COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

KENTUCKY POWER COMPANY	)	
	)	
_____	)	CASE NO. 94-417
	)	
ALLEGED VIOLATION OF COMMISSION REGULATION 807 KAR 5:006, SECTION 24	)	

O R D E R

Kentucky Power Company ("Kentucky Power"), a Kentucky corporation which engages in the distribution of electricity to the public for compensation for lights, heat, power, or other uses, is a utility subject to Commission jurisdiction. KRS 278.010(3)(a).

KRS 278.280(2) directs the Commission to prescribe rules and regulations for the performance of services by utilities. Pursuant to this statutory directive, the Commission promulgated Commission Regulation 807 KAR 5:006, Section 24, which requires a utility to adopt and execute a safety program.

Commission Staff has submitted to the Commission an Electrical Utility Accident Investigation Report dated June 28, 1994, appended hereto, which alleges:

1. On May 15, 1994, Ronnie Oney, Gary Hartman, Michael Rowh, Eric Jackson, and Russell Modesitt, employees of Master Mechanical Insulation, were injured as a result of a sulfur dioxide release at Kentucky Power's Big Sandy Generating Station in Louisa, Kentucky.

2. The sulfur dioxide release occurred as a result of an equipment failure.

3. At the time of the incident, Kentucky Power failed to follow its internal procedures for the unloading of sulfur dioxide. These procedures required that all doorways and windows remain closed during sulfur dioxide unloading. At the time of the incident, one door and several windows were not closed.

4. As a result of Kentucky Power's failure to comply with its internal procedures on May 15, 1994, Kentucky Power is in probable violation of Commission Regulation 807 KAR 5:006, Section 24.

5. The sulfur dioxide system is hazardous to the Big Sandy Generating Plant's operation and personnel. In the event of a significant sulfur dioxide release, the system's design and location prevent the isolation of the release and thus increase the plant personnel's risk of exposure.

Based on its review of the Electrical Utility Accident Investigation Report and being otherwise sufficiently advised, the Commission finds that prima facie evidence exists that Kentucky Power has failed to comply with Commission Regulation 807 KAR 5:006, Section 24, and that the sulfur dioxide system at its Big Sandy Generating Plant constitutes an unsafe practice.

The Commission, on its own motion, HEREBY ORDERS that:

1. Kentucky Power shall appear before the Commission on February 15, 1995, at 10:00 a.m., Eastern Standard Time, in Hearing Room 1 of the Commission's offices at 730 Schenkel Lane, Frankfort, Kentucky, for the purpose of presenting evidence concerning the alleged violation of Commission Regulation 807 KAR 5:006, Section

24, and of showing cause why it should not be subject to the penalties prescribed in KRS 278.990(1) for its alleged violation.

2. At the scheduled hearing, Kentucky Power shall also present evidence on the safety and reliability of the sulfur dioxide system used at its Big Sandy Generating Plant.

3. Kentucky Power shall submit to the Commission, within 20 days of the date of this Order, a written response to the allegations contained in the Electrical Utility Accident Investigation Report.

4. The Electrical Utility Accident Investigation Report of June 28, 1994, a copy of which is appended hereto, is made part of the record of this proceeding.

5. Any motion requesting any informal conference with Commission Staff to consider any matter which would aid in the handling or disposition of this proceeding shall be filed with the Commission no later than 20 days from the date of this Order.

Done at Frankfort, Kentucky, this 22nd day of November, 1994.

PUBLIC SERVICE COMMISSION

Chairman

Vice Chairman

ATTEST:

Executive Director

Commissioner

ATTACHMENT A

ELECTRICAL UTILITY ACCIDENT INVESTIGATION

DATE OF THIS REPORT 6-28-94 SUBMITTED BY Fuad Sharifi and Elie El-Rouaiheb

NAME OF UTILITY Kentucky Power Company

ACCIDENT REPORTED BY Tim Ohlinger

DATE ACCIDENT OCCURRED 5-15-94 at 10:12 A.M.

DATE & TIME UTILITY LEARNED OF ACCIDENT 5-15-94 at 10:12 A.M.

DATE & TIME ACCIDENT REPORTED 5-15-94 at 12:02 P.M.

DATE OF ACCIDENT INVESTIGATION 5-16-94

DATE SUMMARY WRITTEN REPORT WAS RECEIVED FROM UTILITY 5-20-94

PERSONS ASSISTING IN THE INVESTIGATION Timothy L. Ohlinger of Kentucky Power Company.

NAME OF VICTIM(S) 1. Ronnie Oney, Gary Hartman, Michael Rowh, Eric Jackson and Russell Modesitt.

FATAL No NAME OF EMPLOYER Master Mechanical Insulation

INJURIES Respiratory Irritation

LOCATION OF ACCIDENT SITE Kentucky Power Company - Big Sandy Plant P. O. Box 400, Louisa, KY 41230

BACKGROUND

Kentucky Power Company, Big Sandy Plant ("Plant") operates two coal-fired power generation units. Each unit has an electrostatic precipitator to reduce the particulates (ash) emitted to the atmosphere to meet the air pollution regulations. Sulfur trioxide

(SO_3) is injected into the flue gas of each unit as a conditioning agent to increase the efficiency of the precipitators.

Sulfur trioxide is produced in the Plant from sulfur dioxide (SO_2) by oxidizing the latter in two reactors on a vanadium pentaoxide bed. SO_3 is then injected into the flue gas of the boilers.

Sulfur dioxide is purchased from out of state and is transported to the Plant in a liquid form under pressure on 3,500 gallon trucks. The Plant consumes about one truckload every week.

The Plant operates two identical SO_2 systems--one system for each power generation unit. Each SO_2 system consists of a 15,000 gallon high pressure carbon steel storage tank, a stainless steel piping network, and ancillary equipment. Only system No. 1 has truck unloading facilities. SO_2 is transferred from system No. 1 to system No. 2 by a portable compressor. System No. 2 is provided with two pumps to transfer SO_2 to the converter unit at an elevated level. The unloading of liquid SO_2 from the truck to the storage tank of system No. 1 is performed as follows:

The pressure in the tank of the truck and the storage tank in the SO_2 system is about 80-100 psi. A one-inch vapor line from the storage tank will be connected to a compressor located on the truck which draws SO_2 vapor from the storage tank, compresses it, and injects it into the truck tank so that the pressure on the truck tank will be about 20 psi higher than the pressure on the storage tank. Prior to unloading liquid SO_2, a leak test is performed on the 1 1/2" stainless steel unloading liquid lines. A 1 1/2"

reinforced flexible hose is connected from the truck to the unloading SO_2 line. The hose has a valve at each end which is actuated electrically to an on/off position, then the valves are opened to unload the truck. The unloading takes about 4 hours. A 1 1/2" sight flow is located in the unloading line. The sight flow consists of a stainless steel body with a high pressure sight glass which is sealed by a gasket and a screwed fitting made of bronze. The sight glass is used by the operator as an indicator for the flow of the liquid SO_2 from the truckload to the storage tank.

THE ACCIDENT

The accident was due to the failure in the sight-flow. The bronze screwed fitting popped out during the transfer of SO_2 from the truckload to the storage tank, and liquid SO_2 released from the sight flow into the atmosphere and into the building where the injured employees of the contractor were working at that time. At least one door to the building, as well as windows, were left open during the SO_2 unloading.

FINDINGS

1. The sulfur dioxide systems in the Plant are located on both sides of a private road between the two generation units. Any serious accident in any one of the two SO_2 storage tanks could affect the operation of the Plant and could jeopardize the safety of the employees. Staff believes that the SO_2 systems were not part of the original Plant design. Staff is of the opinion that since the air pollution regulations were tightened, the precipitators were too small for the two generators, and the

injection of SO_3 was needed to increase the efficiency of the precipitators which is more economical than replacing the precipitators by larger ones.

2. The sulfur dioxide systems are operated by several departments, loaded by the Laboratory Staff, operated by the Engineering Staff, maintained by the Maintenance Group, and observed by the Safety Group. Staff noticed the equipment was neglected, and corrosion was obvious on the pumps and valve handles.

3. The safety instruments were adequate. The piping network was made of stainless steel with remote controlled shut-off valves, a differential pressure shut-off valve, and a series of quick on/off ball valves along the 1 1/2" unloading line.

4. A compressor for unloading the rail tanks was removed but the piping system was left in place.

5. Adequate safety instructions were given to the operators for the loading and unloading process. Adequate safety products were provided to the operators.

6. The flow sight was made of stainless steel, but was covered by a screw-on bronze cap. Gaskets were replaced upon failure, which occurred about every 6 months. The bronze screwed fitting had worn out and could have been corroded by SO_2 leaks. The Plant will replace the screw-on fitting with a flanged fitting to prevent a similar accident.

PROBABLE VIOLATIONS OF COMMISSION REGULATIONS

There was one probable violation of Commission Regulations involved in this accident. One door was left wide open during SO_2 unloading, resulting in a probable violation of 807 KAR 5:006, Section 24, since Kentucky Power's SO_2 unloading procedures require that doorways, especially roll-up doors, remain closed during SO_2 unloading.

RECOMMENDATION

Staff is of the opinion that the SO_2 system is hazardous to the Plant and its personnel because the systems cannot be isolated in case of a serious accident in the vicinity of the systems.

It is recommended Kentucky Power perform a feasibility study on alternative systems to generate SO_2 from nonhazardous material that could be produced in a confined and well-designed system. A package unit consisting of a sulfur burner to convert sulfur to SO_2 and then convert it to SO_3 could be a safer alternative. About 600 gallons per day of liquid SO_2 is used currently by the Plant which is equivalent to burning about 3,500 lbs/day of sulfur. That is, a sulfur burner capacity of 150 lbs/hr. provides the SO_2 gas needed for the current capacity for the two power generation units.

600 gallons SO_2 x 11.65 lbs./gallon = 6,990 lbs SO_2 per day

or approximately 7,000 lbs SO_2 per day

$S + O_2 \longrightarrow SO_2$

32 lbs. + 32 lbs. ---> 64 lbs.

$S = \frac{32}{64} \times 7{,}000 = 3{,}500$ lbs/day sulfur

$= 150$ lbs/hr.

Further, it is recommended that the Commission require Kentucky Power to show cause why it should not be penalized pursuant to KRS 278.990, due to Kentucky Power's probable violations of Commission Regulation 807 KAR 5:006, Section 24.

ATTACHMENT B

FAX TRANSMITTAL SHEET

KENTUCKY POWER COMPANY
BIG SANDY PLANT
P. O. BOX 400
LOUISA, KY 41230

TO: Martha Morton DATE SENT: 5-20-94

COMPANY: Public Service Commission

LOCATION: Frankfort, Ky

FAX PHONE NUMBER: (502) 564-7279

FROM: Jim Ohlinger, Human Resources Supv.

KPC/BIG SANDY PLANT FAX PHONE NO. 606-686-2415 Ext. 1118

NUMBER OF PAGES TO FOLLOW COVER SHEET: 23

ANY PROBLEMS WITH TRANSMISSION CALL: 606-686-2415 Ext. 1116

ADDITIONAL INSTRUCTIONS: _____

Big Sandy Plant
P. O. Box 400
Louisa, KY 41230-0400
606-686-2415

Commonwealth of Kentucky
Public Service Commission
730 Schenekel Lane
P.O. Box 615
Frankfort, KY 40602

Attn: Ms. Martha Morton

May 20, 1994

Dear Ms. Morton:

Enclosed is the information requested pertaining to the recent SO_2 leak at Big Sandy Plant. Should you have any questions, please feel free to call.

Sincerely,

T. L. Ohlinger/bs

Timothy L. Ohlinger
Human Resources Supervisor

TLO:bs

KY-373
REV. 4/91

KENTUCKY POWER COMPANY
ACCIDENT SUMMARY REPORT

INJURED PERSON:	**NAME** See Attachment A		**AGE**
	ADDRESS		**PHONE NUMBERS:** **HOME:** **BUS:**
	OCCUPATION	**EMPLOYED BY**	
TIME & PLACE	**DATE & TIME OF LOSS OR ACCIDENT** 05/15/94 10:12 AM X PM	**LOCATION** Louisa, KY	**DIVISION** Big Sandy Plant
PERSONAL INJURY	**NATURE & EXTENT OF INJURY** See Attachment A		
	WHERE WAS INJURED TAKEN AFTER ACCIDENT		**NAME OF DOCTOR**
PROPERTY DAMAGE:	**OWNER** Kentucky Power Company - Big Sandy Plant		**PHONE NUMBERS:** **HOME:**
	ADDRESS P.O. Box 400 Louisa, KY 41230		**BUS:** (606) 686-2415
	LIST DAMAGE Rotameter - Site Flow Indicator		**ESTIMATED COST:** $ 700.00
WITNESSES:	**OBTAIN THE NAMES AND ADDRESSES OF DISINTERESTED WITNESSES WHO KNOW ANYTHING ABOUT THE OCCURRENCE INCLUDING DATE, BADGE NO. OR NAME OF POLICE AUTHORITY TO WHOM THE ACCIDENT WAS REPORTED**		
IT IS IMPORTANT TO GIVE FULL NAME & ADDRESS OF EVERY WITNESS	**NAME** John L. Skaggs - Performance Technician Sr. BSP		**PHONE NUMBERS:** **HOME:** (606) 297-1837 **BUS:** (606) 686-2415
	ADDRESS P.O. Box 66 Lomansville, KY 41232		
	NAME Chuck R. Stapleton - Performance Technician BSP		**PHONE NUMBERS:** **HOME:** (606) 329-0086 **BUS:** (606) 686-2415
	ADDRESS 3214 Park Street Ashland, KY 41101		
	NAME		**PHONE NUMBERS:** **HOME:**
	ADDRESS		**BUS:**
DESCRIPTION OF ACCIDENT:	Rotameter (site flow indicator) failed during SO_2 unloading at approximately 10:12 a.m. Sunday, May 15, 1994. The retaining ring which secures the site glass and two gaskets inside the housing failed while the liquid SO_2 was being transferred from a tanker truck to the plant's SO_2 tank. The system was checked for leaks prior.to the unloading and none were detected. The system was not over pressurized. This was the proper application for the rotameter being used. See Accident Investigation report - Attachment B for additional details.		
	IT IS IMPORTANT THAT ANY ARTICLE, PART OR APPLIANCE CAUSING THE OCCURRENCE BE CAREFULLY PRESERVED. ATTACH SKETCH IF APPROPRIATE See Attachment C		
	DATE May 19, 1994	**SIGNATURE** Tim Ohlinger	Tim Ohlinger Human Resources Superviso

Other information provided as requested includes:
Attachment D - SO_2 notification letter of unloading from laboratory supervisor
Attachment E - SO_2 unloading procedures
Attachment F - SO_2 supplier
Attachment G - Job orders compelted on rotameter 1993-94
Attachment H - Operator's daily inspection log

ATTACHMENT A

SO_2 INCIDENT

CONTRACT PERSONNEL

Master Mechanical Insulation
912 5th Street W.
Huntington, West Virginia 25701
(304) 522-6160

Injured

Ronnie Oney Route 1 Box 191C Webbville, Kentucky 41180 (606) 738-6796 Age: 38 Occupation: Laborer	Admitted to Cabell-Huntington Hospital for acute respiratory distress. Fair condition.
Gary Hartman 912 Vallance Street Flatwoods, Kentuckky 41139 (606) 474-6529 Age: 39 Occupation: Laborer	Admitted to Three Rivers Medical Center for observation. Precautionary measure only. Released May 16 at 7:00 p.m.

Evaluated

Timothy Day	Evaluated and released at Three Rivers Medical Center

Federal Industrial Services, Inc.
12980 Inkster Road
Redford, Michigan 48239
(313) 533-9888

Injured

Michael Rowh Route 9 Box 2 Parkersburg, West Virginia 26101 (304) 428-4667 Age: 39 Occupation: Vice President	Admitted to Three Rivers Medical Center for observation. Precautionary measure only. Released May 16 at 3:20 p.m.
Eric Jackson 4106 9th Avenue Parkersburg, West Virginia 26101 (304) 485-5312 Age: 26 Occupation: Laborer	Treated and released at Three Rivers Medical Center for minor respiratory irritation.
Russell Modesitt Route 9 Box 286F Parkersburg, West Virginia 26101 (304) 485-9817 Age: 33 Occupation: Laborer	Treated and released at Three Rivers Medical Center for minor respiratory irritation.

Evaluated

Robert Burch	Evaluated and released at Three Rivers Medical Center.
Daniel Jackson	Evaluated and released at Three Rivers Medical Center.
Cecil McElfresh	Evaluated and released at Three Rivers Medical Center.
Brian McElfresh	Evaluated and released at Three Rivers Medical Center.
Randy Walkins	Evaluated and released at Three Rivers Medical Center.

Three River Medical Center
Hwy. 644
Louisa, KY 41230
(606) 638-1200

Treating Physician - Dr. DiGiulio

Cabell Huntington Hospital
1340 Hal Greer Blvd.
Huntington, WV 25701
(304) 526-2000

Treating Physician - Dr. Ottaviano

PS-92
R12-87HAE

KENTUCKY POWER COMPANY

ACCIDENT INVESTIGATION REPORT

PART I

Kentucky Power Company,
Name Big Sandy Plant SO_2 release 05-15-94 Age ____ Sex ____ S.S. # ____ - ____ - ____

Classification Contract personnel (See attachment 1)

How Long in Classification ____

How Long in Department ____ Date of Employment ____

PART II

Accident Classification and Type (Check All Applicable Boxes)

____ Fatality	____ Electrical Contact	____ First Aid
____ Lost Workday	____ Electrical Flash	____ Near Miss
____ Restricted Activity	____ Medical Case	____ Vehicle Accident

Weather Conditions Mostly cloudy

Date Accident Reported 05-15-94 To Whom Appropriate agencies

Where did Accident Occur? (Be specific; i.e., overhead line, power plant, etc.; if inside plant, give location)
Unit 1 Sulfur Dioxide Unloading Station

Div./Plant/G.O. Dept. Ky. Power Co., Big Sandy Plant Town Louisa State KY

Names of Witnesses to Accident John L. Skaggs, Charles R. Stapleton, Garry Stewart and Gene Haase

Name and Classification of Supervisor in Charge of Work Michael D. Bayes, Performance Engineer

Job Briefing Conducted By: ____ Person in Charge of Work

X Self-Briefing (Previous training provided)

Description of Accident
(If Insufficient Space – Continue on the back or an extra sheet) (If Applicable, Attach Sketch)

ision/Plant/G.O. Dept. Performance - Laboratory Date 05-15-94 Time 10:10 a.m. EDT

ice of Accident Unit 1 Sulfur Dioxide Unloading Station

ssification of Injured _____ Period of Disability _____

tent of Injuries _____

scription of Accident On Sunday, May 15, 1994, a Performance Technician A and a Performance Technician B were overseeing the unloading of sulfur dioxide (SO_2) at the Unit 1 SO_2 unloading station. At 10:10 a.m. EDT, and approximately 1 hour and 20 minutes into the unloading of the first scheduled SO_2 tanker truck, the technicians heard a noise. Instantly a white SO_2 vapor cloud developed in the unloading area. This vapor cloud appeared to be originating from the liquid SO_2 flow indicator and was spraying in an easterly direction toward the tanker trucks. At the time of the release, the wind was blowing in a northeasterly direction.

After hearing the noise and witnessing the SO_2 release, the Performance Technician B donned a full-face SO_2 respirator, rubber gloves, and a chemical resistant jacket and proceeded toward the unloading pad to close the hand-operated shutoff valve located between the flow indicator and the SO_2 storage tank. The Performance Technician A donned a full-face SO_2 respirator and proceeded toward the emergency safety shutoff panel and activated the switch which closes the automatic SO_2 unloading valves. This isolated the upstream side of the SO_2 flow indicator. The Performance Technician A then proceeded to the P.A. located by the passenger elevator on the basement floor of Unit 1 and immediately contacted the Unit 1 Control Room. He informed them of the SO_2 release and instructed them to activate the emergency evacuation alarm to evacuate all appropriate personnel from the plant. Within approximately 30 seconds, the failed SO_2 flow indicator was isolated and the release was stopped.

As a result of the release, three contractor employees were immediately transported to Three Rivers Medical Center due to exposure to SO_2 vapors. Later, other contract personnel sought medical evaluation. (See Attachment 1 for details).

Does the Investigating Committee feel it has a clear picture of just what caused the accident? X Yes _____ No

If yes, why did this accident occur? (If No, please explain) Equipment failure. The bronze retaining ring, which secures the sight glass and two gaskets inside the stainless steel housing, failed during the unloading process.

ATTACHMENT 1

SO_2 INCIDENT

MAY 15, 1994

1. Ronnie Oney, MMI, Cabell-Huntington Hospital, Guarded but stable condition
2. Gary Hartman, MMI, Three Rivers Medical Center, Admitted for observation (Released 5/16)
3. Michael Rowh, FI, Three Rivers Medical Center, Admitted for observation (Released 5/16)
4. Eric Jackson, FI, Three Rivers Medical Center, Treated and released
5. Russell Modesitt, FI, Three Rivers Medical Center, Treated and released
6. Robert Burch, FI, Three Rivers Medical Center, Evaluated and released
7. Timothy Day, MMI, Three Rivers Medical Center, Evaluated and released
8. Daniel Jackson, FI, Three Rivers Medical Center, Evaluated and released
9. Cecil McElfresh, FI, Three Rivers Medical Center, Evaluated and released
10. Brian McElfresh, FI, Three Rivers Medical Center, Evaluated and released
11. Randy Walkins, FI, Three Rivers Medical Center, Evaluated and released

MMI - Master Mechanical Insulation, Huntington, West Virginia

FI - Federal Industries, Parkersburg, West Virginia

EUGENE ERNST PRODUCTS CO. EEP/® BOX 427 FARMINGDALE, NEW JERSEY 07727-0427
PHONE: (Area Code 201) 938-5641

EEP/ SIGHT FLOW INDICATORS

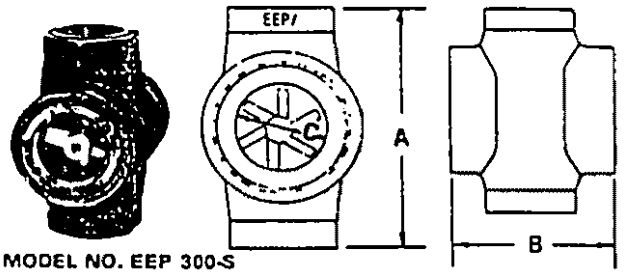
CONSTRUCTION: Iron, Bronze, Carbon Steel, Stainless Steel

Round Glass Retaining Rings are made in Bronze as they do not come in contact with liquid for IRON, CARBON STEEL AND STAINLESS STEEL BODIES

PRESENT

PROPOSED

ROTATING TEFLON* WHEEL



MODEL NO. EEP 300-S

WHEN ORDERING: SPECIFY THE EEP/MODEL NUMBER AND CONSTRUCTION

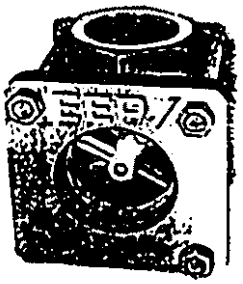
*DuPont's Registered Trademark

SCREWED ENDS

EEP 300-S Sight Flow indicators operate successfully in any position but are particularly adapted to pipe lines carrying dark opaque solutions where the motion of the wheel is easily detected. This model is equally adapted to transparent solutions and gases and is frequently installed where observation must be made from a distance.

PRESSURE RATING — 150 PSIG

FOR INSERTION INTO PIPE



Illustrates 2" size with flange type glass retaining covers

SIZES FOR ABOVE MODELS

Pipe Size	DIMENSIONS A	B	C	Approx. Weight
1/8"	3"	2"	7/8"	1-1/2#
1/4"	3"	2"	7/8"	1-1/2#
3/8"	3"	2"	7/8"	1-1/2#
1/2"	3-3/4"	2-3/4"	1-1/4"	3#
3/4"	3-3/4"	2-3/4"	1-1/4"	3#
1"	4-1/4"	3-1/2"	1-1/2"	4#
1-1/4"	5-1/2"	4-1/2"	2-3/8"	9#
1-1/2"	5-1/2"	4-1/2"	2-3/8"	9#
2"	6-1/4"	5-1/4"	2-7/8"	17#

ADJUSTABLE FACE SPANNER

WRENCHES FOR REMOVING SIGHT FLOW RETAINER RINGS

MODEL NUMBER	482	483	484
Extreme Capacity	2"	3"	4"
PIN SIZE Diameter	3/16"	1/4"	5/16"
Length	7/32"	9/32"	11/32"
Overall Length	6-3/8"	8-1/4"	10-3/8"

A desirable and dependable tool for service where center to center dimensions vary. Pins milled, surfaces smooth, hardened, black enameled.

EUGENE ERNST PRODUCTS CO. EEP/® BOX 427 FARMINGDALE, NEW JERSEY 07727-0427
PHONE: (Area Code 201) 938-5641

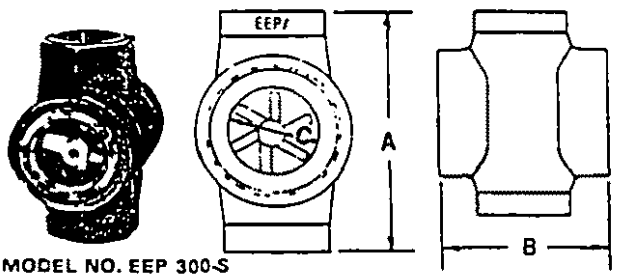
EEP/ SIGHT FLOW INDICATORS

CONSTRUCTION: Iron, Bronze, Carbon Steel, Stainless Steel

Round Glass Retaining Rings are made in Bronze as they do not come in contact with liquid for IRON, CARBON STEEL AND STAINLESS STEEL BODIES

PRESENT **PROPOSED**

ROTATING TEFLON* WHEEL



MODEL NO. EEP 300-S

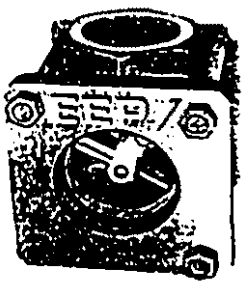
WHEN ORDERING: SPECIFY THE EEP/MODEL NUMBER AND CONSTRUCTION

*DuPont's Registered Trademark

SCREWED ENDS

EEP 300-S Sight Flow indicators operate successfully in any position but are particularly adapted to pipe lines carrying dark opaque solutions where the motion of the wheel is easily detected. This model is equally adapted to transperent solutions and gases and is frequently installed where observation must be made from a distance.

PRESSURE RATING — 150 PSIG
FOR INSERTION INTO PIPE



Illustrates 2" size with flange type glass retaining covers

SIZES FOR ABOVE MODELS

Pipe Size	DIMENSIONS A	B	C	Approx. Weight
1/8"	3"	2"	7/8"	1-1/2#
1/4"	3"	2"	7/8"	1-1/2#
3/8"	3"	2"	7/8"	1-1/2#
1/2"	3-3/4"	2-3/4"	1-1/4"	3#
3/4"	3-3/4"	2-3/4"	1-1/4"	3#
1"	4-1/4"	3-1/2"	1-1/2"	4#
1-1/4"	5-1/2"	4-1/2"	2-3/8"	9#
1-1/2"	5-1/2"	4-1/2"	2-3/8"	9#
2"	6-1/4"	5-1/4"	2-7/8"	17#

ADJUSTABLE FACE SPANNER

WRENCHES FOR REMOVING SIGHT FLOW RETAINER RINGS

MODEL NUMBER	482	483	484
Extreme Capacity	2"	3"	4"
PIN SIZE Diameter	3/16"	1/4"	5/16"
Length	7/32"	9/32"	11/32"
Overall Length	6-3/8"	8-1/4"	10-3/8"

A desirable and dependable tool for service where center to center dimensions vary. Pins milled, surfaces smooth, hardened, black enameled.

ATTACHMENT D

AEP
KENTUCKY POWER

Date 05-10-94

Subject SO_2 Unloading

From M. D. Bayes

To Department Heads

SO_2 is scheduled to be unloaded at 0600 & 1600 hours on Sun May 15 1994.

If there are any conflicts with this schedule, please contact me. All department heads will be notified in the event a change in this schedule is necessary.

M. D. Bayes

M. D. Bayes
Plant Engineer

/bc

cc: M. H. Thomas/W. D. England
N. J. Wilson/D. L. Mell
K. L. Borders
D. M. Duellman
T. L. Ohlinger
W. E. Maynard
B. Q. Bussey
M. Jackson

KENTUCKY POWER COMPANY
BIG SANDY PLANT
SO_2 UNLOADING PROCEDURE

Procedures for employees with respect to work practices during the unloading of SO_2:

1. Laboratory personnel shall notify all appropriate personnel of the date, time and unit location of SO_2 unloading.
2. Human Resources shall notify plant security of the date and time of scheduled SO_2 unloading so notices may be posted at the guardhouse advising plant personnel.
3. Work shall be prohibited in confined spaces unless immediate egress is possible. This applies to outage and non-outage.
4. Work should normally be restricted in the Unit 1 condenser pits, the Unit 1 and Unit 2 ash hopper pits, the plant stack and the Unit 2 F.D. fan areas while they are in operation.
5. Should work be required in restricted areas, the necessary precautions shall be taken.

SO_2 UNLOADING PROCEDURES

SAFETY EQUIPMENT

The following safety equipment is to be used for unloading SO_2:

1) Two self-contained breathing apparatuses.

2) Chemically resistant rain-suit (one per operator).

3) Full-face respirator with appropriate SO_2 cartridges (one per operator).

4) Rubber gloves (one pair per operator).

5) Hard hat (one per operator).

6) Approved safety glasses (one pair per operator).

7) Face shield (one per operator) - optional.

8) If boots are worn due to inclement weather, it is desirable that trouser legs fit "over" the tops of the boots in order to shed spills of liquid SO_2.

TOOLS

1) Two pipe wrenches.

2) One tank car valve wrench.

3) One adjustable crescent wrench.

4) One channel lock wrench.

PLUMBING/FITTINGS

1) Flexible stainless steel hoses with associated couplings and safety valves.

CHEMICALS

1) Ammonia solution, preferably in plastic wash bottle with spray tube, for leak detection.

2) Caustic soda, lime, or soda ash solution for venting, as necessary.

PRE-HOOKUP PROCEDURE

1) Close gates around SO_2 truck to prevent vehicle traffic from entering unloading area.

2) Insure proper operation of eye-wash and safety shower located just inside the southeast door of Unit 1 building.

3) Barricade the southeast door exit (on the inside) to prevent pedistrian traffic from entering unloading area. Do not block access to the safety shower and eye-wash when barricading the exit.

4) Insure that doorways, especially roll-up doors, remain closed during SO_2 unloading.

HOOK-UP PROCEDURE

1) Unloading operations will be performed by two persons properly instructed and made responsible for compliance with all safety regulations.

2) Inspect and perform check-out procedure on the self-contained breathing apparatuses (SCBA). SCBA's should be readily available (with boxes open) for quick access in case of an emergency. Air tanks should have a minimum of 2000 psi.

3) Remove unloading equipment from the SO_2 control building.

4) Put on chemically resistant rainsuits, gloves, and full-face respirator.

5) Insure that liquid and vapor hand-operated shutoff valves (HOSV's) in transfer lines (at tank pad) are closed, then remove end-caps from stationary transfer piping.

6) Connect liquid and vapor safety valve air lines to the permanent air supply on tank pad and to safety valves on flexible hoses. Open air supply valves.

6) Connect flexible liquid and vapor unloading hoses to stationary transfer piping and to truck. If O-ring seated couplings are used, make sure O-rings are in place before connecting.

8) Place liquid and vapor safety valve electrical plugs in respective outlet behind the pad junction box, and into the electrical connections of the safety valves on the flexible hoses.

9) Open the ball valve to pressure gauge in vapor line (if closed).

10) Open both liquid tank car valves on top of SO_2 tank.

11) Open vapor tank car valve if closed.

12) Open tank car valve and HOSV at top of tank sight glass. Tank car valve should be open fully to insure proper operation of valve.

13) Slowly open tank car valve and HOSV at bottom of tank sight glass and inspect for leaks. If no leaks are detected, open tank car valve fully to insure proper operation of valve.

14) Open air operated liquid and vapor safety valves using switches on the SO_2 unloading control cabinet located on the north side of the SO_2 building.

15) Slowly open vapor HOSV's on the stationary transfer piping. Check for leaks. If leaks appear, repair as necessary.

16) Slowly open liquid HOSV's on the stationary transfer piping. Check for leaks. If leaks appear, repair as necessary.

17) Instruct driver to open the truck's vapor valve.

18) When sufficient pressure differential has been established, instruct driver to slowly open the truck's liquid valve.

19) Check all piping for leakage.

20) When SO_2 flow has stabilized, place the switches on the SO_2 unloading control cabinet to the "auto" position.

21) Test automatic safety valves for proper operation by pressing the "kill" switch on the control cabinet. All valves should close.

22) If safety valves operate properly, reopen safety valves by turning the switches to "hand" and then return switches to the "auto" position to insure proper operation of the emergency "kill" switch. If valves fail to operate properly, contact appropriate personnel to repair as necessary. Discontinue the unloading until the problem is resolved.

23) Notify both unit control rooms that SO_2 unloading is in progress. An announcement will be issued over the public address system.

24) Operators may now remove chemically resistant rain-suits if desired.

25) Monitor unloading by observing liquid rotameter, tank pressure gauge, sight glass level, and piping (for possible leakage).

TERMINATION OF TRANSFER

1) When vapor appears in the liquid rotameter, place switches on the SO_2 unloading control cabinet in the "hand" position.

2) Put on chemically resistant suits, gloves, and full-face respirator.

3) When all liquid has been purged from the liquid transfer line, instruct the driver to turn off the truck compressor. Close HOSV's on stationary liquid and vapor transfer piping.

4) If a second truck will be unloaded, close the automatic safety valves and allow the driver to vent the truck piping. When venting is complete, disconnect the flexible hoses and connect them to the second truck. Repeat steps 15 through 25 above.

5) If no further unloading is required and all liquid has been purged from the liquid transfer piping, instruct driver to turn off the truck compressor. Close HOSV's on the stationary liquid and vapor transfer piping.

6) Before closing the automatic safety valves, allow driver to vent the flexible hoses and truck piping. When venting is complete, close automatic safety valves.

7) Disconnect unloading piping, place protective end-caps on the stationary transfer piping, and return equipment to the SO_2 control building.

8) Close the storage tank sight glass valves and both liquid tank car valves.

9) Notify both unit control rooms that unloading is complete. An announcement of completion of SO_2 unloading will be issued over the public address system.

10) Remove the SO_2 personal protective equipment, properly clean and disinfect SCBS's and full-face respirators, and store equipment in designated storage cabinet.

11) Send SO_2 shipping papers to the storeroom.

SO_2 SUPPLIER

Coulton Chemical Corp.
6600 Sylvania Avenue
Sylvania, OH 43560

(419) 885-4661
Contact Person: Cheryl Jamnisk

Drivers: Garry Stewart
Gene Haase

ATTACHMENT G

Listing of specific job orders for SO_2 liquid flow indicator from January 1, 1993 to May 16, 1994.

March 23, 1994

Big Sandy Job Order No. 0296041
Equipment No. 5512529110
Equipment Description: SO_2 Unloading System Unit 1
Requested by: T. J. Rust - Plant Engineer I
Work Description: SO_2 Liquid flow meter - Leak in and around meter. Repair, this is in the rotameter on Unit 1 tank.

August 27, 1993

Big Sandy Job Order No. 0169772
Equipment No. 551259110
Equipment Description: SO_2 Unloading System Unit 1
Requested by: J. L. Skaggs - Performance Technician Sr.
Work Description: SO_2 unloading station - replace gaskets on flow indicator as it is leaking on both sides.

Note: SO_2 unloading was performed on the following dates:

March 30, 1994
April 15, 1994
April 26, 1994
May 15, 1994

ATTACHMENT H

Operator SURVEY UNIT ONE

FREQUENCY 1=ONCE PER SHIFT, 2=TWICE PER SHIFT, A=AS NEEDED

REASON R=REQUIRED, R=ROUTINE, O=OTHER

TYPE V=VISUAL, P=PHYSICAL

ELEVATION	EQUIPMENT DESCRIPTION	FREQUENCY	REASONS	TYPE	SPECIFIC ITEMS CHECKED LKS LEAKS S=SAFETY EQUIP LE=LEVEL G=GAGES PU=PUMP TH=THRUST V=VIBRATION C=CLINKERS T=TEMPERATURE F=FLOW M=MOTOR CH=CHARTS L=LUBRICATION GB=GEAR BOXE A=ABNORMALITIES N=NORMAL P=POSITION
	BOTTOM ASH HOPPER AND PIPING	2	R	V,P	LKS,LE,G,P,T,M,L,A,N,C,F
	EXHAUST HOOD ATTEMPORATOR	2	R	V,P	LKS,A,N,G
	BFP INJECTION WATER VALVE	2	R	V,P	LKS,A,N,P
	COMBUSTION AIR HEATING SYSTEM	2	R	V,P	LKS,LE,V,PU,T,M,TH,L,A,N,P,F
	CIRCULATING WATER VALVES & PIPING	2	R	V,P	LKS,A,N,P
	GENERATOR GROUND TRANSFORMER	2	R	V,P	LKS,A,N
569	TRANSFORMERS EAST, WEST 1AB	2	R	V,P	LKS,LE,G,T,F,M,A,N,P
OUT/	COOLING TOWER & PIPING	2	R	V,P	LKS,LE,F,A,N
SIDE	CIRCULATING WATER PUMPS - 2	2	R	V,P	LKS,V,PU,T,M,L,A,N,P,F
	CHLORING BUILDING	2	R	V,P	LKS,G,V,PU,TH,T,F,M,L,A,N,P
	COMBUSTION AIR COILS	2	R	V,P	LKS,LE,V,P,T,M,TH,L,A,N
	CONDENSATE STORAGE TANK	2	R	V,P	LKS,A,N
	SULFURIC ACID TANK	2	R	V,P	LKS,LE,PU,F,M,T,L,A,N,P
	AMP TANK & PIPING	2	R	V,P	LKS,LE,PU,F,M,T,L,A,N
✓	SO2 TANK & PIPING	2	R	V,P	LKS,LE,PU,F,M,T,L,A,N,P
	SO3 BUILDING & PIPING	2	R	V,P	LKS,G,T,F,M,V,L,A,P,N
	TURBINE ROOM SUMP PIPING	2	R	V,P	LKS,P
	CIRCULATING WATER SUMP	2	R	V,P	LKS,V,PU,T,F,M,A,N,P,LE
	DIESEL FIRE PUMP FUEL TANK	2	R	V,P	LE,LKS,A,N
	FIRE PUMPS EAST, MIDDLE, WEST	2	R	V,P	LKS,S,G,V,PU,TH,T,F,M,L,A,N,P
	FLUME MAKE UP VALVE & LEVEL CONTROL	2	R	V,P	LKS,G,V,P,F,A,N,P
	BRINE PIT AND PUMPS-2	2	R	V,P	LKS,PU,M,L,A,N,G,P,S
	FUEL OIL PUMPS NORTH, SOUTH	2	R	V,P	LKS,G,PU,M,L,A,N,P
	BOTTOM ASH PIPING	2	R	V,P	LKS,N,A,P
553	MISC DRAIN TANK PUMPS & LEVEL CONTROL	2	R	V,P	LKS,G,V,PU,TH,T,M,L,A,N,P
	COOLING WATER PUMPS-2	2	R	V,P	LKS,G,V,PU,TH,T,M,L,A,N,P
	LOW PRESSURE SERVICE PUMPS-3	2	R	V,P	LKS,G,V,PU,TH,T,M,L,A,N,P
	COOLING WATER COOLER	2	R	V,P	LKS,G,T,A,N,P,F
	CONDENSER PIT PIPING	2	R	V,P	LKS,A,N,P
	PASSENGER ELEVATOR SUMP	2	R	V,P	LE,A,N
	FREIGHT ELEVATOR SUMP	2	R	V,P	LE,A,N
	COOLING TOWER BLOW DOWN VALVE	2	R	V,P	LKS,A,N,P
	CONDENSATE TRANSFER PUMP	2	R	V,P	LKS,V,PU,M,L,A,N,P
	BFP AUX SEAL WATER BOOSTER PUMP	2	R	V,P	LKS,M,L,A,N,P,T,TH
	FLASH EVAPORATOR RECIRCULATE PUMPS-2	2	R	V,P	LKS,M,L,A,N,P

KY-1306
Rev. Dec.'82

BIG SANDY GAS CONDITIONING SYSTEM

SHIFT LOG - UNIT 1

Actual Operating Conditions

	Mon.			Tues.			Wed.			Thurs.			Fri.			Sat.			Sun.		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
DATE: 5/2/94 - 5/9/94					5/3		5/4				5/6			5/6		Unit 1 TAKEN OUT-OF-					
TIME:	0100	1700			1256		0420	1821			1230		2200	1100		SERVICE			5-6-94		
UNIT LOAD:	270	270		270	270			250			265		260	265							
PARAMETERS																					
1. SO_2 Flow Mode (Auto or Manual)	M	M		M	M		M	M		M	M		M	M							
2. Tank Pad Pressure, psig	66	85		82	82		82	82		81	85		85	82							
3. Tank Gage Level (By Performance Dept.)																					
4. SO_2 Inlet Pressure, psig	19	19		20	20		20	20		20	17		19	20							
5. SO_2 Flow, Lb/Hr.																					
6. Rotometer, GPM	.055	055		.055	.55		.055	055			.050		.055	058							
7. Vaporizer Discharge Pressure, psig	19	20		14	18		16	18		18	18		18	18							
8. Vaporizer Discharge Temperature, °F	76	80		56	55			50		52	62		53	50							
9. Vaporizer Set Temp. °F:																					
#1	0	0		0	0		0	0			0		0	0							
#2																					
ZONE #3																					
#4																					
#5				0			5			3											

KY-1306
Rev. Nov. '92

BIG SANDY GAS CONDITIONING SYSTEM
SHIFT LOG - UNIT 2
ACTUAL OPERATING CONDITIONS

	MON	TUES		WED		THURS		FRI		SAT		SUN	
DATE MAY 9 1994	5/9	5/9	5/10	5/10	5/11	5/11	5/11	5/12	5/13	5/13	5/14	5/14	Unit 2 TAKE
TIME	0023	1545	0001	1141	0005	1200	2200	1300	0230		0558	1030	OUT-OF-SERV
UNIT LOAD	720	690	685	650	725	720	715	735	740			590	Sunday
SHIFT	B	D	C	A	C	A	C	A	D	A	A	C	
1. SO_2 Flow Mode Remote- Local- Manual	L	L	L	L	L	L	L	L	L	L	L	L	
2. Tank Pad Press. psig	78	84	80	82	79	84	84	84	78	78	73	80	
3. SO_2 Inlet Press. psig	78	86	83	84	81	87	85	86	80	81	76	82	
4. SO_2 Flow Recorder %	30	37	28	35	24	34	27	31	22	31	21	31	
5. Rotometer, GPM	.36	.45	.42	.44	.36	.44	.4	.42	.32	.38	.28	.4	
6. Vaporizer Discharge Pressure Psig	9	13	11	11	10	13	15	12	9	11	9	11	
7. Vaporizer Disch. Temp. °F (Local Thermometer)	<50	40		<50	40	<40	40	40	30	<50	40	46	
8. Blower; a. Filter Diff. Press.	2.5	2.5	2.5	2.5	3	3	3	2.5	2.5	2.5	2.5	2.5	
b. Disc. Press. psig	7.5	7.5	7.5	7.5	8	8	8	8	8	8	8	8	
c. Disc. Temp. °F	195	200	193	205	175	195	190	209	179	210	170	185	
d. Oil Level	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
9. Bed One Inlet Temp. (401)	795	799	783	792	782	761	727	797	781	796	787	795	
10. Bed One Outlet Temp. (402)	808	807		800	784	801	709	801	785	791	797	808	
11. Bed Two Inlet Temp. (403)	945	976		968	873	969	890	965	883	941	881	960	
12. Bed Two Outlet Temp. (404)	928	982	957	981	936	975	962	973	926	939	907	949	
13. North Lance Temp. (405)	693	713	703	729	697	706	713	709	688	728	682	691	
14. South Lance Temp. (406)	770	803		812	773	793	790	792	762	784	756	775	
15. Air Heater Case Temp. (409)	1166	1176		1166	1136	1171	1154	1186	1153	1171	1146	1163	
16. SO_2 Vapor Temp. (414)	36	44		41	37	43	45	44	37	42	37	41	
17. SO_2 Flow Peak To Peak Fluctuation %	31/22	37/8		40/34	34/23	34/33	34/25	33/31	30/20	31/—	27/17	33/28	
18. Is SO_2 Pump I/S Yes or No	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
#6 FUEL OIL TANK LEVEL	19'4"		19'4"	19'4"	19'4"	19'4"	19'4"	19'4"	19'4"	19'4"	19'4"	19'4"	