\$0	\$0	\$0	\$203,520	\$474,880	\$746,240	\$1,017,600	\$1,288,960
Total Accum. Deprec. & Amort.	\$0	\$66,024	\$1,615,057	\$9,470,317	\$18,638,980	\$27,807,643	\$36,976,306	\$46,144,969

**D. Cash Working Capital Allowance**

	2018	2019	2020	2021	2022	2023	2024	2025
Total O&M Expenses	\$0	\$0	\$745,000	\$4,247,000	\$4,247,000	\$4,247,000	\$4,247,000	\$4,247,000
Multiply by 1/8	12.50%	12.50%	12.50%	12.50%	12.50%	12.50%	12.50%	12.50%
Cash Working Capital Allowance	\$0	\$0	\$93,125	\$530,875	\$530,875	\$530,875	\$530,875	\$530,875

## Operating Expenses

### A. Depreciation and Amortization Expense

Project Component	2018	2019	2020	2021	2022	2023	2024	2025	Depreciation Rate
Waste Water Treatment	\$0	\$0	\$0	\$3,736,691	\$4,982,254	\$4,982,254	\$4,982,254	\$4,982,254	4.240%
Unit 3 NIDS/Ash Mixing	\$0	\$39,655	\$52,873	\$52,873	\$52,873	\$52,873	\$52,873	\$52,873	4.240%
Unit 4 NIDS/Ash Mixing	\$0	\$26,369	\$45,204	\$45,204	\$45,204	\$45,204	\$45,204	\$45,204	3.625%
Unit 3 Ash Mixing	\$0	\$0	\$14,049	\$21,073	\$21,073	\$21,073	\$21,073	\$21,073	4.240%
Unit 4 Ash Mixing	\$0	\$0	\$12,011	\$18,016	\$18,016	\$18,016	\$18,016	\$18,016	3.625%
Total Waste Water Treatment	\$0	\$66,024	\$124,137	\$3,873,857	\$5,119,420	\$5,119,420	\$5,119,420	\$5,119,420	
Fly Ash - Spurlock 1	\$0	\$0	\$563,433	\$867,974	\$867,974	\$867,974	\$867,974	\$867,974	4.959%
Fly Ash - Spurlock 2	\$0	\$0	\$65,799	\$810,914	\$810,914	\$810,914	\$810,914	\$810,914	4.633%
Total Fly Ash	\$0	\$0	\$629,232	\$1,678,888	\$1,678,888	\$1,678,888	\$1,678,888	\$1,678,888	
Pond Chemical Feed	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Classified as Land - not depreciable
Water Mass Balance	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	Classified as Land - not depreciable
Bottom Ash - Spurlock 1	\$0	\$0	\$714,978	\$1,103,105	\$1,103,105	\$1,103,105	\$1,103,105	\$1,103,105	5.381%
Bottom Ash - Spurlock 2	\$0	\$0	\$80,686	\$995,890	\$995,890	\$995,890	\$995,890	\$995,890	4.858%
Total Bottom Ash	\$0	\$0	\$795,664	\$2,098,995	\$2,098,995	\$2,098,995	\$2,098,995	\$2,098,995	
Balance of Plant	\$0	\$0	\$0	\$203,520	\$271,360	\$271,360	\$271,360	\$271,360	4.240%
Total Depreciation & Amortization	\$0	\$66,024	\$1,549,033	\$7,855,260	\$9,168,663	\$9,168,663	\$9,168,663	\$9,168,663	

### B. Operation & Maintenance Expense

Project Component	2018	2019	2020	2021	2022	2023	2024	2025
Waste Water Treatment	\$0	\$0	\$0	\$3,502,000	\$3,502,000	\$3,502,000	\$3,502,000	\$3,502,000
Fly Ash - Spurlock 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Fly Ash - Spurlock 2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Fly Ash	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pond Chemical Feed	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Water Mass Balance	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Bottom Ash - Spurlock 1	\$0	\$0	\$372,500	\$372,500	\$372,500	\$372,500	\$372,500	\$372,500
Bottom Ash - Spurlock 2	\$0	\$0	\$372,500	\$372,500	\$372,500	\$372,500	\$372,500	\$372,500
Total Bottom Ash	\$0	\$0	\$745,000	\$745,000	\$745,000	\$745,000	\$745,000	\$745,000
Balance of Plant	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Operation & Maintenance	\$0	\$0	\$745,000	\$4,247,000	\$4,247,000	\$4,247,000	\$4,247,000	\$4,247,000

## Operating Expenses

### C. Property Taxes

Project Component	2018	2019	2020	2021	2022	2023	2024	2025	
Waste Water Treatment	\$834	\$7,462	\$46,428	\$86,438	\$170,654	\$163,181	\$155,707	\$148,234	Manufactured Machinery
Unit 3 NIDS/Ash Mixing	\$0	\$673	\$1,811	\$1,732	\$1,652	\$1,573	\$1,494	\$1,414	Manufactured Machinery
Unit 4 NIDS/Ash Mixing	\$0	\$673	\$1,831	\$1,763	\$1,695	\$1,628	\$1,560	\$1,492	Manufactured Machinery
Unit 3 Ash Mixing	\$0	\$260	\$335	\$724	\$693	\$661	\$630	\$598	Manufactured Machinery
Unit 4 Ash Mixing	\$0	\$260	\$335	\$727	\$700	\$673	\$646	\$619	Manufactured Machinery
Total Waste Water Treatment	\$834	\$9,328	\$50,740	\$91,384	\$175,394	\$167,716	\$160,037	\$152,357	
Fly Ash - Spurlock 1	\$268	\$4,370	\$11,237	\$24,719	\$24,107	\$22,805	\$21,503	\$20,202	Manufactured Machinery
Fly Ash - Spurlock 2	\$268	\$4,370	\$11,237	\$25,465	\$24,939	\$23,723	\$22,507	\$21,290	Manufactured Machinery
Total Fly Ash	\$536	\$8,740	\$22,474	\$50,184	\$49,046	\$46,528	\$44,010	\$41,492	
Pond Chemical Feed	\$0	\$0	\$0	\$0	\$0	\$11,566	\$84,880	\$84,880	Real Estate
Water Mass Balance	\$0	\$0	\$8,488	\$29,708	\$97,612	\$97,612	\$97,612	\$97,612	Real Estate
Bottom Ash - Spurlock 1	\$340	\$4,946	\$13,253	\$28,823	\$28,023	\$26,368	\$24,714	\$23,059	Manufactured Machinery
Bottom Ash - Spurlock 2	\$340	\$4,946	\$13,253	\$29,775	\$29,135	\$27,641	\$26,147	\$24,654	Manufactured Machinery
Total Bottom Ash	\$680	\$9,892	\$26,506	\$58,598	\$57,158	\$54,009	\$50,861	\$47,713	
Balance of Plant	\$382	\$2,031	\$3,417	\$4,766	\$9,295	\$8,888	\$8,481	\$8,074	Manufactured Machinery
Total Property Taxes	\$2,432	\$29,991	\$111,625	\$234,640	\$388,505	\$386,319	\$445,881	\$432,128	

Property Taxes on CWIP are figured at one half the previous calendar year end balance times the manufacturing machinery rate.

Property Taxes on Plant in Service are figured on the net book value as of the end of the previous calendar year times the manufacturing machinery rate.

Property Taxes on plant classified as real estate are figured at the previous calendar year end balance times the real estate rate, regardless whether CWIP or Plant in Service.

### D. Property Insurance

Project Component	2018	2019	2020	2021	2022	2023	2024	2025	
Waste Water Treatment	\$0	\$0	\$0	\$0	\$141,074	\$134,896	\$128,718	\$122,540	
Unit 3 NIDS/Ash Mixing	\$0	\$0	\$1,497	\$1,432	\$1,366	\$1,300	\$1,235	\$1,169	
Unit 4 NIDS/Ash Mixing	\$0	\$0	\$1,514	\$1,458	\$1,401	\$1,345	\$1,289	\$1,233	
Unit 3 Ash Mixing	\$0	\$0	\$0	\$599	\$573	\$547	\$520	\$494	
Unit 4 Ash Mixing	\$0	\$0	\$0	\$601	\$579	\$557	\$534	\$512	
Total Waste Water Treatment	\$0	\$0	\$3,011	\$4,090	\$144,993	\$138,645	\$132,296	\$125,948	
Fly Ash - Spurlock 1	\$0	\$0	\$0	\$20,434	\$19,929	\$18,852	\$17,776	\$16,700	
Fly Ash - Spurlock 2	\$0	\$0	\$0	\$21,051	\$20,617	\$19,611	\$18,606	\$17,600	
Total Fly Ash	\$0	\$0	\$0	\$41,485	\$40,546	\$38,463	\$36,382	\$34,300	
Pond Chemical Feed	\$0	\$0	\$0	\$0	\$0	\$0	\$9,920	\$9,920	
Water Mass Balance	\$0	\$0	\$0	\$0	\$11,408	\$11,408	\$11,408	\$11,408	
Bottom Ash - Spurlock 1	\$0	\$0	\$0	\$23,827	\$23,166	\$21,798	\$20,430	\$19,062	
Bottom Ash - Spurlock 2	\$0	\$0	\$0	\$24,614	\$24,085	\$22,850	\$21,615	\$20,380	
Total Bottom Ash	\$0	\$0	\$0	\$48,441	\$47,251	\$44,648	\$42,045	\$39,442	
Balance of Plant	\$0	\$0	\$0	\$0	\$7,684	\$7,347	\$7,011	\$6,674	
Total Property Insurance	\$0	\$0	\$3,011	\$94,016	\$251,882	\$240,511	\$239,062	\$227,692	

Property Insurance Rate -

Total Property Insurance Premium Allocated to Surcharge Projects

\$839,959

Total Net Book Value at December 31, 2016 of Surcharge Projects

\$678,282,888

Property Insurance figured on net book value as of the end of the previous calendar year times the property insurance cost rate.

Property Insurance Cost Rate

0.124%

Applied only when the project has a Net Book Value; not applied to CWIP balances.



**Operating Expenses**

***E. Ash Pond Closure - ARO - Expensed as Incurred***

	2018	2019	2020	2021	2022	2023	2024	2025
Ash Pond Closure - ARO	\$0	\$319,505	\$4,550,108	\$6,756,699	\$10,936,429	\$13,430,516	\$5,806,744	\$0
Cumulative Project Totals	\$0	\$319,505	\$4,869,613	\$11,626,312	\$22,562,741	\$35,993,257	\$41,800,001	\$0

EAST KENTUCKY POWER COOPERATIVE, INC

FOR ALL COUNTIES SERVED

P.S.C. No. 35, Original Sheet No. 21  
Canceling P.S.C. No. 34, Third Revised Sheet No. 25

---

**Rate ES – Environmental Surcharge (continued)**

- c. OE is the Monthly Pollution Control Operating Expenses, defined as the average of the twelve month operating and maintenance expense; depreciation expense, *Spurlock ash pond closure costs*, property taxes, insurance expense, emission allowance expense, and consulting fees.;
  - d. BAS is the net proceeds from By-Products and Emission Allowance Sales, and;
  - e. (Over) or Under recovery amount resulting from the amortization of amounts determined by the Commission during six-month and two-year reviews and the one-month “true-up” adjustment.
- 2. Total E(m) is multiplied by the “Member System Allocation Ratio” to arrive at Net E(m). The “Member System Allocation Ratio” is based on the ratio of the twelve (12)-month total revenue from sales to owner-members to which the Surcharge will be applied, ending with the current expense month, divided by the twelve (12)-month total revenue from sales to owner-members and off-system sales.
  - 3. The revenue R(m) is the average monthly revenue, including base revenues and automatic adjustment clause revenues less Environmental Cost Recovery Surcharge revenues, for EKPC for the twelve (12)-months ending with the current expense month.
  - 4. The current expense month (m) shall be the second month preceding the month in which the Environmental Surcharge is billed.

---

DATE OF ISSUE: October 2, 2017

DATE EFFECTIVE: Service rendered on and after November 2, 2017

ISSUED BY: \_\_\_\_\_  
Anthony S. Campbell,  
President and Chief Executive Officer

EAST KENTUCKY POWER COOPERATIVE, INC

FOR ALL COUNTIES SERVED

P.S.C. No. 35, Original Sheet No. 21  
Canceling P.S.C. No. 34, Third Revised Sheet No. 25

---

**Rate ES – Environmental Surcharge (continued)**

- c. OE is the Monthly Pollution Control Operating Expenses, defined as the average of the twelve month operating and maintenance expense; depreciation expense, Spurlock ash pond closure costs, property taxes, insurance expense, emission allowance expense, and consulting fees.; T
- e. BAS is the net proceeds from By-Products and Emission Allowance Sales, and;
- e. (Over) or Under recovery amount resulting from the amortization of amounts determined by the Commission during six-month and two-year reviews and the one-month "true-up" adjustment.
2. Total E(m) is multiplied by the "Member System Allocation Ratio" to arrive at Net E(m). The "Member System Allocation Ratio" is based on the ratio of the twelve (12)-month total revenue from sales to owner-members to which the Surcharge will be applied, ending with the current expense month, divided by the twelve (12)-month total revenue from sales to owner-members and off-system sales.
3. The revenue R(m) is the average monthly revenue, including base revenues and automatic adjustment clause revenues less Environmental Cost Recovery Surcharge revenues, for EKPC for the twelve (12)-months ending with the current expense month.
4. The current expense month (m) shall be the second month preceding the month in which the Environmental Surcharge is billed.

---

DATE OF ISSUE: October 2, 2017

DATE EFFECTIVE: Service rendered on and after November 2, 2017

ISSUED BY: \_\_\_\_\_  
Anthony S. Campbell,  
President and Chief Executive Officer