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February 12, 2014

RECEIVED

FEB 12 2014

PUBLIC SERVICE  
COMMISSION

**HAND DELIVERED**

Jeff R. Derouen  
Executive Director  
Public Service Commission  
211 Sower Boulevard  
P.O. Box 615  
Frankfort, KY 40602-0615

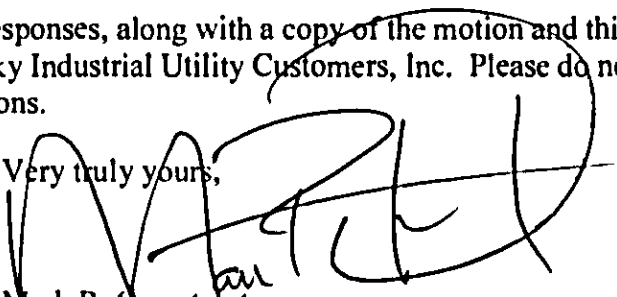
**RE:** *Application Of Kentucky Power Company For A Certificate Of Public Convenience And Necessity To Convert Big Sandy Unit 1 To A Natural Gas-Fired Unit – Case No. 2013-00430*

Dear Mr. Derouen:

Enclosed please find and accept for filing the original and ten copies of the Company's redacted responses to Staff's data requests. Also being filed are the original and ten copies of the Company's motion for confidential treatment and a single sealed copy of the confidential portions of the Company's response to Staff 1-10(c).

A copy of the public version of the responses, along with a copy of the motion and this letter, is being served on counsel for Kentucky Industrial Utility Customers, Inc. Please do not hesitate to contact me if you have any questions.

Very truly yours,

  
Mark R. Overstreet

MRO

cc: Michael L. Kurtz

COMMONWEALTH OF KENTUCKY  
BEFORE THE  
PUBLIC SERVICE COMMISSION

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FEB 12 2014

PUBLIC SERVICE  
COMMISSION

In the Matter Of:

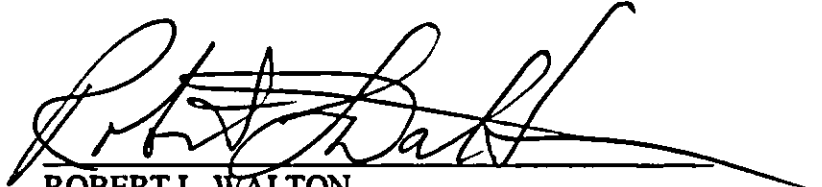
THE APPLICATION OF KENTUCKY POWER COMPANY )  
FOR (1) A CERTIFICATE OF PUBLIC CONVENIENCE )  
AND NECESSITY AUTHORIZING KENTUCKY POWER TO )  
CONVERT THE EXISTING BIG SANDY UNIT 1 TO BE )  
EXCLUSIVELY FUELED BY NATURAL GAS (2) FOR ) CASE NO. 2013- 00430  
DECLARATORY RULINGS; AND (3) FOR ALL OTHER )  
REQUIRED APPROVALS AND RELIEF. )

KENTUCKY POWER COMPANY RESPONSES TO  
COMMISSION STAFF'S INITIAL SET OF DATA REQUESTS

February 13, 2014

**VERIFICATION**

The undersigned, ROBERT L. WALTON being duly sworn, deposes and says he is Managing Director of Projects for American Electric Power, that he has personal knowledge of the matters set forth in the forgoing responses for which he is the identified witness and that the information contained therein is true and correct to the best of his information, knowledge and belief.

  
ROBERT L. WALTON

STATE OF OHIO

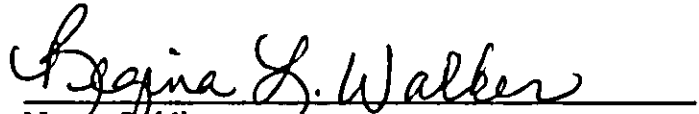
)

) CASE NO. 2013-00430

COUNTY OF FRANKLIN

)

Subscribed and sworn to before me, a Notary Public in and before said County and State, by Robert L. Walton, this the 6<sup>th</sup> day of February 2014.

  
Notary Public

My Commission Expires: 03-18-2017

REGINA L. WALKER  
Notary Public, State of Ohio  
My Commission Expires 03-18-2017





## Kentucky Power Company

### REQUEST

Refer to paragraphs 14 through 20 of the application regarding the natural gas supply and transportation.

- a. Refer to paragraph 16 where it states that the collaboration of Kentucky Power and American Electric Power Service Corporation contacted Federal Energy Regulatory Commission (FERC)-regulated natural gas companies to obtain indicative cost estimates and installation schedules for the project.
  - (1) Provide any information the collaborative provided to the companies identified as potential candidates for the project.
  - (2) Explain why only FERC-regulated natural gas pipeline companies were considered for the project.
  - (3) State whether all FERC-regulated natural gas pipelines in the vicinity not, explain why.
- b. Refer to paragraph 17 regarding the evaluation of the natural gas supply proposals. Provide the specifications and qualifications the collaborative is using to evaluate the natural gas supply proposals.
- c. Refer to paragraph 19 of the application where it states that Kentucky Power will construct an approximate 800-foot gas-delivery pipeline.
  - (1) State whether Kentucky Power will construct the pipeline or have the construction completed by a contractor.
  - (2) If Kentucky Power plans to construct the pipeline, describe what experience Kentucky Power has in such construction.
  - (3) If the answer to subpart (1) above is for a contractor to complete the construction, explain how the contractor will be selected.

**RESPONSE**

a. (1) The initial request was for indicative cost estimates to determine if a gas conversion was viable at the Big Sandy Generating Plant in Louisa, Kentucky. Kentucky Power contacted FERC-regulated natural gas companies for this evaluation and provided these companies with the following information for four (4) differing fueling options that consisted of:

- a) 100,800 mmBtu/Day ("D") @ 550 pounds per square inch gauge ("psig");
- b) 175,000 mmBtu/D @ 650 psig;
- c) 62,400 mmBtu/D @ 150 psig; and
- d) 135,500 mmBtu/D @ 650 psig.

More detailed information was provided in the Request for Proposals ("RFP") that was issued, as is described in the response to request (b) below.

(2) The collaborative chose to contact FERC-regulated pipelines for indicative cost estimates based upon the fact that these pipelines tend to be larger and have the capacity required to address the four options outlined above. It should be noted that the formal RFP is open to all natural gas pipelines.

(3) Yes. All FERC-regulated pipeline companies within the vicinity of the Big Sandy plant were contacted for indicative cost estimates.

b. On January 8, 2014, Kentucky Power issued an RFP, which was open to any company, to construct, own, operate and maintain a pipeline lateral and associated facilities to the Big Sandy plant.

Please refer to KPSC-2013-00430-KPSC 1-1 Attachments 1 through 8 for the Big Sandy Pipeline RFP; BS1 Gas Connection Pipeline Environmental Work Compliance Assessment Draft; Contractor Environmental Requirements Document; AEP General Terms & Conditions for EPC Work; GE System Cleanliness Requirements, Pre-Work Hazard Analysis Form; BS RFP Safety Requirements Natural Gas Venting, Purging, Inerting Procedure; and Safety and Health Requirements, respectively.

- c. (1) The pipeline will be constructed by a third-party contractor.  
(2) Not Applicable.  
(3) The construction of the approximate 800-foot gas delivery system will be a part of the larger mechanical bid package for the project. The mechanical package will be competitively bid with the best and least cost evaluated bidder being selected.

WITNESS: Robert L Walton



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**Request for Proposals  
Big Sandy Power Plant  
Natural Gas Refuel Project  
Pipeline Facilities**

American Electric Power Service Corporation ("AEPSC" or "Company"), as agent for Kentucky Power Company ("KPCo"), is soliciting proposals to construct, own, operate and maintain a natural gas pipeline lateral and associated facilities to the Big Sandy plant ("Plant") located in Louisa, Kentucky. These facilities will be utilized to supply Unit 1 with natural gas as the primary fuel source following a conversion of the current coal fired steam boiler to natural gas fired.

It is the Company's objective to obtain a reliable supply of natural gas fuel at a reasonable cost for the project beginning on its Commercial Operation Date ("COD") estimated to be June 1, 2016. Fuel for testing must be available at the Plant site prior to the COD. All other construction and/or interconnection activities should be completed with sufficient time to provide intermittent startup and fuel for testing beginning approximately April 1, 2016.

Bidders must demonstrate the ability to secure any required approvals or permits in the time necessary for an April 2016 test fuel availability date at the project site without cost exposure to the Company and with minimal risk of delays. Any delays in commercial availability, as a result of the bidder's actions, could result in the assessment of liquidated damages.

**1) RFP SCHEDULE**

Proposals should be submitted to the Company via e-mail no later than 5:00 p.m. Eastern Standard Time ("EST") on March 21, 2014. All RFP communication with the Company shall be directed to the RFP Representative:

Amy Jeffries  
[aejeffries@aep.com](mailto:aejeffries@aep.com)

Bidders may submit multiple proposals, if viable alternatives exist. Below is a schedule for the RFP process. Notification to bidders will occur if changes to the schedule are required.

Issue RFP	January 8, 2014
Notice to AEPSC of intent to bid	January 15, 2014
Submission of credit requirements	January 15, 2014
On-site pre-bid meeting	February 6, 2014
Submission of bids	March 21, 2014
Clarification of bids	March 21-April 30, 2014
Bid selection made	April 30, 2014





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## 2) SCOPE OF WORK

The Company is soliciting responses for the following design scenario:

Delivery point requirement: ~72,000 Dth/day (~3,000 mmBtu/hr) at a minimum pressure of 165 psig

The design scenario described above is detailed in the *BS1 Refuel Project – Gos Pipeline RFP Specification* (Appendix A).

## 3) BIDDER'S REQUIREMENTS

- Submittal of Credit Information (see Section 4)
- Attendance at Pre-Bid Meeting on February 6, 2014 (see Section 5)
- Proposal Inclusive of all Content Requirements (see Section 8)
- Timely Submission of Bids - It is the bidder's responsibility to submit all requested material by the deadlines specified in this RFP.

## 4) CREDIT INFORMATION

Bidders shall provide all of the following credit information by January 15, 2014:

1. Offer of a parent company guarantee with a description of the corporate structure (if applicable).
2. Three years of financial statements for the bidder or where a parent company guarantee has been offered, the financial statements of the parent company. Financial statements shall be audited/reviewed/company prepared with the audit being the most preferred and the company prepared being the least preferred. Financial statements shall mean Balance Sheet, Income Statement, Cash Flow Statement and accompanying notes.
3. Bank references

## 5) PRE-BID MEETING

The required pre-bid meeting will occur at 9:00 a.m. EST on February 6, 2014 at the Big Sandy Plant. This meeting will provide bidders with the opportunity to walk down the Plant property and review any RFP clarification questions. All attendees must RSVP for the on-site pre-bid meeting by Friday, January 31 by contacting the RFP Representative. A conference call number has also been established at 888-237-7001 code 322551# for other bidding company members to listen in to the meeting as well but does not relieve the bidding company from the



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obligation to have at least one representative attend the pre-bid meeting in person. The conference call will start promptly at 9:00 a.m.

The facility is located at: 23000 Highway 23, Louisa, KY 41230

#### **6) COMPENSATION**

The Company is soliciting proposals in which all costs and fees related to the construction of the interconnect and/or delivery facilities are borne by the bidder. The capital cost is to be recovered over a 15 year term, beginning with the expected COD of the Plant ("Initial Term"). The proposal should include the cost to construct, own, operate and maintain the interconnect and/or delivery facilities over the Initial Term of the contract. The proposal should also include a detailed estimate of capital cost projections broken down by material costs, installation costs and service costs as well as the cost AEPSC would incur if AEPSC chose to purchase the pipeline lateral and associated facilities at the end of the initial Term.

Although the Company will not own the pipeline and associated facilities, the Company reserves the right to review and approve engineering drawings for pipeline and associated facilities to be installed on KPCo property as well as review and approve the procedures for any operational release of gas (e.g., plugging process and/or cleaning blows).

#### **7) REGULATORY FILINGS**

KPCo is required to obtain a certificate of public convenience and necessity (CPCN) from the Public Service Commission of Kentucky to convert the current coal fired generating unit to a gas fired unit. It is anticipated that final approval by the Commission will occur in May-June 2014. Prior to final approval, the successful bidder will be limited to only performing work required to support any permitting and/or regulatory approvals, engineering, and right of way identification needed to construct the lateral pipeline. The Company requires that major procurement and construction not occur until such final Commission approval has been received by KPCo. The Company will notify the successful bidder when final approval has been granted and keep open communications regarding the status of such approval throughout the process.

#### **8) PROPOSAL CONTENT REQUIREMENTS**

AEPSC expects bidders to furnish any information that could impact the cost, construction schedule, reliability, or capability of the project. If it appears that certain information is inadvertently omitted from a proposal, AEPSC may contact the bidder to obtain the information.



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Proposals must include a table of contents as well as concise and complete information on all of the following topics:

**Executive Summary** - Provide an executive summary of the bid's characteristics and timeline, including any unique aspects and benefits.

**Bidder's Information** - Bidders must provide the name of the company, its address, and any company representative(s) (name, phone number and email address).

**Experience and References** - Provide a general description of the bidder's background and experience in pipeline projects similar to this project, including any affiliated companies, holding companies, subsidiaries or predecessor companies. Safety performance records should also be included in this section.

**Proposed Rate Structure** - The cost to construct, own, operate, and maintain the pipeline lateral and associated facilities shall be recovered over the initial Term of the contract. The proposal must also include details regarding AEPSC's option to purchase the pipeline lateral and associated facilities at the end of the Initial Term.

**Project and Construction Schedule** - Schedules must include major milestones such as expected receipt of all regulatory approvals, completion of engineering design, procurement of construction materials, major construction activities, availability for testing, and the Commercial Operation Date, etc (as detailed in Appendix B).

**Quarterly Pre-Service Cost Estimates (Appendix C)** - The bidder must complete Appendix C which includes quarterly pre-service cost estimates. This will ensure the Company is aware of potential pre-service cost exposure if the required KPCo Commission approval is not granted.

#### **9) RFP REFERENCE DOCUMENTS**

In addition to the information provided herein, the following are included as appendices to this document:

- Appendix A: BS1 Refuel Project – Gas Pipeline RFP Specification
- Appendix B: Project Schedule Requirements
- Appendix C: Quarterly Pre-Service Cost Estimates
- Appendix D: Safety Requirements and General Terms & Conditions
  - Safety and Health Requirements (Rev. #8, 8/1/11)
  - Natural Gas Venting, Purging, Inerting Procedure (dated 1-1-13)
  - PWSHA Form (dated 7-12-11)



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- o GEK 110483c (Revised, July 2009) – Cleanliness Requirements for Power Plant installation, Commissioning, and Maintenance
- o AEP General Terms and Conditions for Engineering, Procurement, and Construction Work (March 2009 Rev. 2 dated 7/12)
- Appendix E: Environmental Requirements
  - o CERD: Contractor Environmental Requirements Document
  - o Environmental Work Compliance Assessment (EWCA)

#### **10) BID EVALUATION AND SELECTION PROCEDURES**

The objective of the AEPSC bid evaluation is to identify the proposal or proposals which best meet the needs identified in this solicitation. The evaluation process will include an assessment of both economic and non-economic criteria. Non-economic factors will be assessed through a due diligence process that will gauge the relative risks and benefits of the proposal.

The information provided in each initial bid will first be evaluated for completeness and consistency with the proposal content and bid requirements outlined in this RFP. As a result of this screening review, AEPSC will eliminate bids that do not meet the requirements described in this RFP from further consideration. AEPSC will limit follow up contacts to clarify bids or request additional information only to those bids that meet the requirements described in this RFP.

Once bids have been evaluated for completeness, preliminary due diligence will be conducted at this stage to identify any flaws associated with the bid that are unacceptable to AEPSC. As a result of this screening, AEPSC may either eliminate bids from further consideration, or contact bidders to clarify information or request additional material.

The Company has no obligation to accept any proposal, and the Company may reject any proposal for any reason at any time in its sole judgment and discretion. The Company has no obligation to disclose the reason or reasons for rejection. AEPSC reserves the right to solicit additional proposals and the right to submit additional information requests to bidders during the bid evaluation process.

#### **11) POST-BID NEGOTIATIONS AND AWARDING OF CONTRACT**

AEPSC may request additional information regarding factors that could impact the total cost and/or schedule of the project in order to periodically reevaluate the Company's economic and risk exposure until such time as AEPSC and the bidder execute a definitive agreement(s) acceptable to AEPSC in its sole and absolute discretion.



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Neither AEPSC nor its affiliates are obligated to enter into a definitive agreement with any bidder responding to this RFP and may terminate or modify this RFP at any time without liability or obligation to any respondent. AEPSC also reserves the right to negotiate with only those bidders who propose transactions that AEPSC believes offer the best combination of value to Kentucky Power Company and their customers.

For further information or access to the Plant, please contact the Company representative:

Amy Jeffries  
American Electric Power Service Corporation  
1 Riverside Plaza, 14<sup>th</sup> Floor  
Columbus, OH 43215  
Phone: 614.583.6622  
E-mail: aejeffries@aep.com



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## Appendix A: BS1 Refuel Project – Gas Pipeline RFP Specification



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## BS1 REFUEL PROJECT - GAS PIPELINE RFP SPECIFICATION

### EXTENT OF WORK

#### *Work Included:*

*This specification addresses the gas transporter's supply pipe equipment and material requirements of the gas supply to the Big Sandy Power Plant, located along the Big Sandy River, near Louisa, Kentucky.*

*(a1) The gas supply pipe is to be sized for the largest flow requirement. The design base is for providing a capacity sufficient to deliver fuel gas, at a minimum expected pressure of 165 psig (velocity not to exceed 100 feet per second) for a mass flow (133,300 lbs/hr or 72,000 Dth/day, based on an estimated HHV = 22,518 BTU/lb) to one 268 MW gas fired boiler. The gas supply pipe from the main gas header, several miles away, will terminate at the AEP site location, west and on the plant side of the river (see the attached aerial view of the site). (Any proposed alternate site locations will be considered.) It is preferred the gas supply pipe be routed underground and terminate at the plant site, above ground, with a manual isolating flanged ball valve and appropriate pipe support structure.*

(a2) Design and pipe routing drawings shall be submitted for record. The drawings shall show tie-in connections, pipe routing, elevations, burial depth, coordinates at direction changes and equipment layout details, including material and equipment identification. Drawings shall be submitted after award of contract and prior to installation.

(a3) All underground pipe shall have a high visibility marker tape placed parallel and above the pipe. The tape shall contain a metal strip for easy detection from the ground surface.

(a4) All above ground gas piping, on AEP property, to be painted yellow (Federal Std. Color #13655) and labeled with black lettering as "Natural Gas" with flow direction indicated. Labeling shall be at 20 ft. intervals and easily readable from a distance of 25 ft. Lead based paint is not acceptable and shall not be used.

(a5) As close as practical to the gas supply header, the gas supply pipe shall include a filter-separator (with drain tank) and a revenue meter station.



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(a5.1) The filter-separator shall remove gas condensates and 99.99% of solid particles from the gas stream. The filter-separator will have an automatic drain system to remove liquid from the vessel. The filter-separator shall have a thermal relief valve in accordance to ASME Section VIII. Level controls and alarms will be part of the automated drain system.

(a5.2) The revenue meter station shall comply with the appropriate AGA requirements, have an accuracy of +/- 0.25% of full flow, and have a measureable range from 1000 lbs/hr to 145,000 lbs/hr.

***(a6) All materials, equipment, services and future maintenance for the gas supply pipe, to the site termination point will be the gas transporter's responsibility. The pipe internal diameter must be capable of being cleaned using "pigs", and is to be clean and acceptable for service upon completion of the installation. AEP reserves the right to review and approve engineering drawings for any portion of piping and associated facilities installed on AEP property.***

(a7) The gas transporter will provide all necessary access roadways for construction activity, future maintenance and inspection needs. Additionally, any power requirements and lighting will be the responsibility of the transporter.

(a8) The gas transporter shall restore all construction site areas, other than roadways and access, to an "as-found" condition. Any excavated material shall be distributed evenly to blend in with the general contours of the area, unless otherwise required per any right-of-way agreements.

(a9) The gas transporter shall restore AEP property to "as-found" conditions, including re-seeding of grassy areas, except access and roadways. Any excavated material shall be distributed evenly to blend in with the general contours of the area. Areas immediately under equipment and termination points shall be covered with a 6 inch base of gravel.

(a10) As a minimum, for pipe and equipment installation, the gas transporter must meet the requirements of B31.8 and 10CFR, Title 49, Part 192 safety requirements, NFPA 54 and 56, and applicable AGA measurement standards. Additionally, the gas transporter is to be in compliance with the FERC approved tariff, if applicable, for the associated pipeline the gas transporter is interconnecting to and the gas transporter must provide physical security of its equipment to safe-guard against improper actions.





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(a11) The gas transporter's revenue meter station shall provide the following data information to AEP's Process Information system. (All inputs to the AEP system shall be secure and must not be internet addressable. Fiber optics or RS-485 communication links are preferred.)

1. Gas Heating Value - BTU/SCF
2. Gas Flow - MSCF/HR
3. Gas Used Today – MSCF
4. Gas Used Yesterday – MSCF
5. Heat Input - MMBTU/HR
6. Energy Used Today – MMBTU
7. Energy Used Yesterday – MMBTU
8. Nat Gas Temp - DEG F
9. CO2 Concentration - %
10. N2 Concentration - %
11. Specific Gravity
12. Static Pressure – PSIG
13. Heat Value Signal Failure (this is built into our logic)
14. Instantaneous flow rate (MMBtu/Day)

(a12) All electrical components shall meet Class I, Division II, Group D, requirements for hazardous locations per NEC.

(a13) The pipe lateral must be cleaned, prior to service, in accordance with NFPA 56, and comply with AEP's "Natural Gas Venting, Purging, Inerting Procedure" dated 1-1-13. The preferred cleaning method is a continuous inert gas (nitrogen or air) blow performed at low pressure and high velocity. Natural gas shall not be used for the cleaning media. Gas blows shall be performed in accordance with General Electric's document: "Cleanliness Requirements for Power Plant Installation, Commissioning, and Maintenance" (GEK110483c), Section V: "Gas Fuel System Cleanliness and Acceptance Criteria".

(a13.1) All appropriate safety considerations shall be addressed in the Pre-Work Hazard Analysis, or Job Safety Analysis, including:

1. barricading off the blow discharge area, exclusion zones
2. ensuring all piping is secure and properly tightened
3. review of blow procedures, including install/remove blow targets
4. evacuation plan, muster point, hearing and eye protection, communication
5. debris is captured, at the discharge point, from becoming projectiles
6. safety related to use of nitrogen (asphyxiation, cryogenic temperatures)

(a13.2) The goal of the cleaning process is to flow the cleaning medium through the piping system to generate higher forces than can be achieved from



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the flow of natural gas during operation. The line blowing effectiveness is a function of the cleaning force ratio (CFR), as defined in GEK110483c. The gas transporter (contractor) shall conduct pipe flow velocity and CFR calculations. The CFR shall be greater than 1.1, but less than 1.5 throughout the length of the pipe. Calculations shall be submitted to AEP for record, prior to blow.

(a13.3) The pipe cleanliness criteria for the completion of the pipe blow shall be determined by the use and examination of a target plate, as described in GEK110483c, Section VII: "Steam Piping cleaning and Acceptance Criteria".

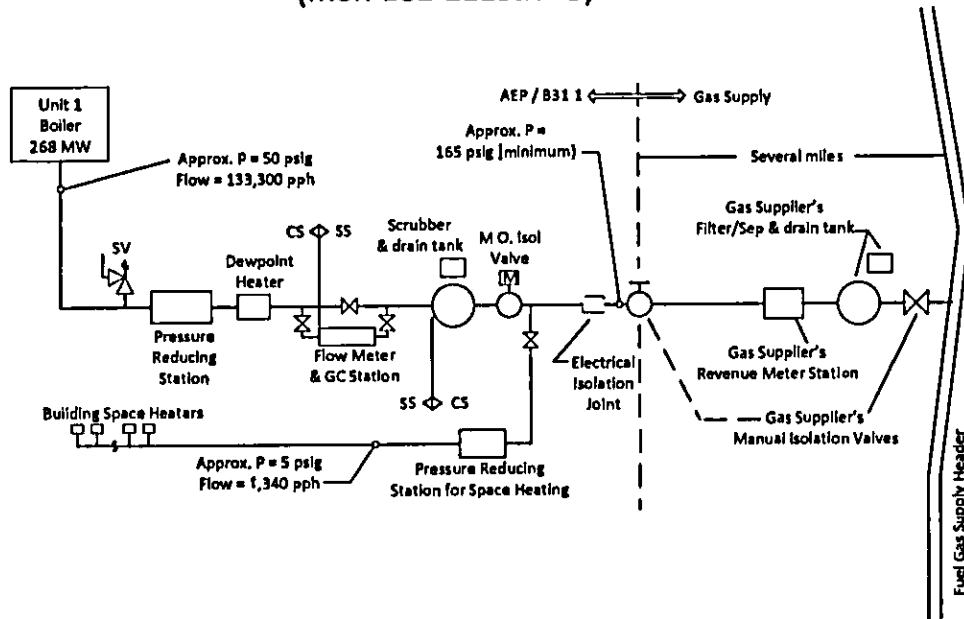
(a14) Other internal pipe cleaning methods may be acceptable provided the pipe is cleaned from all loose material and adherent material which could become detached during operation of the plant; and all water, oil, grease and protective coatings are removed.

(a15) If launching and receiving pigging stations are provided, the portions requiring venting of gases will adhere to the NFPA 56 and comply with AEP's "Natural Gas Venting, Purging, Inerting Procedure" dated 1-1-13.

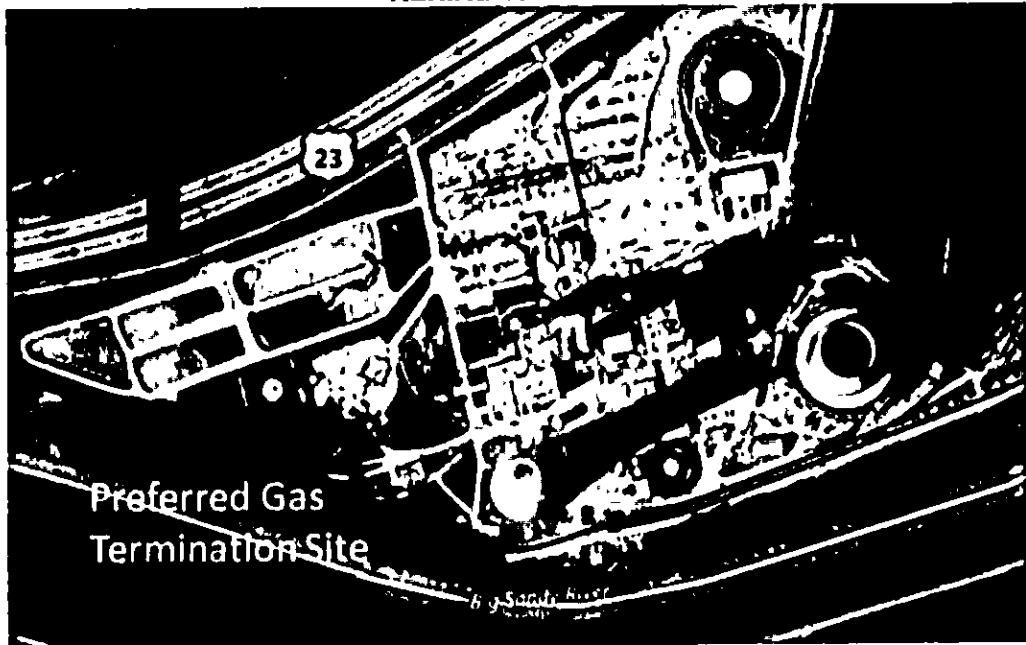


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BS1 Gas pipeline P&ID sketch: Gas Pipe Scope vs. AEP  
 Scope  
 (MSK-BS1-11132013)



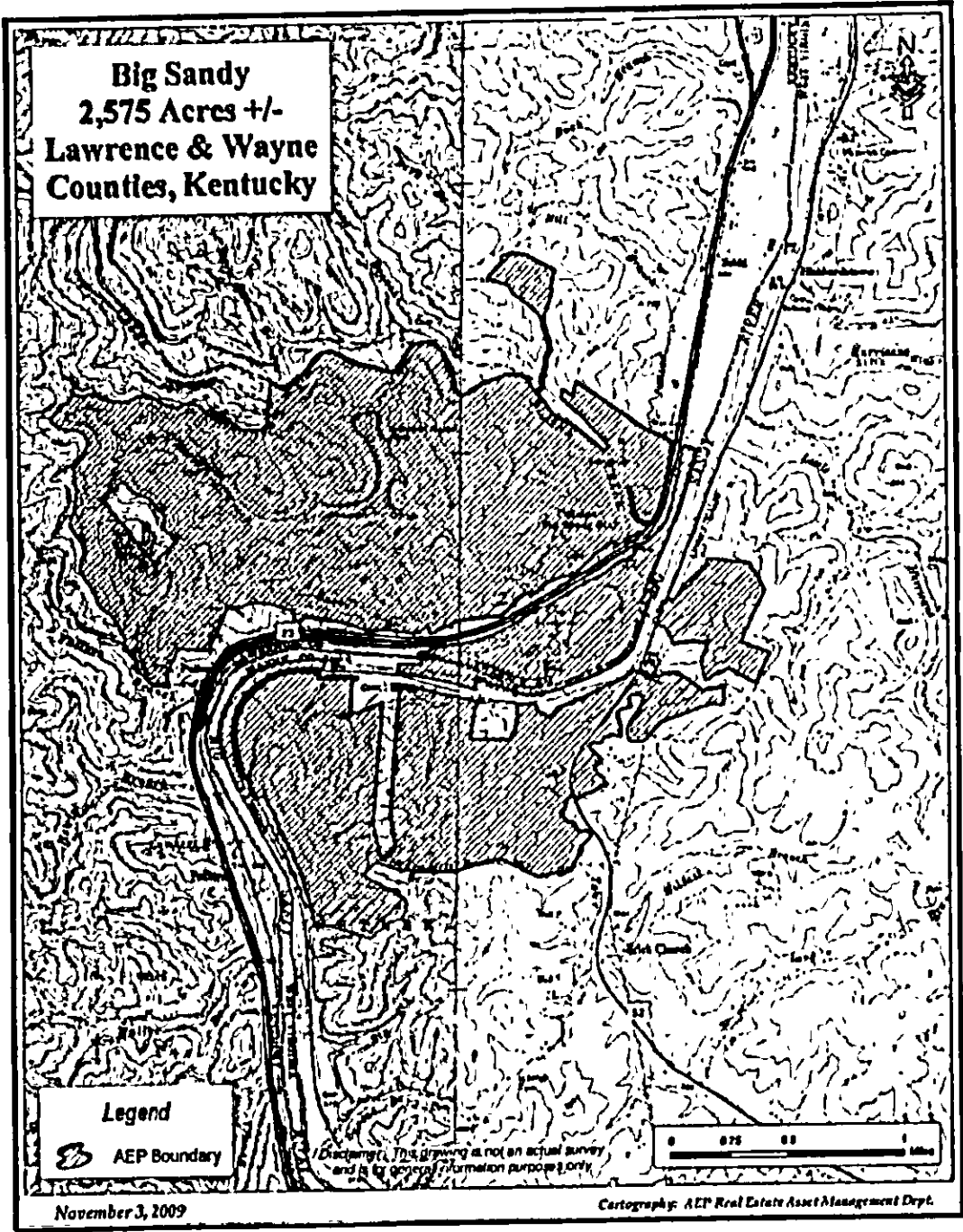
AERIAL VIEW OF PLANT





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**BIG SANDY PLANT – AEP OWNED PROPERTY**





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## Appendix B: Project Schedule Requirements



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## Project Schedule Requirements

### 1.0 INTRODUCTION

- 1.1 The following KPCo schedule development and schedule maintenance requirements are included as part of the contract. Other proposals will be considered, but must be approved by the Company.

### 2.0 SCHEDULE REQUIREMENTS

- 2.1 The Project Schedule shall be a logic driven, resource loaded schedule utilizing the Critical Path Method (CPM). CPM is a network diagramming technique where the relationships or dependencies are used to show the sequence that activities are to be performed. The schedule detail will be sufficiently delineated and defined to isolate individual activities within a subsystem. The end product will consist of a time scaled network that can be printed in a bar chart format (GANTT) Program Evaluation Review Technique (PERT) format or a time-phased format (TSL). Updates to the Integrated Project Schedule shall be based on physical percent complete and accurate remaining durations.
- 2.2 The requirements for input to the Integrated Project Schedule shall include, but are not limited to, the following:
  - 2.2.1 Assure realistic schedule showing the sequence of activities required to complete all of the work as set forth in the Scope of Work and Compensation sections of the RFP.
  - 2.2.2 Assure adequate planning and execution of the Work by the Contractor and its subcontractors.
  - 2.2.3 Incorporate and assure coordination of the Work of the Contractor with the activities of the Owner and its other Project contractors.
  - 2.2.4 Assist the Contractor and Owner's designated Project Manager or designee in evaluating:
    - 2.2.4.1 Contract performance relative to the Integrated Project Schedule
    - 2.2.4.2 Weekly/Monthly progress
    - 2.2.4.3 Proposed Schedule/Scope modifications
- 2.3 Primavera Enterprise Version 6.2 or newer (hereby referred to as P6) will be utilized on the project to allow for integration of all schedules. Critical decisions required by Owner shall be key milestones in the Integrated Project Schedule.



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**2.4** The following information will be furnished as a minimum for each activity:

- Preceding and succeeding activity ID number
- Activity description
- Estimated duration of activities (units = work hours)
- Early start date
- Early finish date
- Actual start date (Upon Progressing)
- Actual finish date (Upon Progressing)
- Late start date
- Late finish date
- Activity float in calendar hours
- Activity percent complete (physical percent complete)
- Budget loaded resources and resource type required to accomplish the activity
- Activity Codes (as applicable)
- Calendar on which work is to be performed
- Unit rates/rules of credit for commodity driven activities.
- Key Milestones for Contract/Completion

**2.5** The Primavera P6 detailed schedule will be developed to include meaningful logic in a Level 3 detail, with the ability to roll up to Level 1 or Level 2. Schedule development is performed in a series of evolutions outlined below starting at a summary level and ending with a detailed and executable implementation plan for all organizations.

**2.6** The following defines schedule levels for Project related work activities.

**2.6.1** Level 1 - Milestone and Team Critical Activities: The Level 1 schedule provides a bar chart format of major milestone events and Team Critical activities, which must occur in a timely sequence to achieve the successful completion of the project. The items are so defined as to represent the status of major work efforts for groups of activities.

**2.6.2** Level 2 - Subproject Group / System / Responsible Group: The Level 2 schedule divides the project into the major project phases: Engineering, Procurement, Construction, and Startup as well as by major system and area.

**2.6.3** Level 3 - System / Contract: The Level 3 schedule will represent a breakdown of the project phases into a more detailed schedule. An example of this would



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be engineering divided into major discipline levels or construction into areas and systems. Typical schedule activities at this level would be no greater than 2 weeks in duration and less than the equivalent of 1000 man-hours in budget.

- 2.7 All schedule submittals, including the proposed Authorized Baseline schedule, will be forwarded to the AEPSC or KPCo scheduler and be subject to acceptance by AEPSC. The following table will describe the required timeline for schedule submittals.

Schedule Type	Project Work
Milestone Schedule	With Bid Proposal
Level 3 Initial Submittal	TBD at Time of Contract

- 2.8 Performance/adherence to the project schedule shall be monitored based on the Schedule Performance Index (SPI).

- 2.8.1 The following method of SPI calculations shall be followed.

2.8.1.1 The method of calculation for SPI is Earned Hours (BCWP) divided by Planned Hours (BCWS). Example: Weekly Earned Hours = 400, Weekly Planned Hours = 390,  $400/390 = 1.02$  Weekly SPI. Calculation of Earned Hours shall be measured against 100% of the Early Start / Finish Dates and be measured against the "Mutually" agreed baseline planned hours as indicated in P6.

- 2.8.2 The SPI shall be based on a resource loaded logic driven schedule with budgeted labor-hours associated with the project. The Construction phase shall be based on all direct craft associated with the project below the General Foreman designation, examples being Foreman, Journeymen, Apprentice, etc.

2.8.2.1 For commodity based schedule activities, unit rates and the resulting rules of credit for each designated commodity shall be submitted to the AEPSC or KPCo scheduler. For example; Activity A – Install small bore pipe for coolant pump (80 lf), should have a resource (ex. Pipe Fitter), a budget (ex. 120 mhrs), a rate (ex. 0.66 lf/hr) and the resulting rule of credit would be for every (1) linear foot of pipe installed then (1.5) hours of budget are earned; therefore, after earning (1.5) hours, or installing (1) linear foot, the physical percent complete would be 1.25%. The rules of credit are independent of the activity duration.

- 2.8.3 Critical paths will be established and their respective total float will be reported on a cycle coinciding to the schedule progressing periods. The





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critical paths will be agreed upon by both AEPSC or KPCo and the contractor. Various paths, i.e., primary, secondary, tertiary, etc. will be developed as necessary to track scheduled work and execution efforts.

**2.9** Commodity curves will be utilized for tracking construction related work. The intention will be to validate and provide a higher level of confidence in the physical progress of activities and quantities relating to the schedule.

**2.9.1** The curve data may reside within the schedule and be produced from the software or may be developed within an offline system; however, the installation curve must coincide with the timescale logic of the associated schedule activity.

**2.9.2** The reporting cycle for the updating and distribution of the commodity curves will coincide with the required schedule progress updates.

**2.9.3** Curves for tracking each specific commodity need to be developed in a timely manner as a reasonable level of engineering and defined scope data becomes available. The refinement of curve quantities may continue throughout the lifecycle of the activity as advanced information is obtainable. Commodity curves shall be developed and submitted prior to commodity work (install or remove) being initiated.

**2.9.4** Required minimum data for commodity curves shall include:

- Planned, installed, and forecasted commodities by reporting period.
- Accumulative 'S' curves for planned (total contract duration), installed (contract-to-date), and forecasted (to go) commodities.

### **3.0 PROGRESS SUBMITTALS FOR PROJECT RELATED WORK**

#### **3.1 Schedule Development**

**3.1.1** Contractor shall work with AEPSC or KPCo schedule team to identify appropriate period for developing a Level 3 Project Schedule and the subsequent review, baseline, and integration of such schedule into the IPS (integrated project schedule).

**3.1.2** A determination will be made at the time of contract signature as to the proper timing for completion of Level 3 schedule development. In cases where information may be limited, a rolling wave development approach may be allowed, whereby the contractor develops their detailed schedule in progressive sections, which allows for further future planning without delaying the near term work execution. Further detail or questions



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surrounding this technique should be addressed at the pre-bid meeting or prior to contract approval.

### **3.2 Weekly Progress Submittals (During Construction)**

The comprehensive Weekly Progress Submittal prepared by the Contractor will be required during the construction phase and is due to the Integrated Scheduler no later than 11:00 AM Monday after the close of the prior week. The reporting period will be from 07:00 Monday morning through the end of backshift Sunday night. The schedule data date will be set at 07:00 Monday. The Weekly Progress Submittal will be utilized for the weekly project meeting.

#### **3.2.1 Weekly Progress Submittal will include the following information:**

**3.2.1.1 Updated Project Schedule at Level 3**

**3.2.1.2 Level 3 – 30 day look-ahead schedule**

**3.2.1.3 Current status of:**

- Major Activities Completed (by deliverable)
- Major Activities in Progress (by deliverable)
- Schedule Performance Index
- Major Activities Scheduled for Next Week (by deliverable)

### **3.3 Monthly Progress Submittals**

**3.3.1** The Comprehensive Monthly Progress Submittal is prepared by contractor, submitted to the Integrated Scheduler and is required by AEPSC or KPCo no later than the seventh business day of the calendar month to support internal AEPSC or KPCo reporting requirements to upper management. The submittal will be prepared for the close of the prior business calendar month.

#### **3.3.2 Monthly Progress Submittal will include the following information:**

**3.3.2.1 Executive Summary**

**3.3.2.2 Milestone Schedule Summary detailing Milestones completed to date and in the last month and a recovery plan for Milestones not completed as scheduled.**

**3.3.2.3 Current status of:**

- Major Activities Completed (by deliverable)
- Major Activities in Progress (by deliverable)



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- Schedule Performance Index
- Major Activities Scheduled for Next Month (by deliverable)

- 3.3.2.4** A written assessment including, if required, a recovery action plan of critical path and near critical path activities
- 3.3.2.5** Level 3 Schedule Status of overall project performance
- 3.3.2.6** Level 3 - 30 day look-ahead schedule
- 3.3.2.7** Identify changes to the project critical path and any changes to dates that are recognized as hand-off points to other contractors, AE's, etc...



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### Appendix C: Quarterly Pre-Service Cost Estimates

Bid Item	Description	Q2 2014	Q3 2014	Q4 2014	Q1 2015
1	Estimated cost of acquiring all required regulatory approvals and permits				
2	Estimated Cost of Engineering and Design				
3	Estimated Cost of Environmental Impact Study				
4	Estimated Cost of Identifying and Acquiring Right of Ways				
5	Estimated Material Costs				
6	Estimated Installation and Labor Costs				
7	Other Estimated Costs				

Note: Please indicate whether or not costs are cumulative.



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## Appendix D: Safety Requirements and General Terms & Conditions

See separate attachments:

- 1) Safety and Health Requirements – Rev 8 Core Document.pdf
- 2) Natural Gas Venting, Purging, Inerting Procedure Rev 0.pdf
- 3) PWHA Form – 7-12-11.xls
- 4) GEK 110483c – Cleanliness Requirements for Power Plant Installation, Commissioning, and Maintenance
- 5) AEP General Terms and Conditions for Engineering, Procurement, and Construction Work

Safety requirements outlined in the above mentioned attachments only apply to work performed on AEP/KPCo owned property.



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## Appendix E: Environmental Requirements

### See Separate Attachments:

- 1) CERD: Contractor Environmental Requirements Document
- 2) Environmental Work Compliance Assessment (EWCA)

Environmental requirements outlined in the above mentioned attachments only apply to work performed on AEP/KPCo owned property.

## AEP Generation's Environmental Work Compliance Assessment (EWCA)

**CONSULT THE PEC, CEC, AND/OR ENVIRONMENTAL SERVICES REPRESENTATIVES FOR MORE DETAILS ON ALL ITEMS LISTED BELOW**  
 The EWCA or any other equivalent forms are informational documents for initial and subsequent environmental planning purposes. No claim or representation is expressed or implied that the EWCA is comprehensive, all-inclusive, accurate, and complete or that items not listed will not be present or pose a threat to environmental compliance. The EWCA is a working document and may be revised throughout the term of the Contract at no cost to Owner.

**Location/Work-Site:** Big Sandy Power Plant and Vicinity      **Start Date:** 1-Jul-14      **End Date:** 31-Jul-15

**Contractor/Work Description:** TBD/ BS1 Gas Connection Pipeline

**Work Contacts (Owner & Contractor):** Chris Barton, Len Robinson, Steve Sargent, Dave Vice, Derek Peters, Jeff Clark, Marty Leedy, Jill Lukehart, Steve Austin, Kyle Ruha, Ken Borders, James Burton

**Date Form Completed, Rev 0:** 18-Nov-13      **Date Form Revised (Rev #):** [Click here to enter a date](#)

### Signature Process

**EWCA Completed By:** Kyle Ruha 18-Nov-13      **EWCA Completed By:** Len Robinson/Dave Vice 11-Nov-13

**EWCA Reviewed By:** [Click here to enter a date.](#)      **EWCA Reviewed By:** [Click here to enter a date.](#)

### Environmental Aspects and Impacts of the Work

\*Check mark the red N/A box in each section's Environmental Impacts Header to inactivate a whole segment if Not Applicable

Rev 0	Rev__	Air/Water/Land Aspects	Environmental Impacts    N/A <input type="checkbox"/>	Contractor &/or Owner to be Responsible?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Soil: <input checked="" type="checkbox"/> Call Before You Dig (i.e. 811) <input checked="" type="checkbox"/> Excavation <input checked="" type="checkbox"/> Trenching <input checked="" type="checkbox"/> Grading	Permit/Plan/Notification Notes: Soil excavation, trenching, and grading will be performed during the gas pipeline installation. BSP will obtain and manage the excavation permit for activities occurring on BSP property. Contractor will be responsible for obtaining and managing any excavation permit applicable for activities occurring off of BSP property. (SWPPP).	<input checked="" type="checkbox"/> C <input type="checkbox"/> O
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Contaminated Media Removal <input checked="" type="checkbox"/> Soil <input checked="" type="checkbox"/> Water	Permit/Plan Notes: Contaminated media can be generated with incidental spills associated with refueling and other activities. Care should be exercised to prevent any spills to the soil/ground. Notify the CEC/PEC should any materials become contaminated. If Hydrostatic Testing of the pipeline is required, a Hydrostatic Permit may be required and/or coordinated disposal through the BSP Plant pond system (Solid Waste, HAZWOPER).	<input checked="" type="checkbox"/> C <input checked="" type="checkbox"/> O
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Drilling <input checked="" type="checkbox"/> Boring <input checked="" type="checkbox"/> Pile Driving	Permit/Plan/Notification Notes: Drilling, boring, and pile driving will occur. This is expected in multiple locations. The Contractor is expected to comply with all Local, State, and Federal laws, as well as AEP/BSP policies (Fugitive Oust, SWPPP, SPCC).	<input checked="" type="checkbox"/> C <input type="checkbox"/> O
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Use of Explosives <input type="checkbox"/> Blasting	<a href="#">Click to Select</a> Notes: N/A	<input type="checkbox"/> C <input type="checkbox"/> O
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Working on a Dam	<a href="#">Click to Select</a> Notes: N/A	<input type="checkbox"/> C <input type="checkbox"/> O
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Working: <input type="checkbox"/> Over Water <input type="checkbox"/> On it <input checked="" type="checkbox"/> Near it	Notification Notes: Drilling/boring under the Sandy River is expected to occur. Contractor shall exercise care to prevent any spills. Notify the CEC/PEC should any spills occur (SPCC, Solid Waste)	<input checked="" type="checkbox"/> C <input type="checkbox"/> O
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Erosion <input checked="" type="checkbox"/> Sediment Controls	Permit/Plan/Notification Notes: E&SC's will be implemented as BMP's to prevent sediment from stockpiled soils and any contaminated media from entering storm drains located on the BSP property that discharge directly to the Sandy River. Several environmental permits are applicable to this work-site that cover the need for E&SC's. The contractor is expected to read and follow these permits, as needed (SWPPP, NPDES, 404/401).	<input checked="" type="checkbox"/> C <input checked="" type="checkbox"/> O

<input type="checkbox"/>	<input type="checkbox"/>	Rock or Concrete: <input type="checkbox"/> Crushing <input type="checkbox"/> Screening <input type="checkbox"/> Washout	Click to Select Notes: N/A	<input type="checkbox"/> c <input type="checkbox"/> o
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Ozone Depleting Substances (ODS)	Click to Select Notes: N/A	<input type="checkbox"/> c <input type="checkbox"/> o
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Asphalt <input type="checkbox"/> Pesticides <input type="checkbox"/> Special Coatings	Click to Select Notes: N/A	<input type="checkbox"/> c <input type="checkbox"/> o
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Dust Control/s	Permit Notes: The BSP utilizes approved BMP's to minimize fugitive dust, per their Title V Permit (Fugitive Dust, Storm Water).	<input type="checkbox"/> c <input checked="" type="checkbox"/> o
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Other:	Click to Select Notes:	<input type="checkbox"/> c <input type="checkbox"/> o
<b>Rev 0</b>	<b>Rev</b>	<b>Oil &amp; Chemical Aspects</b>	<b>Environmental Impacts - N/A</b>	<b>C / O</b>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Used Oil: <input checked="" type="checkbox"/> Plant Recycling <input checked="" type="checkbox"/> Contractor Recycling	Plan/Notification Notes: The storage and disposal of Used Oil will be done in accordance with CG 751.00.07 - Mgt of Used Oil. Used Oil will not be mixed with any chemicals, especially hydrocarbons. Small amounts of used oil generated on BSP property can be combined with the BSP Used Oil recycling. Contractor will be responsible for any Used Oil recycling occurring off of BSP property (Solid Waste).	<input checked="" type="checkbox"/> c <input checked="" type="checkbox"/> o
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Oil Storage (in gallons): <input type="checkbox"/> <1,320 <input checked="" type="checkbox"/> >1,320	Plan/Notification Notes: An SPCC Plan is required if more than 1,320 gallons of petroleum products are kept on site by the Contractor. The CEC/PEC will approve of this plan before the product is brought on-site (HAZWOPER, SPCC).	<input checked="" type="checkbox"/> c <input checked="" type="checkbox"/> o
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Chemicals: <input checked="" type="checkbox"/> Storage <input checked="" type="checkbox"/> Labeling <input checked="" type="checkbox"/> Use <input checked="" type="checkbox"/> Handling	Permit/Plan/Notification Notes: All chemicals will be stored & labeled according to AEP and BSP policies as well as all local, state, and federal regulations. Contractor will provide a Chemical Mgmt. Plan for any bulk chemicals (>55 gallons total) prior to bringing them on-site. Contractor will also provide MSDS's to the Site Coordinator for all chemicals to be used prior to bringing them on-site. (Solid Waste, HAZWOPER, Spill Response, HazCom).	<input checked="" type="checkbox"/> c <input type="checkbox"/> o
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Other: <u>Rinsing of Pipe, Equipment, Containers; Hydrostatic Testing (if water disposal involved)</u>	Click to Select Notes: If used in this work, CG 751.00.06 - Hydrostatic Testing will be followed and a permit and/or plan created to deal with this environmental aspect of the work. Contractor is to ensure rinsing and hydrostatic discharge is done in pre-approved locations verified by the CEC/PEC (Solid Waste).	<input checked="" type="checkbox"/> c <input checked="" type="checkbox"/> o

<b>Rev 0</b>	<b>Rev</b>	<b>Waste Aspects</b>	<b>Environmental Impacts - N/A</b>	<b>C / O</b>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Construction & Demolition Debris	Permit/Plan/Notification Notes: C&D debris will be managed in accordance with CG 751.00.09 - Managing Construction & Demolition Debris. (Solid Waste)	<input checked="" type="checkbox"/> c <input type="checkbox"/> o
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Lead Abatement Waste	Click to Select Notes: N/A	<input type="checkbox"/> c <input type="checkbox"/> o
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Asbestos Waste	Click to Select Notes: N/A	<input type="checkbox"/> c <input type="checkbox"/> o
<input type="checkbox"/>	<input type="checkbox"/>	Electrical Work: <input type="checkbox"/> PCB's <input type="checkbox"/> Oils <input type="checkbox"/> Wire <input type="checkbox"/> Transformer <input type="checkbox"/> Capacitor <input type="checkbox"/> Asbestos <input type="checkbox"/> Ballasts <input type="checkbox"/> Mercury Switches	Click to Select Notes: N/A	<input type="checkbox"/> c <input type="checkbox"/> o
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Grinding <input checked="" type="checkbox"/> Cutting <input checked="" type="checkbox"/> Drilling Waste	Permit/Plan/Notification Notes: Grinding, cutting, and/or drilling waste will be picked-up, containerized and disposed of properly (Solid Waste).	<input checked="" type="checkbox"/> c <input type="checkbox"/> o
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Recycling of: <input checked="" type="checkbox"/> Wood <input checked="" type="checkbox"/> Metal <input checked="" type="checkbox"/> Plastic <input checked="" type="checkbox"/> Vegetation <input type="checkbox"/> Other:	Click to Select Notes: The recycling of all materials is encouraged and in some cases mandatory per AEP policy (i.e. Material Management). While on BSP property contractor will follow BSP recycling procedures. (Solid Waste).	<input checked="" type="checkbox"/> c <input type="checkbox"/> o
<input type="checkbox"/>	<input type="checkbox"/>	Special Notifications: <input type="checkbox"/> Demolition <input type="checkbox"/> Asbestos	Click to Select Notes: N/A	<input type="checkbox"/> c <input type="checkbox"/> o



<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Air Permit <input type="checkbox"/> Water Permit <input type="checkbox"/> Waste Permit		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Radioactive Materials	Click to Select Notes: N/A	<input type="checkbox"/> C <input type="checkbox"/> O
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hazardous Waste: <input type="checkbox"/> PCB's (Paint, Caulk, Oil) <input checked="" type="checkbox"/> Hydrostatic Testing Water <input checked="" type="checkbox"/> Rinse Water <input checked="" type="checkbox"/> Chemical Cleaning <input checked="" type="checkbox"/> Spent Solvent <input type="checkbox"/> Other:	Plan/Notification Notes: The generation of these materials is to be handed in accordance with the CERD and a Chemical Mgt Plan (CMP) will be created if a chemical will be used in cumulative quantities of 55 gallons or more (Solid Waste, HAZWOPER).	<input checked="" type="checkbox"/> C <input checked="" type="checkbox"/> O
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Non-Hazardous Waste: <input checked="" type="checkbox"/> Rinse Water <input checked="" type="checkbox"/> Hydrostatic Testing Water <input checked="" type="checkbox"/> Chemical Cleaning <input checked="" type="checkbox"/> Spent Solvent <input type="checkbox"/> Other:	Plan/Notification Notes: The use/generation of these materials is to be handed in accordance with the CERD and a Chemical Mgt Plan (CMP) will be created if a chemical will be used in cumulative quantities of 55 gallons or more (Solid Waste, HAZWOPER).	<input checked="" type="checkbox"/> C <input checked="" type="checkbox"/> O
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Partially Used, Unused, and/or Expired Chemical Products Left Behind	Permit/Plan/Notification Notes: Contractor will not leave an unused, partially used or expired chemical product(s) behind, without written permission. (Solid Waste) <b>*Any such products left behind after demobilization will be shipped back to the Contractor at their expense unless written permission is given or else billed for any waste disposal costs if environmental law prevents shipment.</b>	<input checked="" type="checkbox"/> C <input checked="" type="checkbox"/> O
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Universal Waste: <input checked="" type="checkbox"/> Lamps <input checked="" type="checkbox"/> Batteries <input type="checkbox"/> Other: _____	Plan/Notification Notes: Universal Wastes generated from the work while on BSP property will be properly handled and disposed of through the BSP. Contractor will be responsible for proper disposal for Universal Wastes generated off of BSP property in accordance with local, state, federal regulations. The CEC/PEC can provide a list of materials that qualify under this law. All Universal Waste will be managed in accordance with CG 751.00.02 - Managing Universal Waste (Solid Waste).	<input checked="" type="checkbox"/> C <input checked="" type="checkbox"/> O
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Aerosol Cans	Click to Select Notes: Aerosol cans may not be disposed of in the general trash. Consult with the CEC/PEC for information regarding a Satellite Accumulation Area for empty aerosol cans. Such waste will be processed through the BSP (Solid Waste).	<input checked="" type="checkbox"/> C <input checked="" type="checkbox"/> O
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Pollution Prevention (P2)	Notification Notes: Eco-friendly products are encouraged. Assistance in finding alternatives can be provided by The CEC/PEC (Solid Waste).	<input checked="" type="checkbox"/> C <input type="checkbox"/> O
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sewage Concerns: <input checked="" type="checkbox"/> Portalets <input checked="" type="checkbox"/> Holding Tanks <input type="checkbox"/> Septic System <input checked="" type="checkbox"/> WWTP Hook-up <input type="checkbox"/> POTW Hook-up	Click to Select Notes: WWTP hook ups are available for Contractors setting up facilities on BSP property. While off site sewage options may require permit(s). Contractor is responsible for properly acquiring, permitting, and maintaining any sewage facility they acquire. Contractor is expected to follow CG-751.00.03 - Managing Temp. Sewage Systems as appropriate (Storm Water, Solid Waste).	<input checked="" type="checkbox"/> C <input type="checkbox"/> O
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Other:	Click to Select Notes: N/A	<input type="checkbox"/> C <input type="checkbox"/> O
<b>Rev 0</b>	<b>Rev__</b>	<b>Sensitive Aspects</b>	<b>Environmental Impacts</b> N/A <input type="checkbox"/>	<b>C / O</b>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Species Protection: <input checked="" type="checkbox"/> Vertebrates (birds, mammals, fishes, reptiles, etc.) <input type="checkbox"/> Invertebrates (dams, snails, insects, etc.) <input type="checkbox"/> Plants (flowering plants, ferns, etc.)	Permit/Plan Notes: The Indiana Bat is the only known Endangered Species in the area, any such timbering activities will be coordinated with AEP Land Mgmt accordingly as not to affect this species (Species Protection).	<input type="checkbox"/> C <input checked="" type="checkbox"/> O
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Protected Areas: <input checked="" type="checkbox"/> Cultural <input checked="" type="checkbox"/> Historical <input type="checkbox"/> Prehistoric <input type="checkbox"/> Other:	Permit/Plan/Notification Notes: Potential cultural and/or historical areas may be in the path of the new pipeline. AEP Environmental Services will conduct appropriate investigations to identify these areas (Protected Areas).	<input type="checkbox"/> C <input checked="" type="checkbox"/> O
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Areas: <input checked="" type="checkbox"/> Wetland <input checked="" type="checkbox"/> Woods <input checked="" type="checkbox"/> Stream <input type="checkbox"/> Dune <input type="checkbox"/> Other: _____	Permit/Plan/Notification Notes: Potential preservation woods, protected streams and/or wetlands may be in the path of the new pipeline. AEP Environmental Services will conduct appropriate investigations to identify these areas (Preservation Areas).	<input type="checkbox"/> C <input checked="" type="checkbox"/> O
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Other:	Click to Select Notes: N/A	<input type="checkbox"/> C <input type="checkbox"/> O

Rev 0	Rev	Plans, Policies, Permits, & Permissions	Comments N/A <input type="checkbox"/>	C / O
<input checked="" type="checkbox"/>	<input type="checkbox"/>	For AEP, OVEC/IKEC, FEL &/or PC&C Plant or Work-site and Generation Procurement Use Local Operational Controls, Procedures, & Policies	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No; Notes: <u>BSP will obtain and manage applicable permits (excavation, hot work) for work occurring on BSP property. Contractor will be responsible for obtaining and managing such permits for work occurring off of BSP property.</u>	<input checked="" type="checkbox"/> C <input checked="" type="checkbox"/> O
<input checked="" type="checkbox"/>	<input type="checkbox"/>	AEP Safety Services Corporate Operational Controls, Procedures, & Policies ESH = Environmental, Safety & Health Policy	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No; Notes: <u>Applicable policies for the Contractor to follow include:</u> <input type="checkbox"/> ESH0000013876 - Hex. Chrome Exp. Control <input type="checkbox"/> ESH0000013879 - Mercury Exposure Control <input type="checkbox"/> ESH0000014349 - Methylene Chloride Policy <input checked="" type="checkbox"/> ESH0000013825 - HAZWOPER/Emer. Resp. <input type="checkbox"/> Other: <input type="checkbox"/> ESH0000013995 - Asbestos Management <input type="checkbox"/> ESH0000013882 - Lead Exposure Control <input type="checkbox"/> ESH0000013821 - Cadmium Exp. Control <input checked="" type="checkbox"/> ESH0000013998 - Hazard Communication	<input checked="" type="checkbox"/> C <input checked="" type="checkbox"/> O
<input checked="" type="checkbox"/>	<input type="checkbox"/>	AEP Environmental Services Corporate Operational Controls, Procedures, & Policies EP - Environmental Policy	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No; Notes: <u>Applicable Controls, Procedures and Policies for the contractor to follow include:</u> <input checked="" type="checkbox"/> EP-92-05 Archeological Artifacts Encountered <input type="checkbox"/> EP-92-07 PCB Management Policy <input type="checkbox"/> EP-92-8.5 Asbestos Management Policy <input checked="" type="checkbox"/> EP-93-09 Wetlands Policy <input checked="" type="checkbox"/> EP-95-11 Used Oil/Solvent Mixture <input type="checkbox"/> EP-97-12 Treated Wood Give-Away <input checked="" type="checkbox"/> EP-08-14 Avian Protection Policy <input type="checkbox"/> EP-08-15 PCB Insulation/Capacitors	<input checked="" type="checkbox"/> C <input checked="" type="checkbox"/> O
<input checked="" type="checkbox"/>	<input type="checkbox"/>	AEP Environmental Documents Provided	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No; Notes: <u>Applicable documents provided to the Contractor upon request include:</u> <input checked="" type="checkbox"/> Wetland/404 Permit <input checked="" type="checkbox"/> Stream/401 Permit <input checked="" type="checkbox"/> Industrial NPDES Permit <input checked="" type="checkbox"/> Construction Storm Water Permit <input checked="" type="checkbox"/> Industrial Storm Water Permit <input type="checkbox"/> Pollution Prevention (P2) Plan <input checked="" type="checkbox"/> Title V Air Permit <input checked="" type="checkbox"/> Sewage Holding Tank Permit <input type="checkbox"/> Septic System Permit <input checked="" type="checkbox"/> Portalet Permit <input type="checkbox"/> Groundwater Protection Plan <input type="checkbox"/> Other:	<input checked="" type="checkbox"/> C <input checked="" type="checkbox"/> O
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Plans Required For Work	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No; Notes: <u>Applicable plans required from Contractor to perform work:</u> <input checked="" type="checkbox"/> Site Drainage Plan <input checked="" type="checkbox"/> SPCC Plan <input checked="" type="checkbox"/> Hydrostatic Plan <input checked="" type="checkbox"/> Demobilization Plan <input checked="" type="checkbox"/> Archeological Evaluation <input checked="" type="checkbox"/> Erosion & Sediment Control (E&SC) Plan <input checked="" type="checkbox"/> Chemical Management Plan <input checked="" type="checkbox"/> Waste Management Plan <input checked="" type="checkbox"/> Sewage Management Plan <input checked="" type="checkbox"/> Spill Response Plan <input checked="" type="checkbox"/> Fugitive Dust / Emissions Plan <input type="checkbox"/> Other:	<input checked="" type="checkbox"/> C <input type="checkbox"/> O
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Other:	Notes:	<input type="checkbox"/> C <input type="checkbox"/> O
<b>Special Instructions -</b> *Check this box to spell check document <input checked="" type="checkbox"/>				
Name of Contractor's eCP: TBD		eCP Will Be:	<input type="checkbox"/> Full-time <input checked="" type="checkbox"/> Part-time (20%) <input checked="" type="checkbox"/> On-site <input type="checkbox"/> Off-site	
eCP Training Requirements:		<input checked="" type="checkbox"/> Spill Awareness <input checked="" type="checkbox"/> HAZWOPER Choose an item.	<input checked="" type="checkbox"/> SWP3 <input checked="" type="checkbox"/> SPCC <input checked="" type="checkbox"/> Other: <u>Hydrostatic Testing, Protected Areas, Preservation Areas, and Species Protection</u>	<input checked="" type="checkbox"/> Dust <input checked="" type="checkbox"/> Solid Waste - <input checked="" type="checkbox"/> Hazardous <input checked="" type="checkbox"/> Non-Haz <input type="checkbox"/> Department of Transportation / Materials of Trade (For Transportation of Hazardous Materials)
Worker Training Requirements:		<input checked="" type="checkbox"/> Spill Awareness <input checked="" type="checkbox"/> HAZWOPER Choose an item.	<input checked="" type="checkbox"/> SWP3 <input checked="" type="checkbox"/> SPCC <input checked="" type="checkbox"/> Other: <u>Hydrostatic Testing, Protected Areas, Preservation Areas, and Species Protection</u>	<input checked="" type="checkbox"/> Dust <input checked="" type="checkbox"/> Solid Waste - <input type="checkbox"/> Hazardous <input type="checkbox"/> Non-Haz <input type="checkbox"/> Department of Transportation / Materials of Trade (For Transportation of Hazardous Materials)
Env. Event Notification Authority:		<input type="checkbox"/> Owner Only <input type="checkbox"/> Contractor, if Owner is Unavailable within: Enter time= _____ Choose an item.	<input type="checkbox"/> Owner to Provide Notification Training	
Spill Kits Required:		<input checked="" type="checkbox"/> Around the work-site <input checked="" type="checkbox"/> Vehicles <input checked="" type="checkbox"/> Equipment <input type="checkbox"/> Other:	Notes:	

Source Waste Generator Will Be:	<input type="checkbox"/> Owner	<input checked="" type="checkbox"/> Contractor is Co-Generator	List special instructions: <i>Contractor is responsible for any waste(s) occurring off of AEP/BSP property</i>	
Week Day SWP3 Inspections:	<input type="checkbox"/> Owner	<input checked="" type="checkbox"/> Contractor	Week End SWP3 Inspections:	<input type="checkbox"/> Owner <input checked="" type="checkbox"/> Contractor
Sediment Track-out Clean-up:	<input type="checkbox"/> Owner	<input checked="" type="checkbox"/> Contractor	If Contractor - List other areas responsible for: _____	




# Generation Policy/Document Approval Cover Sheet

<b>Document Type</b>	ESH Enterprise	<b>Document Sub-Type</b>	Procedure/Guideline
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	<b>Contractor Environmental Requirements Document</b>	<b>Rev. # 1 Date: 4/15/13</b>	<b>Page 1 of 23</b>
<i>Christian Beam, VP Projects, Controls, &amp; Construction (PC&amp;C)</i>		<i>PC&amp;C, F&amp;H Plants, FEL, Generation Procurement, ES&amp;H Management Systems, &amp; Environmental Services</i>	
Document Holder		Sponsoring Organizations	

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## **1.0 DEFINITIONS**

- 1.1 Assessment** – A physical walk down of the work-site(s) using checklists or other methods to record compliance of the Work with environmental laws, policies, and Best Management Practices.
- 1.2 Contractor Reimbursement** – The term “Owner will pay for” or “Owner will reimburse Contractor the cost of” will be in accordance with the “Extra Work” or “Cost-Plus Work” provisions of any resulting contract.
- 1.3 Discharge** – Includes, but is not limited to any spilling, leaking, releasing, pumping, pouring, emitting, emptying or dumping of oil, chemicals or process waters, etc. into the environment (e.g., land, water or air).
- 1.4 Emergency Environmental Situation** – An event that demands immediate action to protect the health, wellbeing, and/or condition of the surrounding environment and community including ground water, surface water, land, and air.
- 1.5 environmentally Competent Person (eCP)** – Contractor-designated person(s) is one who by way of training and/or experience:
- 1.5.1** Is capable of identifying existing and predictable environmental risks in regards to the Work, surroundings or working conditions that may be non-compliant, unsanitary, hazardous or dangerous to employees, the public or the environment.
  - 1.5.2** Understands the required engineering controls to mitigate such risk and has the authorization to take prompt corrective measures to initiate, minimize, and/or remedy environmental issue(s).
  - 1.5.3** Has completed all of Owner required training as described in section 6.1, including any additional training as specified in the Environmental Work Compliance Assessment (EWCA). In addition, the environmentally Competent Person shall be able to clearly communicate to the workers, Owner’s environmental requirements and the environmental controls they are expected to utilize in the performance of their Work.
- 1.6 Environmental Event Report** – Owner’s environmental incident reporting form that Contractor is required to complete in regard to environmental incidents, corrective actions and preventive actions jointly agreed upon, along with what will be or has been implemented to ensure a similar environmental incident will not be repeated.
- 1.7 Environmental Management Plan** – A document prepared by Owner that outlines certain environmental activities, planning, responsibilities, practices, procedures, processes, resources or standards to be carried out to meet Owner’s environmental policy and to achieve its compliance objectives.
- 1.8 Environmentally-Sensitive Area** – Place where even minor disturbances to the natural order can impact the ecological balance and/or place the Owner at environmental risk. Such areas can include, but are not limited to wetlands, water bodies, designated conservation areas, parks, preserves, and recreational areas.
- 1.9 Environmental Management System** – A series of plans or documents consisting of proven processes to conduct, monitor, and correct all environmental activities within an organization. These processes can either be written, verbal or a combination of both.
- 1.10 HAZWOPER** – Training requirements under OSHA’s Hazardous Waste Operations and Emergency Response regulation. For additional information on this requirement, reference 29 CFR 1910.120 and/or 1926.65. A summation of the training that Owner requires is outlined below:

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- 1.10.1 Under First Responder – Awareness (Level 1) spill and emergency training:** personnel may report a leak, release, spill, and/or suspicious puddle to their environmentally Competent Person who handles such calls, can identify the type of material if they can do so at a safe distance from it, can keep others from approaching the spill area, and who can do all of this without any additional Personal Protective Equipment (PPE).
- 1.10.2 Under First Responder – Operations (Level 2) spill and emergency training:** personnel may stop spills remotely by closing valves, turning off equipment, etc. and/or prevent the spread of spills by covering drains, placing dikes, booms or other absorbents at a safe distance. However, they may not approach the spill/release area unless it has been determined by authorized personnel in charge that it is safe to do so, have been taught, and are qualified to use PPE appropriate for the situation. First Responder - Operations training should take approximately 8 hours to perform depending upon knowledge of the chemicals being used and is subject to review and acceptance by Owner. Higher levels of HAZWOPER training may be requested by Owner (i.e. Level 3, 4 or 5), if deemed necessary.
- 1.11 Jurisdictional Wetland or Stream –** Areas determined by the US Army Corps of Engineers and/or USEPA that are subject to Section 404 of the Clean Water Act of 1977 or Section 10 of the Rivers and Harbors Act of 1899. Isolated wetlands or streams subject to state environmental agency jurisdiction are included in this definition.
- 1.12 Minor Spill –** A discharge of oil, chemicals or process waters to the environment in quantities below any regulatory reporting threshold amount. This threshold amount is dependent on the environmental media the spill occurs in and the type of material spilled.
- 1.13 Negative Environmental Impact –** A determination that the Work is having a negative impact on the environment that might affect the local population, endangered species, biodiversity, archeological artifacts, historical significance, community beauty, environmentally-sensitive areas, etc.
- 1.14 Oil –** Oil of any kind or in any form, as defined by 40 CFR 112.2, including, but not limited to fats, oils or greases of animal, fish or marine mammal origin; vegetable oils, including oils from seeds, nuts, fruits or kernels; and other oils and greases, including petroleum, fuel oil, sludge, synthetic oils, mineral oils, oil refuse or oil mixed with wastes other than dredged spoil.
- 1.15 On Scene Incident Commander –** An Owner, Contractor or government person who directs the emergency response options during an Emergency Environmental Situation. Topics addressed in this person's training to assume this position include Emergency Operations Centers, Incident Management System implementation, structure and function of a command, communications, team leadership, managing responder safety, and site characterization. Per OSHA's HAZWOPER Standard, this person typically receives 24 hours training plus any additional training needed to achieve competency all other areas mentioned above (i.e. Level 5).
- 1.16 Records –** Documents of an environmental nature to record compliance with this specification and/or Federal, State, and/or Local rules and regulations. Records may include, but are not limited to permits, reports, studies, evaluations, logbooks, photographs, plans, employee training, and material classifications. The requirements to maintain this documentation are usually outlined within regulations, permits, training, etc.
- 1.17 Waste Determination –** A recorded communication process by which a waste (i.e. solid, liquid or gas) is classified to be a Solid Waste or Hazardous Waste, and why, for the purpose of disposal in accordance with Resource Conservation and Recovery Act (RCRA) rules and regulations. A waste can also be excluded from this process and be specifically covered under other rules and regulations.

## **2.0 INTRODUCTION**

- 2.1** Owner's philosophy is that no aspect of its operations is more important than the health and safety of people and that its customers' needs will be met in harmony with the environment. Owner is committed to social responsibility and sustainability. Owner is proactive in its efforts to protect people and the environment by committing to:
- 2.1.1** Utilizing Contractors that maintain compliance with all applicable environmental requirements;
  - 2.1.2** Ensuring that Contractors performing Work for Owner understand and integrate environmental responsibilities into their business practices;
  - 2.1.3** Utilizing Contractors that support continuous process improvement of their environmental performance; and
  - 2.1.4** Utilizing Contractors that eliminate hazards through continual process improvement.
- 2.2** The purpose of this document is to convey Owner's minimum expectations to all Contractors on how to meet its philosophy and policy outlined in 2.1 above. The scope of this document is that it is applicable to all of Owner's Fossil and Hydro Generation facilities; its Projects, Controls, and Construction work-sites; its Fuel, Emission, and Logistics - Operations and Mining facilities and work-sites, and also Generation Procurement too. Otherwise stated, Contractor shall exercise prudent planning and diligence regarding the environmental aspects of all Work to be performed.
- 2.3** Owner's environmental requirements are to be used in conjunction with the applicable General Terms and Conditions for Work performed at Owner's work-sites. These requirements convey Owner's minimum requirements regarding environmental practices and may exceed the requirements of Federal, State, and/or Local regulatory agencies. These Requirements are in addition to any of Contractor's and its subcontractors own policies, procedures, guidance, instructions or other requirements. Contractor and its subcontractors shall comply with all project, outage, and/or facility environmental rules and all procedures issued by Owner; provided that such rules and procedures do not conflict with any other Federal, State, and/or Local agency's environmental laws, rules or regulations. However, if such a conflict does arise, precedence shall be given to the most stringent environmental laws, rules, regulations or policies that apply.
- 2.4** Contractor understands that any environmental requirements as may be provided by Owner are not intended to (and do not) provide legal or other professional advice. Owner makes no representations or warranties that the information contained herein satisfies Federal, State, and/or Local laws. Contractor agrees that it shall consult with its own legal counsel or other qualified persons with respect to satisfying the requirements of any such laws as may be applicable to its Work. Contractor acknowledges and agrees that: (i) It is not relying on any claim or representation of Owner relative to any environmental requirement, (ii) Owner expressly disclaims any claim or representation that the information contained in any environmental requirement will produce any particular result, and (iii) Owner shall not be responsible for any errors or omissions in the design, implementation, and/or enforcement of any environmental requirements. Contractor remains completely responsible for its compliance with the requirements of Federal, State, and/or Local environmental laws.
- 2.5** Contractor shall designate an environmentally Competent Person(s) who represents Contractor and who shall have full and complete authority to act on behalf of Contractor to manage, assess, coordinate, and enforce its environmental compliance during performance of Work. Contractor shall provide Owner with the resumes of the proposed environmentally Competent Person(s). While the Owner may not designate an individual or individuals to perform this role, qualifications for these individuals shall include the proper training listed in section 6.1.1 and satisfactory work



experience as determined by Owner. Contractor's environmentally Competent Person(s) shall be on-site or off-site, full-time or part-time at the discretion of the Owner, as indicated on the Environmental Work Compliance Assessment (EWCA) or Owner's localized, equivalent form. Environmentally Competent Person(s) shall notify Owner of any environmental issues to be remedied. Contractor's Workers are to immediately notify the environmentally Competent Person(s) of any environmental issues they observe.

- 2.6 If Owner believes that a non-compliant environmental condition exists at the work-site which is a failure to comply with this Contractor Environmental Requirements Document and/or a legal demand of a Federal, State, and/or Local law or regulation, Owner shall have the right to immediately order corrective measures or stop Work until the non-compliant condition is corrected. To the extent Contractor has caused the non-compliant condition and there are subsequent delays or impacts to the Work, Contractor will be responsible for any costs it incurs to bring the Work into compliance and costs associated with Work stoppage. This provision does not relieve Contractor of its responsibility for environmentally-compliant work practices nor imposes upon Owner any obligation to supervise Contractor's work.
- 2.7 Contractor's failure to comply with and enforce these environmental requirements and all Federal, State, and/or Local agency laws, rules, and/or regulations applicable to the Work may be cause for the Contract to be terminated and may prevent eligibility for future work.
- 2.8 Contractor shall remove from Owner's work-sites any worker(s) who repeatedly fail(s) to comply with this Contractor Environmental Requirements Document.

### **3.0 ENVIRONMENTAL PLANNING**

#### **3.1 Environmental Work Compliance Assessment (EWCA)**

- 3.1.1 Prior to Contractor beginning Work, Owner will provide Contractor with an initial EWCA using the form located in Attachment A. Owner may provide an enhanced, equivalent version of the EWCA at some of its facilities that are site specific. The EWCA or any other equivalent forms are informational documents for initial and subsequent environmental planning and communication purposes. No claim or representation is expressed or implied that the EWCA is comprehensive, all-inclusive, accurate, complete or that items not listed will not be present or pose a threat to environmental compliance.
- 3.1.2 Contractor shall meet with Owner prior to commencing Work to inform Owner as to how it intends to implement the requirements listed in the supplied EWCA throughout the course of the Work. Contractor may invite its subcontractors to attend these meetings and in some cases may be required to do so by Owner. Contractor may be required by Owner to have its subcontractor complete an EWCA in addition to its own.
- 3.1.3 With prior Owner approval, Contractor environmental plans, procedures or guidelines in response to the EWCA may be included in the Health and Safety Plan (HASP) as required by Owner's S&H Requirements Document. However, for larger or environmentally complicated projects, all such information should be provided as a separate document to Owner.
- 3.1.4 The EWCA does not relieve Contractor of its obligation to conduct continuous environmental assessments of the Work. If Contractor determines during the performance of its Work that there are negative environmental impacts, concerns, questions, etc. not listed on the original EWCA, Contractor shall immediately inform Owner and the EWCA will be updated jointly by Owner and Contractor. Owner shall then be informed by Contractor of how it will manage such Work related activities which could result in a negative environmental impact.

**3.1.5** After Owner evaluates the Contractor's scope-of-work, Owner may waive any portion or all of the Additional Environmental Requirements listed in Section 6 of the CERD. Should this take place, the Section(s) waived will be documented on the EWCA or an Exemption Form will be filled out.

**3.1.6** Contractor's environmentally Competent Person(s) shall communicate all initial and subsequent environmental aspects addressed in the EWCA to its employees, provide environmental training as required, and will oversee the implementation and management of each environmental aspect of the Work.

### **3.2 Owner's Environmental Management Plans or Instructions**

**3.2.1** Contractor shall comply with Owner's Environmental Management Plan(s) or Instructions, as provided. Contractor may also be required to participate in Owner's Environmental Management planning activities.

### **3.3 Environmental Audits and Inspections**

**3.3.1** Random and scheduled environmental audits or inspections may be conducted by Owner or by a Federal, State, and/or Local agency representatives. Contractor shall cooperate fully with all inspector/auditor representatives during such environmental inspections or audits. Contractor shall have available upon request, all applicable environmental records required as part of the Work, work-site permits or applicable environmental laws or regulations. A typical audit form to be used in conjunction with the CERD is shown in Attachment B and is called the Contractor Environmental Evaluation. Owner will conduct at least one audit evaluation per calendar year at each of its facilities or work-sites.

**3.3.2** For additional requirements on handling Regulatory Inquiries, refer to Owner's document on Contractor Safety & Health Requirements.

## **4.0 ADMINISTRATIVE**

### **4.1 Record Availability**

**4.1.1** Prior to the start of Work, Contractor and Owner shall agree upon the appropriate means of maintaining on-site environmental records and documentation applicable to the Work. Contractor shall provide a copy of all applicable records and documentation (e.g. permits, training records, etc.) to Owner upon its request and at the completion of the Work.

### **4.2 Communication**

**4.2.1** Unless directed otherwise, Owner will be the single point of contact for all regulatory agency interaction for environmental communication (written or verbal) that is applicable to the Work. For emergency communication requirements, see section 5.1. For non-emergency communication requirements, see section 5.2.

**4.2.2** Contractor shall ensure that its personnel clearly understand oral and written instructions, signs, and labels associated with the Work. This includes, but is not limited to ensuring they understand the scope of the Work they are to perform, Owner's Environmental Management Plans or Instructions (see section 3.2), Contractor's Environmental Plans, all other Owner and/or Contractor specific training, site specific environmental permits/plans, and/or Hazard Communication manuals, as they pertain to the Work.

## **5.0 EMERGENCY PREPAREDNESS AND RESPONSE**

### **5.1 Discharges, Spills or Releases**

- 5.1.1** Prior to commencing Work, Contractor shall review with Owner its work-site specific environmental emergency response plans involving potential discharges, spills or releases from substances, chemicals, materials or products that may be brought on-site. Owner and Contractor shall jointly agree who will be responsible for making immediate notifications to governmental entities of oil spills to water and releases of reportable quantities of hazardous substances to the environment. Additionally, Owner and Contractor shall jointly agree who will be responsible and to what extent for responding to an emergency situation based on personnel qualifications, availability, experience, etc. and the type of substances, chemicals, materials or products involved.
- 5.1.2** Owner's Environmental Coordinator, environmentally Competent Person or designee is responsible for assisting Contractor in carrying out its emergency environmental duties at the work-site and other associated issues with the Work. This person will verify the Contractor's proper clean-up of all discharges, spills or releases that occurred during an Emergency Environmental Situation.
- 5.1.3** In the event of a discharge, spill or release that results in an Emergency Environmental Situation, Contractor shall identify the material and immediately notify Owner. Whoever has been identified in 5.1.1 as the emergency responder for a specific substance, chemical, material or product, shall attempt to stop or contain the source from spreading, reaching a drain, and/or waterway; as long as conditions are safe to perform this task and the persons are properly trained or otherwise qualified to do so in accordance with all applicable Federal, State, and/or Local laws and regulations, such as 29 CFR 1910.120 or 29 CFR 1926.65, but the more stringent shall apply.
- 5.1.3.1** When possible, Owner will assist Contractor in conducting all required response actions and may perform the duties of the On Scene Incident Commander, if qualified to do so or until relieved by a qualified responding governmental agency or authorized response Contractor.
- 5.1.4** In all States where Owner has Work to be performed, there is an immediate notification requirement of reportable discharges, spills or releases to an environmental agency, if it meets certain threshold requirements. 'Immediately' has been interpreted by AEP, based upon the monetary penalties outlined in EPA's 'Enforcement Response Policy', to be within 15 minutes of discovery of the discharge, spill or release. If the Owner's representative cannot be reached within the timeframe allowed by the EWCA and the Contractor has been designated on it to make any Federal, State, and/or Local agency notifications; the Contractor's eCP will conduct this task.
- 5.1.4.1** If the Contractor has been authorized to conduct such official notifications, Owner will train the Contractor's eCP to conduct this important responsibility.
- 5.1.4.2** If possible, Owner's immediate representative on-site shall have the opportunity to review and approve such notifications or to even conduct it on behalf of the Contractor. This requirement shall in no way impede or restrict the ability of the Contractor to provide such official notification within the required regulatory timeframe.
- 5.1.4.3** For any Contractor-Initiated agency notifications, Contractor shall provide Owner with all incident and reporting information immediately after this notification takes place or when the incident is under control.
- 5.1.5** Contractor shall document all such Emergency Environmental Situations using the Environmental Event Report (EER) form located in Attachment C and shall submit the completed report to Owner the following work day. Equivalent spill reporting forms may

be used and can be provided by the Owners facilities or by the Contractor themselves. All spills of any quantity will be documented.

- 5.1.6 Contractor may be required to participate in Owner's investigation into the facts and circumstances of an Owner or Contractor initiated agency notification that resulted from an environmental incident, spill, release, discharge, and/or event.

## 5.2 Notification Requirements for Non-Emergency Environmental Situations

- 5.2.1 Contractor shall notify Owner as soon as possible of all non-emergency environmental situations. These can include, but are not limited to minor oil/chemical spills (as defined by Owner at each work-site), wastewater or process water discharges, sewage seepage, complaints from the general public/Owner's neighbors or events that do not trigger the immediate notification to a regulatory agency.
- 5.2.2 Contractor shall document non-emergency events using the EER form located in Attachment C and shall submit the completed report to Owner the following Work day after notifying Owner as required in 5.2.1. Equivalent spill reporting forms may be used and can be provided by the Owners facilities or by the Contractor themselves. All spills of any quantity will be documented.

## 6.0 ADDITIONAL ENVIRONMENTAL REQUIREMENTS

### 6.1 Environmental Training and Qualification Requirements

- 6.1.1 Environmentally Competent Person(s) shall have environmental training that is appropriate to the type of Work that the Contractor routinely performs, in addition to having the training specified in the EWCA. The typical training that an environmentally Competent Person is expected to have may include, but is not limited to the following and shall be provided at Contractor's sole expense:
- 6.1.1.1 Training that meets the requirements of OSIIA's HAZWOPER Standard (1910.120 or 1926.65) for First Responder - Awareness (Level 1). The environmentally Competent Person(s) must be able to demonstrate to Owner that they meet these minimum requirements. The requirement to have this type of training or similar will be identified on the EWCA.
  - 6.1.1.2 If the type of Work that the Contractor routinely performs involves the use of Hazardous Materials or Wastes, they are expected to demonstrate their ability to the First Responder - Operations stage (Level 2) for spill response according to OSIIA's HAZWOPER Standard. The requirement to have this type of training will be identified on the EWCA. Additional training the Contractor's environmentally Competent Person may be required includes the following.
    - 6.1.1.3 Storm Water Pollution Prevention
    - 6.1.1.4 Spill Prevention, Control, and Countermeasures
    - 6.1.1.5 Fugitive Dust Emissions and Control
    - 6.1.1.6 Solid and Hazardous Waste Management
    - 6.1.1.7 Other environmental training, as identified on the EWCA (e.g. wetlands, Ozone Depleting Substances, etc.)
- 6.1.2 Contractor's employees and workers shall be trained and/or qualified by Contractor's environmentally Competent Person(s) for the environmental portion of the Work they will

be performing, as identified within the EWCA. This training should focus on the worker(s) expected duties, especially those that could create environmental risk, and/or potentially create an environmental discharge, spill or release for which an emergency response may be necessary. General environmental training typically includes, but is not necessarily limited to the following training opportunities listed below depending on their specific work assignments.

- 6.1.2.1** HAZWOPER First Responder - Awareness training may be required per the EWCA and will be provided by the Contractor's environmentally Competent Person(s) or its third party training provider. This training will meet the requirements of OSHA's HAZWOPER Standard (1910.120 or 1926.65). This training will be performed annually, but could be more often if required by Owner. This training is often site-specific so additional training may be necessary for workers reassigned to other Work. The requirement to have this type of training will be identified on the EWCA. Contractor shall maintain all training records as stated in section 4.1.
- 6.1.2.2** If the type of work that Contractor's employees and craft routinely performs involves the use of Hazardous Materials or Wastes, then they are expected to demonstrate their ability to the First Responder - Operations stage (Level 2) for spill response according to OSHA's HAZWOPER Standard (1910.120 or 1926.65). The requirement to have this type of training will be identified on the EWCA. Additional training the Contractor's employees may be required to have includes the following.
  - 6.1.2.3** Storm Water Pollution Prevention Awareness
  - 6.1.2.4** Spill Prevention, Control, and Countermeasures Awareness
  - 6.1.2.5** Fugitive Dust Emissions and Control Awareness
  - 6.1.2.6** Solid and Hazardous Waste Management Awareness
  - 6.1.2.7** Other environmental training, as identified on the EWCA (e.g. wetlands, Ozone Depleting Substances, etc.)
- 6.1.3** Contractor is responsible for the cost of all HAZWOPER First Responder - Awareness (Level 1) training for its direct employees and workers, including contingent staff (i.e. those who typically travel from job to job for the Contractor).
- 6.1.4** Owner will reimburse Contractor the cost of all HAZWOPER First Responder - Awareness (Level 1) training for all non-direct (e.g. temporary union craft or non-union craft) workers. This HAZWOPER training should take up to, but not more than 2 hours to perform and this training is subject to review and acceptance by Owner.
- 6.1.5** Owner will reimburse Contractor for the cost of its worker(s) attending Owner-required training, as specified below. Contractor shall submit timesheets for Owner's review and approval for all such training.
  - 6.1.5.1** Owner's Environmental Management Plan(s) or procedures training, if applicable;
  - 6.1.5.2** Site-specific environmental orientation (e.g. waste storage practices, environmental emergency actions, Used Oil procedures, Avian Protection Program, etc.). Site-specific environmental orientation may take up to 1.5 hours in aggregate;

- 6.1.5.3 A periodic refresher may be required (e.g. Storm Water Awareness, Universal Waste Awareness), per Owner or regulatory direction; and
- 6.1.5.4 Additional training may be required, as determined by Owner, based on site specific issues (e.g. Process Water Spill Awareness, Wetlands Protection, etc.).
- 6.1.6 If on-going work observations indicate additional environmental hazards or if the scope of work changes, Owner may require Contractor to augment the training required in 6.1.1, 6.1.2, and 6.1.4.
- 6.1.7 If Contractor fails to comply with Owner's environmental requirements and/or fails to achieve environmental compliance as it relates to the Work, Owner may require that the environmentally Competent Person(s) and/or its employees be replaced or receive additional training at no additional expense to Owner.

## 6.2 Chemical Management Plans

- 6.2.1 This section applies to hazardous substances, chemicals, materials or products that Contractor may bring on Owner's work-sites (e.g. Two-Part Epoxy Resins, Gasoline, Ammonia, Polymers, etc.). These are substances or materials deemed hazardous by Federal, State, and/or Local regulations, where exposure to them may result in adverse effects on the health or safety of employees and/or contamination of the environment.
- 6.2.2 If identified on the EWCA, Contractor shall prepare a Chemical Management Plan for all hazardous substances, chemicals, materials or products that will be stored on-site in cumulative quantities equal to or greater than 55 gallons. Areas to address in the Chemical Management Plan include, but are not limited to:
  - 6.2.2.1 Identifying all applicable hazardous substances, chemicals, materials or products and how they will be used;
  - 6.2.2.2 Description of how all applicable hazardous substances, chemicals, materials or products (e.g. flammables, combustibles, caustics, etc.) will ultimately be containerized and stored (i.e. fire-rated storage unit);
  - 6.2.2.3 Description of spill response resources that Contractor will have available (e.g. spill kits/materials, equipment, manpower, and Personal Protective Equipment) and how potential spills will be managed;
  - 6.2.2.4 The frequency of Contractor's inspections of all applicable hazardous substances, chemicals, materials or products, a copy of the inspection form to be used, and who will perform these inspections;
  - 6.2.2.5 Identification of Contractor's primary and alternate Chemical Management Plan points of contact; and
  - 6.2.2.6 Any oil products to be used and stored on-site that are not covered under an applicable Spill Prevention Control and Countermeasures (SPCC) Plan shall be covered under the Contractor's Chemical Management Plan. This part of the plan shall include the location of all such oil product containers with an individual capacity equal to or greater than 55 gallons.
- 6.2.3 All chemical storage containers to include "Conex" boxes shall be marked on their exterior with appropriate labeling made of Ultra-Violet resistant material which will include Contractor identification, contact information, and chemical hazards.

- 6.2.4 Contractor may be required to submit an updated Chemical Management Plan if Owner requires revisions to the original based upon scope of work changes, etc. that require additional substances, chemicals, materials or products be brought on-site.
- 6.2.5 Contractors performing Work in Michigan or Louisiana may be required to follow Michigan's Rule 5 Pollution Incident Prevention Plan requirements or Louisiana's Spill Prevention and Control Plan requirements for chemicals at Owner's work-site(s).
- 6.2.6 Prior to Contractor demobilizing, any remaining substances, chemicals, materials or products (not yet determined to be a waste by Owner) must be removed by Contractor, including partially used containers. No substances, chemicals, materials or products shall be left on Owner's work-site without written authorization. Any substances, chemicals, materials or products found to be left on-site will be returned to Contractor and Contractor billed for shipping and handling.
- 6.2.6.1 For any substances, chemicals, materials or products left behind without prior approval by Owner and are determined to be a waste incapable of being returned to Contractor because of Federal, State, and/or Local regulation or law; Owner will either properly dispose of this waste and Contractor will be billed for this service or else notify Contractor to come back and properly dispose of the waste itself. Owner will decide which option is in the best interest of the corporation.
- 6.2.7 For additional requirements on Hazard Communication and Hazardous Materials Management, refer to Owner's document on Contractor Safety & Health Requirements.

### 6.3 Spill Prevention, Control and Countermeasures

- 6.3.1 Owner will instruct Contractor on the need to develop and/or maintain a Spill Prevention, Control, and Countermeasures (SPCC) Plan or follow Owner's Plan, via the EWCA document. If required, the Contractor's plan must be reviewed and approved by Owner prior to oil/fuel being brought on-site. If Contractor is required to have and maintain a SPCC Plan, it must meet the requirements of the U.S. EPA (40 CFR 112). This is required if Contractor anticipates having greater than 1,320 cumulative gallons of oil/fuel storage capacity on-site counting all containers equal to or greater than 55 gallons, regardless of the potential to discharge to nearby navigable waters and adjoining shorelines.
- 6.3.2 Contractors performing Work in Virginia or Louisiana may be required to follow Virginia's Chapter 91 and 9 Virginia Administrative Code 25-91-10 or Louisiana's Spill Prevention and Control Plan requirements for Above-ground Storage Tanks at Owner's work-site(s).
- 6.3.3 Contractor shall document and perform at a minimum monthly visual inspections of all applicable oil/fuel containing equipment, containers, and storage areas as specified within their approved SPCC Plan. These inspections shall occur no sooner than 14 days and no later than 30 days from the date of the last inspection. Owner's site-specific policies and/or State/Local regulations may require more frequent inspections than once a month.
- 6.3.4 Contractor shall remove accumulated rainwater to allow their secondary containment to function as designed. Contractor shall inspect all of its secondary containments for the presence of oil/fuel and/or sheens, and remove all oil/fuel and/or sheens prior to discharge and manage the removed materials in compliance with all applicable regulations, statutes, and Owner's requirements. Owner shall be notified if the presence of oil/fuel and/or sheens is observed.
- 6.3.5 Oil-filled equipment which has not been initially placed into service (i.e. not connected to Owner's facilities) fall under section 6.3.1 until it becomes actively connected (i.e. placed

into service and connected for its designed purpose), unless otherwise directed by Owner. An example of this would be an oil-filled transformer that has not yet been energized or an oil-filled gearbox still sitting in the lay down yard.

- 6.3.6 Unless prior written permission is given by Owner, Contractor shall not perform any repairs, modifications, and/or maintenance activities on any bulk fuel tanks on-site if such activities relate to corrosion, damage, interior inspections, and/or pressure testing for integrity.
- 6.3.7 The filling of all bulk storage containers and all equipment refueling by Contractors shall be attended to at all times by an environmentally Competent Person and/or trained worker(s), to minimize the potential for spillage. All fuel storage containers shall be marked accordingly with appropriate labeling made of Ultra-Violet resistant material which will include Contractor identification, contact information, and chemical hazards.

#### 6.4 Storm Water Pollution Prevention

- 6.4.1 Work performed on Owner's property may require a Storm Water Pollution Prevention Plan (SWPPP). Contractor may be required to develop and maintain a SWPPP, comply with, and/or obtain a storm water permit as indicated on the EWCA. If required to obtain a storm water permit, develop, and/or comply with a SWPPP; Contractor will coordinate all such activities within the required time frame before earthwork or other regulated activities commence.
- 6.4.2 If Owner develops a SWPPP, Contractor shall comply with Owner's plan. In addition, Contractor may be required to maintain the SWPPP as indicated on the EWCA.
- 6.4.3 Storm water and/or erosion and sediment control inspections are to be performed as specified within the SWPPP. These inspections may be initiated and be the responsibility of the Owner or Contractor, as defined in the scope of work documents.
  - 6.4.3.1 The designated and/or chosen inspection frequency as allowed per the SWPPP shall be maintained by the responsible party and not deviated from.
  - 6.4.3.2 If the Contractor does not have workers on site during or after a qualifying rain event per the approved SWPPP, then the Owner may elect to have the Contractor provide such coverage in order to perform SWPPP inspection and/or maintenance work. Owner will pay Contractor for these additional inspections as they occur.
- 6.4.4 If any storm water and/or erosion & sediment control repairs and modifications are required, they shall be made in accordance with the SWPPP.
- 6.4.5 Storm water Best Management Practices (BMP) are physical, structural or managerial practices employed before, during, and/or after the Work that have been proven and accepted to help reduce or prevent pollution. BMP(s) may need to be implemented wherever possible to minimize potential environmental impacts to Owner's operations. BMP(s) can vary between sites and may be at the Owner's discretion.
  - 6.4.5.1 Owner will reimburse Contractor for the cost of any required storm water BMP(s) to be implemented resulting from a Federal, State, and/or Local agency inspection or as directed by Owner's Environmental Coordinator for the Work to be performed under an Owner-supplied Industrial or Construction SWPPP.
  - 6.4.5.2 Contractor shall be responsible for the cost of any required storm water BMP(s) to be implemented resulting from a Federal, State, and/or Local agency



inspection or as directed by Owner's Environmental Coordinator for Work to be performed under a Contractor-supplied Construction SWPPP.

**6.4.5.3** Contractor shall be responsible for the cost of any required storm water BMP(s) to be implemented resulting from a Federal, State, and/or Local agency inspection or as directed by Owner's Environmental Coordinator when no SWPPP has been required for Work at Owner's work-site.

## **6.5 Fugitive Dust Control and Air Emissions**

- 6.5.1** Owner and Contractor have a general obligation to minimize or eliminate fugitive dust/emissions in accordance with Federal, State, and/or Local air permits (e.g. Title V) or nuisance law requirements. At some of Owner's work-sites, Contractor may be required to comply with similar Mining Safety & Health Administration (MSHA) fugitive dust requirements as indicated on the EWCA.
- 6.5.2** Fugitive dust control shall be in accordance with the EWCA. All measures Contractor intends to use in the performance of its Work shall be approved by Owner prior to use, including the application of water. Contractor shall only apply enough water to control dust and to not generate uncontrolled run-off or discharge.
- 6.5.3** Fugitive dust is to be controlled throughout the performance of Work. Contractor shall be responsible for supplying and implementing all control measures for the fugitive dust it creates during the performance of its Work, unless otherwise indicated by Owner on the EWCA. Owner will notify Contractor if it will have additional dust control responsibilities for Work other than its own.
- 6.5.4** Contractor shall only use designated construction entrance/exits when performing Work at Owner's work-sites. In addition, when designated on the EWCA, Contractor shall be responsible for limiting the track-out of sediment on Owner or public roadways to reduce or eliminate fugitive dust.
- 6.5.5** Equipment such as, but not limited to batch plants, rock crushers, screeners, limestone/gypsum handling equipment, and in particular situations, large stockpiles of material; can require special air permits prior to their mobilization, setup, and/or usage. All intentions to use such equipment and/or any other large sources of fugitive emissions must be reviewed and pre-approved by Owner before mobilizing such equipment on-site. Contractor shall obtain and pay for all necessary permits prior to the on-site mobilization and operation of this equipment and shall follow all permit and/or exemption requirements to maintain environmental compliance.
- 6.5.6** Contractors shall provide Owner the liquid capacity of all bulk storage fuel containers in use or planned for use by Contractor. On a monthly basis, Contractor shall provide Owner the fuel quantities consumed that have been removed from these containers. Contractor shall ensure all fuel storage containers are closed and sealed when not actively conducting filling operations per the requirements of 40 CFR Part 63 and other applicable regulations and statutes. Contractor shall also comply with all submerged filling (i.e. nozzle actually in liquid, fill tube at bottom of tank, etc.) requirements applicable to their temporary, bulk fuel containers per applicable state laws and regulations.
- 6.5.7** Prior to commencing any demolition activities of the Owner's permanent structures, Contractor and Owner shall jointly agree who will submit and pay for all inspections and notifications required by Federal, State, and/or Local agencies.
- 6.5.8** Contractor is not permitted to conduct any open burning activities until receiving written permission from Owner and any permits required by Federal, State, and/or Local agencies.

Contractor and Owner shall jointly agree who will submit any required notifications or applications to Federal, State, and/or Local agencies, as well as pay for the permit.

- 6.5.9 Contractors performing Work in Michigan may be required to follow Michigan's Administrative Rules (336.1201) for air pollution control by tracking and reporting information on certain mobile equipment that produce air emissions.

## 6.6 Temporary Sewage Permitting and Other Requirements

- 6.6.1 Prior to beginning Work, Contractor shall review with Owner all site specific needs for temporary sewage systems such as septic tank systems, sewage holding tanks, Dropbox/Tankbox(s), portalets, office trailer restrooms, and temporary connections to Owner's Waste Water Treatment Plant (WWTP) or public sanitary sewer system. Additionally, this review will include who is planned to supply such sewage systems.
- 6.6.2 If Contractor is providing temporary sewage systems, Contractor shall provide Owner with a Sewage Waste Procedure or Guideline as part of its overall Waste Management Plan, as required below in section 6.7.2. This will be noted in the EWCA. This shall be provided upon mobilization and prior to the commencement of its use. Such a plan may include listing the Owner as part of its overall disposal process for such wastes (i.e. temporary connections to the WWTP, public sanitary sewer system, etc.), if such an agreement is reached.
- 6.6.3 If Contractor is providing temporary sewage systems, Contractor shall obtain any required temporary sewage permits as needed by the State or Local agencies prior to bringing such systems on-site. All requirements set forth in the permit shall be enforced by Contractor's environmentally Competent Person.
- 6.6.4 Whether or not a temporary sewage system permit is required for the sewage option implemented by Contractor, all associated sewage pumping and removal records shall be maintained on-site and copies shall be turned over to Owner upon completion of Contractor's Work.

## 6.7 Waste Management

- 6.7.1 Unless specified otherwise within the EWCA, Owner shall be considered the Generator for all waste (both hazardous and non-hazardous) produced at its work-sites and resulting from the Work. Contractor shall follow all of Owner's Waste Management Plans, procedures, and/or guidelines (e.g. Used Oil, Universal Waste, Construction & Demolition Debris, etc.). A waste includes, but is not limited to a discarded material or inherently waste-like material as defined by the EPA per 40 CFR 261.2. Wastes can be, but are not limited to hazardous or non-hazardous, solid, liquid, and/or containerized gaseous materials.
- 6.7.2 Before mobilization, Contractor shall provide Owner a copy of its plans, procedures, and/or guidelines detailing their intended waste management practices. This will include using Owner's facilities (if allowed) and any planned disposal/recycling vendors for wastes not expected to be handled by Owner. Contractor shall attempt to minimize quantities of hazardous waste generated through such practices as the segregation of materials, proper selection of raw materials and products, etc. Owner may accept or reject for revision Contractor's waste management practices at its discretion.
- 6.7.3 Contractor is responsible for compliance with all Federal, State, and/or Local requirements for all of its waste generation until Owner accepts it at a pre-approved transfer point. Contractor may be required by Owner to recycle certain waste streams, where practical.

- 6.7.4** If Contractor is designated by the EWCA to be the Co-Generator of any hazardous or non-hazardous waste, Contractor shall be responsible for managing all aspects of the waste compliance and disposal process. If Owner determines that the Contractor's environmentally Competent Person is not qualified to perform such duties, then Owner may require via the EWCA that a qualified waste management subcontractor be hired to perform such tasks. Owner's facility identification numbers and work-site address/name will be recorded on all tracking documentation. Additionally, all waste transporters, along with the final disposal facilities, will be reviewed and pre-approved by Owner. Documents shall indicate that the Contractor is acting as agent for Owner with respect to waste transportation and disposal.
- 6.7.4.1** If any waste is determined to be hazardous, Contractor shall track and report to Owner the amount generated on a weekly basis.
- 6.7.4.2** Contractor shall ensure all hazardous waste remains segregated from other forms of waste and do not become mixed, thus increasing the amount of hazardous waste to be disposed.
- 6.7.4.3** Contractor shall review with Owner, prior to having any waste transported off-site, all draft transportation documentation (i.e. manifests, bills of lading, etc.).
- 6.7.4.4** Contractor shall supply Owner with completed copies of all hazardous and non-hazardous waste transportation documentation at the completion of its Work.
- 6.7.5** Contractor shall supply all waste determination documentation that it initiates. Owner shall approve all waste determinations as to whether a waste is hazardous or non-hazardous in nature (i.e. using analytical data, process knowledge, MSDS, Safety Data Sheets, etc.).
- 6.7.6** Contractor shall not mix its Used Oil with any solvents, chemicals or waste and will segregate them, as appropriate. Under no circumstance shall Contractor land-apply Used Oil on Owner's work-sites or anywhere else not authorized by law.
- 6.7.7** Contractor may be required to submit an updated Waste Management Plan if Owner requires revisions based upon scope of work changes, etc. that requires additional wastes be disposed of.
- 6.7.8** As restated from section 6.2.6, prior to Contractor demobilizing, any remaining substances, chemicals, materials or products (not yet determined to be a waste by Owner) must be removed by Contractor, including any partially used containers. No substances, chemicals, materials or products shall be left on Owner's work-site without written authorization. Any substances, chemicals, materials or products found to be left on-site will be returned to Contractor and Contractor billed for shipping and handling.
- 6.7.8.1** For any substances, chemicals, materials or products left behind without prior approval by Owner and are determined to be a waste incapable of being returned to Contractor because of Federal, State, and/or Local regulation or law; Owner will properly dispose of this waste and Contractor will be billed for this service or else notify Contractor to come back and properly dispose of the waste itself. Owner will decide which option is in the best interest of the corporation.
- 6.7.9** For additional requirements on Hazardous Communication and Hazardous Materials Management, refer to Owner's document on Contractor Safety & Health Requirements.

**6.8 Environmentally-Sensitive Areas**

- 6.8.1** All jurisdictional wetlands or streams at Owner's work-site will be identified to Contractor. Contractor shall bring to Owner's attention any such areas which have not yet been identified and which may be impacted by the Work.
- 6.8.2** Contractor shall not disturb or impact a Jurisdictional Wetland, Stream, Critical Dune or other Environmentally-Sensitive Area, as identified in the EWCA, without the proper permit(s) in place. Contractor shall follow all such permit requirements as applicable to the Work.
- 6.8.3** Contractor shall ensure that all Owner site-specific protection requirements are maintained in regards to any Wetland, Stream, Critical Dune or other Environmentally-Sensitive Area.
- 6.8.4** Whenever temporary barricades are erected and/or maintained by Contractor near Environmentally-Sensitive Areas, Contractor shall post barricade signs around the perimeter that identify the nature of the environmental issue (e.g. NOTICE – Wetland Boundary Keep Out). This signage shall be made of Ultra-Violet and weather resistant material.

**6.9 Species Protection**

- 6.9.1** Contractor shall comply with Owner's Avian Protection Program (e.g. the protection of most native species of birds in North America). Owner will provide training on this program, as required by the scope of work.
- 6.9.2** Owner will notify Contractor if there is a known presence of a Protected, Endangered, Rare, Threatened species, and/or their dwellings. Contractor shall comply with all Federal, State, and/or Local rules and regulations if such a species and/or their dwellings exist on or near Owner's work-site, as identified on the EWCA. Contractor shall notify Owner immediately if such species and/or dwellings are observed so they can be documented and protective measures established, if necessary.

**6.10 Protection of Archeological and Cultural Resources**

- 6.10.1** Work on Owner's sites has the potential to uncover pre-historic, historic, and/or cultural artifacts. If during the performance of its Work, Contractor discovers pre-historic, historic, and/or cultural artifacts (e.g. arrow heads, pottery shards, bones, jewelry, etc), Contractor must immediately stop work, contact Owner, preserve and protect any items discovered to Owner's satisfaction while complying with all Federal, State, and/or Local requirements. If Contractor acquires knowledge of such an incident from a third party, Contractor shall immediately inform Owner so that Owner may investigate the legitimacy of such claims. Any impact to these areas is strictly prohibited, other than by archeological investigation and preservation activities that may be specifically included in Contractor's scope of Work.
- 6.10.2** For already identified pre-historic, historic, and/or cultural areas as listed within the EWCA, additional requirements to protect these areas may be required from Contractor (e.g. fencing, signage, periodic inspections, training, restrictive work requirements, etc.). Contractor shall comply with all such requirements.

<b>7.0 REVIEW AND MINOR REVISION HISTORY</b>			
<b>DATE</b>	<b>REV #</b>	<b>CHANGES (e.g. paragraph #, scope of change, etc.)</b>	<b>REVIEWER</b>
3-6-13	1	Too numerous to list. Most were minor clarifications to CERD sections: 3.1.3 (new EWCA form), 3.3.1 (new audit form), 5.1.3.1, 5.1.4, 5.1.5 (new EER form), 6.1.1, 6.1.2, 6.2.6.1, and 6.7.8.1	S. Austin & M. McCallin

Approved

# ATTACHMENT A - ENVIRONMENTAL WORK COMPLIANCE ASSESSMENT

(Side 1 of 3)

AEP Generation's Environmental Work Compliance Assessment (EWCA)			
<p><b>CONSULT THE PEC, CEC, AND/OR ENVIRONMENTAL SERVICES REPRESENTATIVES FOR MORE DETAILS ON ALL ITEMS LISTED BELOW</b>                      The EWCA or any other equivalent forms are informational documents for initial and subsequent environmental planning purposes. No claim or representation is expressed or implied that the EWCA is comprehensive, all-inclusive, accurate, and complete or that items not listed will not be present or pose a threat to environmental compliance. The EWCA is a working document and may be revised throughout the term of the Contract at no cost to Owner.</p>			
Location/Work-Site: <small>Click here to enter text.</small>		Start Date: <small>Click here to enter a date.</small>	End Date: <small>Click here to enter a date.</small>
Contractor/Work Description: <small>Click here to enter text.</small>			
Work Contacts (Owner & Contractor): <small>Click here to enter text</small>			
Date Form Completed, Rev 0: <small>Click here to enter a date</small>		Date Form Revised (Rev #...): <small>Click here to enter a date.</small>	
Signature Process			
EWCA Completed By: <small>Click here to enter a date.</small>		EWCA Completed By: <small>Click here to enter a date.</small>	
EWCA Reviewed By: <small>Click here to enter a date.</small>		EWCA Reviewed By: <small>Click here to enter a date.</small>	
Environmental Aspects and Impacts of the Work			
*Check mark the red N/A box in each section's Environmental Impacts Header to inactivate a whole segment if Not Applicable			
Rev 0	Rev	Air/Water/Land Aspects	Environmental Impacts <span style="color: red;">N/A</span>
<input type="checkbox"/>	<input type="checkbox"/>	Soil: <input type="checkbox"/> Call Before You Dig (i.e. 811) <input type="checkbox"/> Excavation <input type="checkbox"/> Trenching <input type="checkbox"/> Grading	<small>Click to Select</small> Notes: <small>Click here to enter text.</small>
<input type="checkbox"/>	<input type="checkbox"/>	Contaminated Media Removal <input type="checkbox"/> Soil <input type="checkbox"/> Water	<small>Click to Select</small> Notes: <small>Click here to enter text.</small>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Drilling <input type="checkbox"/> Boring <input type="checkbox"/> Pile Driving	<small>Click to Select</small> Notes: <small>Click here to enter text.</small>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Use of Explosives <input type="checkbox"/> Blasting	<small>Click to Select</small> Notes: <small>Click here to enter text.</small>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Working on a Dam	<small>Click to Select</small> Notes: <small>Click here to enter text.</small>
<input type="checkbox"/>	<input type="checkbox"/>	Working: <input type="checkbox"/> Over Water <input type="checkbox"/> On it <input type="checkbox"/> Near it	<small>Click to Select</small> Notes: <small>Click here to enter text.</small>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Erosion <input type="checkbox"/> Sediment Controls	<small>Click to Select</small> Notes: <small>Click here to enter text.</small>
<input type="checkbox"/>	<input type="checkbox"/>	Rock or Concrete: <input type="checkbox"/> Crushing <input type="checkbox"/> Screening <input type="checkbox"/> Washout	<small>Click to Select</small> Notes: <small>Click here to enter text.</small>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Ozone Depleting Substances (ODS)	<small>Click to Select</small> Notes: <small>Click here to enter text.</small>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Asphalt <input type="checkbox"/> Pesticides <input type="checkbox"/> Special Coatings	<small>Click to Select</small> Notes: <small>Click here to enter text.</small>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Dust Control/s	<small>Click to Select</small> Notes: <small>Click here to enter text.</small>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Other: <small>Click here to enter text.</small>	<small>Click to Select</small> Notes: <small>Click here to enter text.</small>
Rev 0	Rev	Oil & Chemical Aspects	Environmental Impacts <span style="color: red;">N/A</span>
<input type="checkbox"/>	<input type="checkbox"/>	Used Oil: <input type="checkbox"/> Plant Recycling <input type="checkbox"/> Contractor Recycling	<small>Click to Select</small> Notes: <small>Click here to enter text.</small>
<input type="checkbox"/>	<input type="checkbox"/>	Oil Storage (in gallons): <input type="checkbox"/> <1,320 <input type="checkbox"/> >1,320	<small>Click to Select</small> Notes: <small>Click here to enter text.</small>
<input type="checkbox"/>	<input type="checkbox"/>	Chemicals: <input type="checkbox"/> Storage <input type="checkbox"/> Labeling <input type="checkbox"/> Use <input type="checkbox"/> Handling	<small>Click to Select</small> Notes: <small>Click here to enter text.</small>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Other: <small>Click here to enter text.</small>	<small>Click to Select</small> Notes: <small>Click here to enter text.</small>

Approved

KPSC Case No. 2013-00430  
 Commission Staff's First Set of Data Requests  
 Order Dated January 30, 2014  
 Item No. 1  
 Attachment 3  
 Page 19 of 24

ATTACHMENT A - ENVIRONMENTAL WORK COMPLIANCE ASSESSMENT

(Side 2 of 3)

Rev #	Rev	Waste Aspects	Environmental Impacts	N/A	C	O
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Construction & Demolition Debris	Click to Select	Notes: [blank]	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Lead Abatement Waste	Click to Select	Notes: [blank]	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Asbestos Waste	Click to Select	Notes: [blank]	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Electrical Work: <input type="checkbox"/> PCB's <input type="checkbox"/> Oil <input type="checkbox"/> Wire <input type="checkbox"/> Transformer <input type="checkbox"/> Capacitor <input type="checkbox"/> Asbestos <input type="checkbox"/> Ballasts <input type="checkbox"/> Mercury Switches	Click to Select	Notes: [blank]	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Grinding <input type="checkbox"/> Cutting <input type="checkbox"/> Drilling Waste	Click to Select	Notes: [blank]	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Recycling of: <input type="checkbox"/> Wood <input type="checkbox"/> Metal <input type="checkbox"/> Plastic <input type="checkbox"/> Vegetation <input type="checkbox"/> Other: [blank]	Click to Select	Notes: [blank]	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Special Notifications: <input type="checkbox"/> Demolition <input type="checkbox"/> Asbestos <input type="checkbox"/> Air Permits <input type="checkbox"/> Water Permits <input type="checkbox"/> Waste Permits <input type="checkbox"/> Radioactive Materials	Click to Select	Notes: [blank]	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Hazardous Waste: <input type="checkbox"/> PCB's (Paint, Caulk, Oil) <input type="checkbox"/> Hydrostatic Testing Water <input type="checkbox"/> Rinse Water <input type="checkbox"/> Chemical Cleaning <input type="checkbox"/> Spent Solvent <input type="checkbox"/> Other: [blank]	Click to Select	Notes: [blank]	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Non-Hazardous Waste: <input type="checkbox"/> Rinse Water <input type="checkbox"/> Hydrostatic Testing Water <input type="checkbox"/> Chemical Cleaning <input type="checkbox"/> Spent Solvent <input type="checkbox"/> Other: [blank]	Click to Select	Notes: [blank]	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Partially Used, Unused, and/or Expired Chemical Products Left Behind	Click to Select	Notes: [blank] *Any such products left behind after demobilization will be shipped back to the Contractor at their expense unless written permission is given or else billed for any waste disposal costs if environmental law prevents shipment.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Universal Waste: <input type="checkbox"/> Lamps <input type="checkbox"/> Batteries <input type="checkbox"/> Other: [blank]	Click to Select	Notes: [blank]	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Aerosol Cans	Click to Select	Notes: [blank]	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Pollution Prevention (P2)	Click to Select	Notes: [blank]	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Sewage Concerns: <input type="checkbox"/> Portalets <input type="checkbox"/> Holding Tanks <input type="checkbox"/> Septic System <input type="checkbox"/> WWT/P Hook-up <input type="checkbox"/> POTW Hook-up <input type="checkbox"/> Other: [blank]	Click to Select	Notes: [blank]	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Other: [blank]	Click to Select	Notes: [blank]	<input type="checkbox"/>	<input type="checkbox"/>
Rev #	Rev	Sensitive Aspects	Environmental Impacts	N/A	C	O
<input type="checkbox"/>	<input type="checkbox"/>	Species Protection: <input type="checkbox"/> Vertebrates (birds, mammals, fishes, reptiles, etc.) <input type="checkbox"/> Invertebrates (clams, snails, insects, etc.) <input type="checkbox"/> Plants (rare/endemic plants, ferns, etc.)	Click to Select	Notes: [blank]	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Protected Areas: <input type="checkbox"/> Cultural <input type="checkbox"/> Historical <input type="checkbox"/> Prehistoric <input type="checkbox"/> Other: [blank]	Click to Select	Notes: [blank]	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Preservation Areas: <input type="checkbox"/> Wetland <input type="checkbox"/> Woods <input type="checkbox"/> Stream <input type="checkbox"/> Dune <input type="checkbox"/> Other: [blank]	Click to Select	Notes: [blank]	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Other: [blank]	Click to Select	Notes: [blank]	<input type="checkbox"/>	<input type="checkbox"/>

Approved

ATTACHMENT A - ENVIRONMENTAL WORK COMPLIANCE ASSESSMENT

(Side 3 of 3)

Rev 0	Rev 1	Plans, Policies, Permits, & Permissions	Comments	N/A	C/O
<input type="checkbox"/>	<input type="checkbox"/>	For AEP, OVEC/INEC, FEL A/or PCBC Plant or Work-site and Generation Procurement Use Local Operational Controls, Procedures, & Policies	<input type="checkbox"/> Yes <input type="checkbox"/> No; Notes: _____		<input type="checkbox"/> C <input type="checkbox"/> O
<input type="checkbox"/>	<input type="checkbox"/>	AEP Safety Services Corporate Operational Controls, Procedures, & Policies OSHA - Environmental, Safety & Health Policy	<input type="checkbox"/> Yes <input type="checkbox"/> No; Notes: _____ <input type="checkbox"/> ESH-0000013876 - Hex. Chrome Exp. Control <input type="checkbox"/> ESH-0000013879 - Mercury Exposure Control <input type="checkbox"/> ESH-0000014349 - Methylene Chloride Policy <input type="checkbox"/> ESH-0000013825 - HAZWOPER/Emer Resp. Other: _____ <input type="checkbox"/> ESH-0000013995 - Asbestos Management <input type="checkbox"/> ESH-0000013882 - Lead Exposure Control <input type="checkbox"/> ESH-0000013821 - Cadmium Exp. Control <input type="checkbox"/> ESH-0000013998 - Hazard Communication		<input type="checkbox"/> C <input type="checkbox"/> O
<input type="checkbox"/>	<input type="checkbox"/>	AEP Environmental Services Corporate Operational Controls, Procedures, & Policies EP - Environmental Policy	<input type="checkbox"/> Yes <input type="checkbox"/> No; Notes: _____ <input type="checkbox"/> EP-02-03 Archeological Artifacts Encountered <input type="checkbox"/> EP-02-07 PCB Management Policy <input type="checkbox"/> EP-02-08 Asbestos Management Policy <input type="checkbox"/> EP-03-09 Wetlands Policy <input type="checkbox"/> EP-05-11 Used Oil/Solvent Mixture <input type="checkbox"/> EP-07-12 Treated Wood Give-Away <input type="checkbox"/> EP-08-14 Avian Protection Policy <input type="checkbox"/> EP-08-15 PCB Insulation/Coatings		<input type="checkbox"/> C <input type="checkbox"/> O
<input type="checkbox"/>	<input type="checkbox"/>	AEP Environmental Documents Provided	<input type="checkbox"/> Yes <input type="checkbox"/> No; Notes: _____ <input type="checkbox"/> Wetland/404 Permit <input type="checkbox"/> Stream/401 Permit <input type="checkbox"/> Industrial NPDES Permit <input type="checkbox"/> Construction Storm Water Permit <input type="checkbox"/> Industrial Storm Water Permit <input type="checkbox"/> Pollution Prevention (P2) Plan <input type="checkbox"/> Title V Air Permit <input type="checkbox"/> Sewage Holding Tank Permit <input type="checkbox"/> Septic System Permit <input type="checkbox"/> Portlet Permit <input type="checkbox"/> Groundwater Protection Plan <input type="checkbox"/> Other: _____		<input type="checkbox"/> C <input type="checkbox"/> O
<input type="checkbox"/>	<input type="checkbox"/>	Plans Required For Work	<input type="checkbox"/> Yes <input type="checkbox"/> No; Notes: _____ <input type="checkbox"/> Site Drainage Plan <input type="checkbox"/> SPCC Plan <input type="checkbox"/> Hydrostatic Plan <input type="checkbox"/> Demolition Plan <input type="checkbox"/> Archeological Evaluation <input type="checkbox"/> Erosion & Sediment Control (EASC) Plan <input type="checkbox"/> Chemical Management Plan <input type="checkbox"/> Waste Management Plan <input type="checkbox"/> Sewage Management Plan <input type="checkbox"/> Spill Response Plan <input type="checkbox"/> Fugitive Dust / Emissions Plan <input type="checkbox"/> Other: _____		<input type="checkbox"/> C <input type="checkbox"/> O
Notes: _____					
<b>Special Instructions</b> <span style="float: right;">*Check this box to spell check document <input type="checkbox"/></span>					
Name of Contractor's eCP: _____ eCP will be: <input type="checkbox"/> Full-time <input type="checkbox"/> Part-time (%: _____) <input type="checkbox"/> On-site <input type="checkbox"/> Off-site					
eCP Training Requirements: <input type="checkbox"/> Spill Awareness <input type="checkbox"/> HAZWOPER (Choose an item) <input type="checkbox"/> SWP3 <input type="checkbox"/> SPCC <input type="checkbox"/> Dust <input type="checkbox"/> Other: _____ <input type="checkbox"/> Solid Waste - <input type="checkbox"/> Hazardous <input type="checkbox"/> Non-Haz <input type="checkbox"/> Department of Transportation / Materials of Trade (for Transportation of Hazardous Material)					
Worker Training Requirements: <input type="checkbox"/> Spill Awareness <input type="checkbox"/> HAZWOPER (Choose an item) <input type="checkbox"/> SWP3 <input type="checkbox"/> SPCC <input type="checkbox"/> Dust <input type="checkbox"/> Other: _____ <input type="checkbox"/> Solid Waste - <input type="checkbox"/> Hazardous <input type="checkbox"/> Non-Haz <input type="checkbox"/> Department of Transportation / Materials of Trade (for Transportation of Hazardous Material)					
Env. Event Notification Authority: <input type="checkbox"/> Owner Only <input type="checkbox"/> Contractor, if Owner is Unavailable within _____ (Enter time) <input type="checkbox"/> Other: _____ <input type="checkbox"/> Owner to Provide Notification Training					
Spill Kits Required <input type="checkbox"/> Around the work site <input type="checkbox"/> Vehicles <input type="checkbox"/> Equipment <input type="checkbox"/> Other: _____ (Notes: _____)					
Solid Waste Generator Will Be <input type="checkbox"/> Owner <input type="checkbox"/> Contractor or Co-Generator - List special instructions: _____					
Week Day SWP3 Inspections: <input type="checkbox"/> Owner <input type="checkbox"/> Contractor <input type="checkbox"/> Week End SWP3 Inspections: <input type="checkbox"/> Owner <input type="checkbox"/> Contractor					
Sediment Track out Clean-up: <input type="checkbox"/> Owner <input type="checkbox"/> Contractor <input type="checkbox"/> If Contractor - List other areas responsible for: _____					

Approved



**ATTACHMENT B – CONTRACTOR ENVIRONMENTAL EVALUATION**

(Side 1 of 2)

**AEP Generation's Contractor Environmental Requirements Document (CERD)**

**Contractor Environmental Evaluation**

**\*\*Each AEP Plant, facility, end/or work-site is to perform at least one Environmental Audit per year on one active Contractor who is performing work when the CERD is applicable to them. All issues discovered shall be detailed in the Corrective Action Plan area below and dealt with to conclusion\*\***

Date: \_\_\_\_\_ Contractor Name: \_\_\_\_\_

Contract Number: \_\_\_\_\_ Superintendent: \_\_\_\_\_

eCP Name: \_\_\_\_\_ Full Time: Yes \_\_\_ No \_\_\_ ( \_\_\_% time)

Number of Contractor Employees On-Site Today: \_\_\_

Questions for Contractor's environmentally Competent Person (eCP):				
1.	Is a copy of the AEP CERD at the work-site for the Contractor to refer to?	Yes__	No__	N/A__
2.	Is a copy of the EWCA at the work-site for Contractor to execute?	Yes	No	N/A
3.	Was the EWCA jointly reviewed by AEP and Contractor prior to it being used in the field for planning and compliance purposes?	Yes__	No__	N/A__
4.	Has an environmentally Competent Person (eCP) been identified for this work?	Yes__	No__	N/A__
5a.	Did the eCP receive training on the environmental issues listed within the EWCA?	Yes__	No__	N/A__
5b.	Is this training documented and available on-site?	Yes	No	N/A
6a.	Did the Contractor's employees/craft receive training that is at the appropriate level for the environmental issues within the EWCA?	Yes__	No__	N/A__
6b.	Is this training documented and available on-site?	Yes	No	N/A
7.	Does the Contractor have a written disciplinary procedure for failing to follow environmental rules and regulations?	Yes__	No__	N/A__
8.	Does the eCP conduct documented Environmental Self-Assessments?	Yes__	No__	N/A__
9.	Are the Contractor's Conex boxes labeled per the CERD?	Yes	No	N/A
10.	Does the Contractor have spill kits on-site with sufficient quantity to handle the largest spill possible?	Yes__	No__	N/A__
11.	If required, does the Contractor have a written Chemical Management Plan in place, is it properly administered, and is it at the work-site?	Yes__	No__	N/A__
12.	If required, does the Contractor have a written Waste Management Plan in place, is it properly administered, and is it at the work-site?	Yes__	No__	N/A__
13.	If required, does the Contractor have a written Sewage Management Plan in place, is it properly administered, and is it at the work-site?	Yes__	No__	N/A__
14.	If required, does the Contractor have a written Spill Prevention Control & Countermeasures Plan in place, is it properly administered, and is it at the work-site?	Yes__	No__	N/A__

Approved

**ATTACHMENT B – CONTRACTOR ENVIRONMENTAL EVALUATION**

(Side 2 of 2)

15.	If required, does the Contractor have a written Storm Water Pollution Prevention Plan in place, is it properly administered, and is it at the work-site?	Yes__	No__	N/A__
16.	Does the Contractor have a written Spill Response Plan in place, is it properly administered, and is it at the work-site?	Yes__	No__	N/A__
17.	Does the Contractor have a written Emergency Event Reporting Procedure in place with a Point of Contact (POC) list, is it properly administered, and is it at the work-site?	Yes__	No__	N/A__
18.	Has AEP been given a copy of any and all of these procedures in order to conduct a proper review and to provide comments?	Yes__	No__	N/A__
19.	Has AEP provided the Contractor with copies of their written plans, policies or permits and allowed time for clarifying questions or comments?	Yes__	No__	N/A__
20.	Are all these written plans, permits, and/or policies available to the Contractor's employees/craft to review to conduct their work?	Yes__	No__	N/A__
<b>Conduct a Work-Site Environmental Compliance Assessment:</b>				
1.	Are there any non-compliance issues that need to be addressed?	Yes	No	N/A
<b>Questions for a Small Sample of Contractor's Employees/Craft:</b>				
1.	Who is your Contractor's environmentally Competent Person?			
2.	Have you received training in regards to the environmental issues you are most likely to come across during this work?	Yes__	No__	N/A__
3.	How long in total did this training last?			
4.	What were some of the environmental subjects covered during this training?			
5.	Do you know what to do if you have any environmental questions on how to deal with the issues you have been trained on?	Yes__	No__	N/A__
6.	Are the environmental procedures applicable to the work reviewed with you frequently?	Yes__	No__	N/A__
<b>Corrective Action Plan:</b>				
#	Description of Environmental Issue to be Addressed	POC Responsible	Due By	Completed
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

AEP Coordinator's Name: \_\_\_\_\_ Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_ Location: \_\_\_\_\_

**ATTACHMENT C - ENVIRONMENTAL EVENT REPORT**

**AEP's Environmental Event Report (EER)**

Click here to enter text.
Click here to enter a date.
Click here to enter text.
Click here to enter text.
Click here to enter text.
<input type="checkbox"/> Air <input type="checkbox"/> Land <input type="checkbox"/> Water <input type="checkbox"/> MESH
Click here to enter text.
Click here to enter text.
<input type="checkbox"/> Enforcement Action <input type="checkbox"/> Permit Issue <input type="checkbox"/> Complaint
<input type="checkbox"/> NPDES TSS <input type="checkbox"/> NPDES Chlorine <input type="checkbox"/> NPDES D&G
<input type="checkbox"/> NPDES Metals <input type="checkbox"/> NPDES BOD <input type="checkbox"/> NPDES Flow
<input type="checkbox"/> NPDES Temperature <input type="checkbox"/> NPDES Faecal Coliform <input type="checkbox"/> NPDES Other
<input type="checkbox"/> NPDES pH <input type="checkbox"/> Oil Spill <input type="checkbox"/> Chemical Spill/Release
<input type="checkbox"/> Stack Opacity Exceedance >2% <input type="checkbox"/> MESH Nonconformance <input type="checkbox"/> Near Miss
<input type="checkbox"/> Lessons Learned <input type="checkbox"/> Describe Others Click here to enter text.
<input type="checkbox"/> Check if this is a NPDES, Oil Spill or Chemical Spill/Release Reportable Event
Click here to enter text.
Click here to enter text.
Click here to enter text.
<input type="checkbox"/> Roles/Responsibilities Not Defined <input type="checkbox"/> New Process, Procedure or Guidance
<input type="checkbox"/> Budget <input type="checkbox"/> Change Management
<input type="checkbox"/> Communication <input type="checkbox"/> Contracting
<input type="checkbox"/> Emergency Planning <input type="checkbox"/> Operational
<input type="checkbox"/> Software <input type="checkbox"/> Equipment Failure
<input type="checkbox"/> Work Practices <input type="checkbox"/> Human Performance Improvement
<input type="checkbox"/> Fitness for Duty <input type="checkbox"/> Work Planning/Scheduling
<input type="checkbox"/> Management System <input type="checkbox"/> Training/Competency
<input type="checkbox"/> Inadequate Documentation <input type="checkbox"/> Inadequate Procedure or Guidance
<input type="checkbox"/> External Factors (e.g. weather, emergency, etc.)
<input type="checkbox"/> Describe Others Click here to enter text.
<input type="checkbox"/> Time Pressures <input type="checkbox"/> Half Hour After Waking Up or Meal
<input type="checkbox"/> Distractive Environment <input type="checkbox"/> Vague or Incorrect Guidance
<input type="checkbox"/> High Workload <input type="checkbox"/> Overconfidence / Complacency
<input type="checkbox"/> 1st Time Evolution/Task Unfamiliarity <input type="checkbox"/> Imprecise Communication
<input type="checkbox"/> Day Prior To/1st Day After Days Off <input type="checkbox"/> Work Stress / Fatigue
<input type="checkbox"/> Pre-Job Briefing/JSA Process <input type="checkbox"/> Two-Minute Rule
<input type="checkbox"/> S.T.A.R. (Stop, Think, Act, & Review) <input type="checkbox"/> Stop when Uncertain
<input type="checkbox"/> Peer Checking & Coaching <input type="checkbox"/> Procedure Use
<input type="checkbox"/> Questioning Attitude <input type="checkbox"/> Three-Way Communication
<input type="checkbox"/> Qualify, Validate, & Verify (Q, V, & V) <input type="checkbox"/> Phonetic Alphabet
Type in the web address/file location:
Type in the link description: Click here to enter text.
<input type="checkbox"/> NPDES Controllable Event <input type="checkbox"/> Spill Controllable Event
Corporate Determination for ICP Metric
Comments: Click here to enter text

# ***AMERICAN ELECTRIC POWER***

## **AEP GENERAL TERMS AND CONDITIONS FOR ENGINEERING, PROCUREMENT AND CONSTRUCTION WORK**

**March 2009 Rev. 2 dated 7/12**

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AFFIDAVIT OF COMPLETION

Exhibit 1

## **AEP GENERAL TERMS AND CONDITIONS FOR ENGINEERING, PROCUREMENT AND CONSTRUCTION WORK**

### **1.0 DEFINITIONS**

Subject to additional definitions contained in subsequent Articles, capitalized terms used in these General Terms and Conditions for Engineering, Procurement and Construction Work have the meanings set forth below:

- 1.1 **Business Day**: "Business Day" means any calendar day, other than a Saturday or Sunday or a calendar day on which U.S. commercial banking institutions are authorized or required by law to close.
- 1.2 **Change Order**: "Change Order" means a written order as defined and issued in accordance with Article 14.0.
- 1.3 **Contract**: "Contract" means collectively the Contracting Instrument and all documents referenced in the Contracting Instrument and any Change Orders, amendments or addenda.
- 1.4 **Contract Price**: "Contract Price" means the price to be paid to the Contractor for the performance of Work as set forth in the Contracting Instrument.
- 1.5 **Contracting Instrument**: "Contracting Instrument" means the contractual document that identifies the parties, the nature of the Work, the Contract Price, documents to be included as part of a Contract, and other matters relating to a Contract. The Contracting Instrument may be in the form of a contract letter, blanket purchase order, purchase order or other similar documents.
- 1.6 **Contractor**: "Contractor" means the entity contracting with Owner for the performance of Work.
- 1.7 **Direct Cost**: "Direct Cost" means the actual costs and charges incurred and payments made by Contractor, its Subcontractors for Site Equipment, materials, services and labor (including payroll burden and expenses) which are directly attributable to the performance of Contractor's Work hereunder. Direct Cost includes Contractor's home office or Site labor to the extent Contractor's home office or Site labor is directly assignable to the Work which must be demonstrable under the circumstances. Direct Cost shall not include corporate, general and administrative costs including home office functions, sales, marketing, accounting, human resources, information technology, payroll, profit, research, development, quality assurance and control, purchasing, safety, management, administration, warranties, insurances, offsite or other unabsorbed costs.
- 1.8 **Equipment**: "Equipment" means all goods, materials and accessories to be purchased under the Contract, including all documentation required by the Contract.
- 1.9 **Final Acceptance**: "Final Acceptance" means Owner's determination that the Work has been completed in accordance with the Contract requirements.
- 1.10 **Initial Acceptance**: "Initial Acceptance" means Owner's determination prior to final inspection and testing that the Work conforms to the Contract requirements for purposes of receipt.
- 1.11 **Owner**: "Owner" means any one or more of the companies of the American Electric Power System as may be specified in the Contract Instrument.
- 1.12 **Site**: "Site" means Owner's property or such other premises (including adjacent bodies of water and property owned or controlled by a third-party) upon which the Work is to be performed.

- 1.13 Subcontractor: "Subcontractor" means vendors, suppliers, consultants, and subcontractors of any tier, materialmen, professionals, laborers, and all other persons providing equipment, materials or services directly or indirectly to Contractor in connection with the Work.
- 1.14 Work: "Work" means all of Contractor's obligations under the Contract.

2.0 CONTRACTOR'S OBLIGATIONS

- 2.1 Contractor shall at its expense provide everything necessary for the complete, proper and timely execution of the Work including, but not limited to, home office support, labor, supervision, and technical field assistance; engineering, design, construction and start-up services; safety equipment, construction equipment, temporary utilities and facilities, equipment to be installed, materials, tools and supplies; fabrication and manufacturing; transportation; drawings and documentation, unless explicitly excluded in the Contract. Contractor's performance of the Work shall include everything requisite and necessary to comply with prudent electric utility industry standards and to complete the Work, notwithstanding the fact that every item necessarily involved may not be specifically mentioned. Details and items not indicated by the Contract documents shall be adequately and properly performed by Contractor at no extra cost if such details and items are necessary to complete the intent of the Contract or otherwise to complete the Work.
- 2.2 Contractor is responsible for considering the conditions affecting the Work including, but not limited to, conditions affecting the transportation, disposal, handling and storage of materials; the availability and cost of labor, water, electric power, utilities, and roads; the uncertainties of weather, river stages, and similar physical conditions at the Site; the conformation and condition of the ground; and the character of equipment and facilities needed. Contractor shall take into account the character, quality and quantity of surface and subsurface materials or obstacles to be encountered to the extent this information is reasonably ascertainable from the Contract documents or an inspection of the Site.
- 2.3 Contractor shall immediately and before such conditions are disturbed notify Owner of: (a) subsurface or latent physical conditions at the Site which differ materially from those indicated in the Contract; (b) unusual geologic conditions at the Site which differ materially from conditions ordinarily encountered or from conditions addressed in the Contract; or (c) artifacts or articles which appear to have archaeological or historical significance. Owner shall promptly investigate such conditions and, if such conditions do materially differ and cause an increase or decrease in Contractor's cost of, or the time required for, performance of any part of the Work, the parties shall agree to amend the Contract. No claim of Contractor under this clause shall be allowed unless Contractor has given immediate notice as required above and confirmed such notice in writing within ten (10) days of discovery.
- 2.4 Contractor shall have an authorized representative at the Site to whom Owner may give instructions at all times when Work is being performed.
- 2.5 Contractor shall assign qualified and competent supervision and personnel to perform the Work and have qualified and competent supervision at the Site at all times to direct and observe the Work. Key personnel shall not be removed or replaced without prior consent of Owner which shall not be unreasonably withheld. Contractor will investigate and take appropriate action with respect to any personnel problems brought to its attention by Owner.
- 2.6 Contractor shall confine all of its operations and personnel to those areas of the Site to which Owner authorizes access.
- 2.7 Contractor's personnel may not operate Owner's tools, vehicles, materials or equipment ("Owner's Equipment") without Owner's prior authorization. If Contractor borrows Owner's Equipment, Contractor (a) agrees that Owner has provided the Owner's Equipment AS IS, with no representations or warranties; (b) assumes full responsibility for the protection of the borrowed Owner's Equipment; (c) assumes all liability for injuries or damages resulting from the use of the

borrowed Owner's Equipment; and (d) agrees to return the borrowed Owner's Equipment to Owner in the same condition as when it was borrowed, or, if repairs are necessary, to cause such repairs to be performed promptly at Contractor's expense before the Owner's Equipment is returned to Owner. Owner has no obligation to lend Owner's Equipment to Contractor.

- 2.8 Contractor shall cooperate with Owner and others working at or near the Site. Contractor shall promptly report to Owner any defects in the work of others which affects the Work. Failure to report such defects constitutes acceptance of the conditions by Contractor. Contractor shall properly fit, connect and coordinate its Work with that of Owner and other contractors.
- 2.9 Contractor shall keep all of its work areas free from trash and debris, and keep its work areas "broom clean" on a continuous basis.
- 2.10 Contractor shall secure and protect its materials, tools, equipment and the Work, including Owner's Equipment.
- 2.11 As requested by Owner, Contractor shall provide Owner with periodic reports concerning the progress of the Work.
- 2.12 Contractor is responsible for the proper execution of the Work with respect to any base lines and bench marks established by Owner.
- 2.13 If the Work is subject to prevailing wage requirements, Contractor agrees to comply with such requirements.
- 2.14 Contractor, its Subcontractors, and their respective employees and agents involved in the Work shall adhere to the provisions contained in Owner's Code of Business Conduct which can be found at Owner's website.

### 3.0 TERM AND EFFECTIVE DATE

- 3.1 The Contract shall commence as of the effective date and, unless earlier terminated as provided in Article 29.0, shall terminate on the termination date set forth in the Contract. Unless specified elsewhere in the Contract, the effective date of the Contract shall be the earlier of the date on which Contractor begins performance hereunder or the date of the latter signature on the Contract.

### 4.0 RELATIONSHIP OF THE PARTIES

- 4.1 Contractor and all of its employees and Subcontractors are, with respect to Owner, independent contractors. Contractor will be solely responsible for the supervision, direction, and control of its employees and Subcontractors. Contractor is responsible for the payment of all compensation, benefits, and employment taxes with respect to the Contractor's employees.

### 5.0 ASSIGNMENT AND SUBCONTRACTING

- 5.1 Contractor shall not assign or otherwise dispose of the Contract, or any obligations hereunder, without the written consent of Owner. Any assignment or disposal without the written consent of Owner shall be null and void.
- 5.2 Prior to entering into any subcontract, Contractor shall submit to Owner a subcontractor data sheet that includes the name and address of the Subcontractor and the scope of work proposed to be included under such subcontract. Within five Business Days of receipt of a Subcontractor data sheet, Owner may reject such Subcontractor without cost or contract extension by giving written notice of such rejection to Contractor.



- 5.3 Contractor is responsible for the selection of any Subcontractor and for the Subcontractor's proper performance of the Work assigned to it. If the work of a Subcontractor is not in compliance with the Contract requirements, Contractor shall take immediate steps to bring the Subcontractor's work into compliance and, at Owner's written request, terminate its contractual relationship with the Subcontractor as it relates to the Work at no cost to Owner.

#### 6.0 LABOR RELATIONS

- 6.1 Contractor shall comply with any project, national or local labor agreements that are applicable to the Work or Site. Contractor shall cooperate with Owner and other contractors in establishing and maintaining labor work rules and practices.
- 6.2 When the Work is performed by building and construction trades labor, a pre-job conference shall be held with local labor representatives prior to starting Work. Owner shall be afforded the opportunity to attend and participate in pre-job conferences.
- 6.3 Contractor shall provide immediate notice to Owner of any actual or potential labor dispute that may delay the timely, efficient and productive performance of the Work.
- 6.4 Contractor shall inform and cooperate with Owner on labor matters. Contractor shall consult with Owner prior to rendering its decision(s) on labor matters that may impact the timely, efficient and productive performance of the Work.
- 6.5 Contractor shall exercise its management rights contained in applicable labor agreements to establish, maintain, and enforce work rules conducive to timely, efficient, productive and harmonious work operation. Contractor shall take the necessary steps available to resolve grievances, jurisdictional disputes, or other violations of collective bargaining agreements.

#### 7.0 SAFETY AND SECURITY

- 7.1 Contractor shall perform the Work in a safe and careful manner, provide first aid facilities and transportation, and use such safety devices and methods as are necessary to protect its employees, agents, Subcontractors, Owner's employees and agents, other contractors and the public from bodily injury and property damage.
- 7.2 Contractor shall comply with and enforce all laws, rules and regulations applicable to safety and health standards, including, but not limited to, the Occupational Safety and Health Act of 1970 ("OSHA") and any revisions of OSHA or successor legislation.
- 7.3 Contractor shall comply with project and Site safety and security rules and all procedures issued by Owner, provided that such rules and procedures do not conflict with OSHA or other safety laws, rules or regulations. Contractor shall assign a competent person at all times to manage, coordinate and enforce its safety program during performance of the Work.
- 7.4 Contractor shall provide Owner with Material Safety Data Sheets ("MSDS") for all applicable materials prior to delivery to Owner's Site.
- 7.5 Contractor shall obtain Site permits or approval from Owner for its vehicles, any excavation, use of explosives, access to restricted areas, use of Owner's Equipment, tools and facilities, and other similar activities.
- 7.6 Owner will arrange all necessary clearances on energized equipment, electrical and communications circuits, piping systems or other operational equipment. Contractor shall notify Owner requesting the clearances prior to the scheduling of such Work. Contractor shall comply with Owner's clearance permit system regarding tagout and lockout of electrical and mechanical systems and other equipment.

- 7.7 Contractor shall fully inform Owner in writing regarding the types, quantities and use of any hazardous materials brought on the Site; the types and quantities of hazardous wastes being generated from the Work; and Contractor's program for proper storing, handling and disposal of such materials in a safe and secure manner.
- 7.8 Contractor shall immediately inform Owner of all regulatory, safety, health and environmental inspections, citations and penalties associated with the Work. Contractor shall provide Owner with written reports and copies of all documents submitted to or by regulatory agencies and insurance companies.
- 7.9 Contractor shall promptly inform Owner of any injuries to its employees, agents, Subcontractors, or other persons arising out of the Work that require medical treatment.
- 7.10 Contractor shall obtain, maintain, and properly complete all record keeping required by regulatory agencies. Upon request, Contractor shall provide Owner with copies of all logs, reports and other records.
- 7.11 Contractor shall investigate all accidents resulting in personal injury, property damage, or near misses to determine root cause(s) and corrective action(s). Upon request, Contractor shall provide Owner with a copy of investigative reports, including all documents submitted to insurance companies.
- 7.12 All of Contractor's employees, agents, Subcontractors, vehicles, trailers, etc. entering or leaving the Site are subject to inspection at any time by Owner.
- 7.13 If a safety violation or other unsafe condition causes imminent danger, Owner may immediately shut down the Work involved without advance written notice.
- 7.14 Contractor and all Subcontractors performing Work at the Site must have a substance abuse program. This program must apply to all personnel of Contractor and its Subcontractors. Minimum requirements of this program shall include pre-hire testing, testing for cause and if requested, random testing. Screening substances and their associated cut-off limits are listed below.

Drug Classes	Screening Cut-Off Limit (ng/ml)	Confirmation Cut-Off Limit (ng/ml)
Amphetamines	1,000	500
Benzoylcegonine	300	150
Cannabinoids	50	15
Opiates	2,000	2,000
Phencyclidine	25	25

Blood & Breath alcohol content: .02% per Department of Transportation.

Testing shall be performed by a testing facility certified by Department of Health & Human Services. Personnel must have evidence of having tested negative within a year prior to employment. Owner will accept conditional employment predicated upon (a) employee(s) furnishing evidence that they have submitted to testing within forty-eight (48) hours of initial employment and (b) employee(s) furnishing evidence of negative test results within five (5) Business Days of initial employment. Contractor shall ensure personnel are "drug free". Owner reserves the right to examine evidence outlined herein. Contractor's program shall incorporate reciprocity on "drug free" employee verification to minimize Owner's economic impact and employee(s) recertification while maintaining the program's intent.

- 7.15 If required by Owner, Contractor must meet certain security criteria set forth herein.

- 7.15.1 Contractor shall submit to Owner a copy of its background investigation process for Owner's review and file. If Owner, in its sole discretion, determines that Contractor's background investigations do not meet certain specific requirements, then Contractor, at its expense, must perform a background investigation that does meet Owner's certain specific requirements on each individual designated by Contractor to perform Work, or is performing Work on behalf of Contractor, for Owner (referred to herein for purposes of this Article, as an "individual"). Notwithstanding anything to the contrary stated herein, Owner reserves the right to conduct a background investigation on each individual at Contractor's expense.
- 7.15.2 Owner's certain specific requirements of background investigations include the following: (i) determination of whether an individual has been convicted of a felony crime in each state where the individual has resided during the past seven years; (ii) performance of the background investigation at the state level (in other words, to only search the records of the county in which the individual has resided during the past seven years is not a sufficient background investigation); and (iii) if the individual is to operate a motor vehicle while performing Work for Owner, then a state operator's license abstract must be completed in the states where the individual has been licensed as a vehicle operator during the past seven years.
- 7.15.3 If any background investigation reveals or indicates that an individual has been convicted of a felony crime, then the Contractor must notify the Owner prior to the individual commencing Work. Owner in its sole discretion shall have the option of barring from any Work Site any individual who has a reported felony conviction. Owner may audit or review specific Contractor screening files to ensure compliance with this Contract.
- 7.15.4 If an individual requires unescorted access to Owner's critical cyber assets, then Owner will conduct its own background investigation, which will include a Social Security Number verification. Additional specific provisions or requirements related to any Owner conducted background investigation pursuant to this Section 7.15.4 will be communicated to Contractor prior to implementation of such background investigation.
- 7.15.5 Contractor shall not perform any screening activities that violate the federal Fair Credit Reporting Act, Title VII of the Civil Rights Act of 1964 or any other applicable law in any circumstances. Contractor shall ensure that the substance and manner of any and all background investigations performed by Contractor conform fully to applicable law.
- 7.16 "Personally Identifiable Information" or "PII" means any information to which Contractor is provided access that could identify an individual either directly or indirectly including, without limitation to, the individual's name, credit card numbers, social security number, biometric, bank account numbers, passport numbers, computer passwords or health, financial or employment information and other individual confidential information.
- 7.16.1 To the extent that Work under the Contract requires Contractor to be given access to PII gathered and/or maintained by or on behalf of Owner, or in the event Contractor acquires access to or encounters any PII during performance of the Work, Contractor shall after receipt thereof, treat such PII as confidential and safeguard such PII from unauthorized use and disclosure. Upon request of Owner, Contractor shall have its employees execute a confidentiality agreement protecting PII. Contractor agrees not to appropriate such PII for its own use or to disclose such PII to third parties unless specifically authorized by Owner in writing. Contractor shall ensure that its employees will not discuss, divulge or disclose any such PII to any person or entity except those persons directly concerned with and only to the extent necessary to complete the performance of the Work. Contractor shall access, use and process PII and other data on behalf of Owner only for the purposes specified in the Contract.

- 7.16.2 Contractor shall comply with (i) NERC Reliability Standards as applicable, including without limitation, those relating to Critical Infrastructure Protection, (ii) Owner's security standards, and (iii) such further instructions as Owner may provide regarding the processing of such PII. Contractor shall inform Owner promptly if it has reason to believe that applicable law (or changes in applicable law) prevents Contractor from fulfilling the obligations relating to treatment of PII or other data under Owner's security standards and/or the Contract.
- 7.16.3 To the extent permitted by law, Contractor shall notify Owner promptly and act only upon Owner's instruction concerning: (a) any request for disclosure of PII or other data by law enforcement or other governmental authority; (b) any request by law enforcement or other governmental authority for information concerning the processing of PII or other data in connection with the Contract; or (c) any request received directly from an individual concerning his/her PII.
- 7.16.4 Contractor may not store PII, on computers, mobile devices, including but not limited to a cellular telephones and/or personal digital assistants, servers and/or storage devices including removable media (any of which, hereinafter known as a "Computer"), unless required for the performance of Work. Any such information must be deleted from a Computer, in a manner that ensures that it cannot be accessed or read, as soon as such storage is no longer required for the performance of Work.
- 7.16.5 Upon termination of the Contract or upon Owner's request, Contractor must promptly (a) return all PII in written form to Owner, and (b) delete all PII in Contractor's possession or control (on computer or in whatever other form or media) in a manner that ensures that this information cannot be accessed or read.
- 7.16.6 Contractor shall administer a monitoring process to ensure compliance with Section 7.16 and the related subsections hereof, promptly report any breaches to Owner, and implement immediate, appropriate corrective actions to contain and prevent recurrence. Contractor shall report to Owner immediately upon discovery of a real or suspected loss of PII. In the event of a breach of this provision or the occurrence of any other event regarding PII that requires notification under applicable law, Contractor agrees to assume responsibility for informing all such individuals in accordance with applicable law.
- 7.16.7 In addition to any remedy available to Owner under the Contract, Contractor acknowledges that any breach of Section 7.16 or the related subsections hereof by Contractor or its Subcontractors may subject Contractor to civil and criminal penalties. Contractor shall include the full text of Section 7.16 and the related subsections 7.16.1 through 7.16.7 in all appropriate subcontracts. However, including such provision in the subcontracts shall not relieve Contractor of its obligation to ensure compliance with the provisions of Section 7.16 and the related subsections 7.16.1 through 7.16.7.

## 8.0 EQUIPMENT

- 8.1 All Equipment shall be new and meet the requirements of all applicable codes. Equipment which will not become a part of the permanent installation is not required to be new. Owner reserves the right to reject Equipment which has not been previously used but which has been in storage for an unreasonable period of time. Title to the Equipment shall be free and clear of all liens and encumbrances.
- 8.2 Contractor shall not substitute Equipment specified in the Contract unless authorized by Owner in writing. Unless substitution has been so authorized, Contractor shall, at its expense, remove and replace any improperly substituted Equipment.

- 8.3 Upon Owner's request, Contractor shall, at its expense, submit to Owner samples of Contractor-furnished Equipment. Contractor must obtain Owner's written approval before performing Work involving the use of Equipment for which samples have been requested. Approval by Owner shall not relieve Contractor from responsibility for complying with the requirements of the Contract and all applicable codes. Equipment used shall conform to the approved samples. Contractor shall remove and replace nonconforming Equipment at its expense.

9.0 INSPECTION AND ACCEPTANCE

- 9.1 Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the Work performed conforms to the Contract requirements. Owner reserves the right to review and approve the adequacy of Contractor's inspection system. Contractor shall provide all quality control and quality assurance program information requested by Owner.
- 9.2 Owner shall have free access to the Work for inspection purposes. Owner's inspectors and expeditors shall be admitted at all reasonable times to the shops of Contractor, its Subcontractors for inspection purposes. Owner's inspection, receipt or Initial Acceptance of the Work shall not relieve Contractor of its obligation to comply with the terms of the Contract.
- 9.3 Each party shall bear its own expenses in performing inspections, except that (a) Owner may use Contractor's facilities, ladders and scaffolds to perform inspections of the Work; (b) Contractor shall pay Owner's expenses in re-inspecting Work which was rejected as non-conforming to the Contract requirements in an earlier inspection; (c) Contractor shall pay the costs of uncovering and re-covering Work for Owner's inspection if Contractor failed to give Owner reasonable notice that the Work was ready to be covered; and (d) prior to Final Acceptance, if Owner requests an inspection of Work already completed which requires removing and tearing out Work, and the Work is found to be materially defective, Contractor shall pay the expenses of inspection and reconstruction, but if the Work is found to be in conformance with the Contract requirements, Owner shall pay the expenses of inspection and reconstruction.
- 9.4 Owner will not pay for defective work. Contractor shall repair or replace all defective work at its expense. Contractor shall promptly remove from the Site any Equipment that does not comply with the requirements of the Contract. If Owner's Equipment has been used in any defective work, the cost of such Owner's Equipment shall be backcharged to Contractor.
- 9.5 Contractor shall, at its expense, furnish to Owner certificates of shop inspection as required by laws or regulations, or by the National Board of Fire Underwriters, or by any company insuring the Equipment for the benefit of Owner.
- 9.6 Owner shall have the right to take possession of or use any part of the Work. Owner's possession or use shall not constitute Initial Acceptance or Final Acceptance of the Work.
- 9.7 Contractor shall make all production and shop tests at its expense. Owner shall have the right to have a representative present at such tests, including those at Contractor's suppliers' shops, and notice shall be given to Owner at least two weeks prior to any scheduled test. Contractor shall give Owner copies of certified test results promptly upon request.
- 9.8 Unless otherwise provided in the Contract, Final Acceptance by Owner shall be made as soon as practicable after all Work has been completed and inspected. Any part of the Work not rejected by Owner following Final Inspection shall be deemed to have achieved Final Acceptance.

10.0 SHIPMENT AND DELIVERY

- 10.1 Contractor shall coordinate shipment so that Equipment arrives at the Site on schedule and during Site receiving hours. Contractor shall provide shipping notices to Owner prior to shipment of the Equipment. Owner's storeroom at the Site where the Equipment is to be delivered shall be notified at least 48 hours in advance of the arrival of the Equipment, or as required by the Contract. Notification to Owner's storeroom and all shipping notices shall include special unloading and storage directions and a list of equipment required to unload the Equipment.
- 10.2 Contractor shall provide a complete bill of materials for each separate shipment. Every part that is not preassembled shall be identified on the bill of materials.
- 10.3 Contractor must attach metal tags with corrosion resistant tie wire, and waterproof markings and labels, to each piece and package, making reference to the bill of materials and Contract number.
- 10.4 Owner reserves the right to refuse shipments that do not contain proper markings, bills of materials, or for which proper shipping notices were not received. The return and redelivery will be at Contractor's expense.
- 10.5 Contractor shall deliver all Equipment F.O.B. Site, with freight prepaid and included in the Contract price.

11.0 TITLE AND RISK OF LOSS

- 11.1 Title and risk of loss shall pass to Owner upon Final Acceptance of the Work. Contractor agrees that title shall vest in Owner free and clear of all liens and encumbrances. If the Work is rejected as non-conforming, title and risk of loss shall remain with Contractor.
- 11.2 If the Work requires warranty work, title shall remain at all times with Owner, except that if the Work is replaced rather than repaired, Owner's title shall vest in the replacement Work.
- 11.3 If any part of the Work requires warranty work at Contractor's facility or any other off-Site location, risk of loss to that part of the Work shall pass to Contractor upon delivery by Owner of that part of the Work to a common carrier. Risk of loss to that part of the Work shall pass back to Owner upon delivery to Owner, installation at the Site and successful acceptance testing of the repaired or replaced Work.

12.0 SCHEDULE

- 12.1 Contractor shall perform the Work to meet the schedule date(s) set forth in the Contract documents. Contractor shall not commence Work until authorized by Owner to do so.
- 12.2 In a format acceptable to Owner, Contractor shall develop, update, maintain and provide to Owner a written schedule for execution of the Work. The schedule shall be time scaled, complete, and accurate in detail depicting Contract milestone dates, work activities and durations. Upon review and approval by Owner, this schedule shall become the Contract schedule. Updates to the Contract schedule shall be provided to Owner on at least a monthly basis. Updates shall depict actual progress measured against planned progress.
- 12.3 Contractor shall notify Owner within 24 hours of the first knowledge that any completion date(s) will not be met and shall, within five (5) Business Days thereafter, submit a detailed program depicting the plans and actions being taken to regain the lost time. The notice shall not limit any other rights or remedies afforded Owner under the Contract or by law.

13.0 TERMS OF PAYMENT

13.1 Except as otherwise provided in the Contract, the following terms of payment shall apply:

13.1.1 The Contract Price set forth in the Contract shall constitute full and complete payment for all Work.

13.1.2 Contractor shall submit invoices with proper documentation to Owner for the Work completed or for milestones achieved during the prior month. Owner may withhold all or any part of payment in an amount necessary to protect Owner from loss due to the occurrence, or imminent occurrence, of (i) Contractor's breach or failure to perform in accordance with the Contract, (ii) defective Work, (iii) Contractor's failure to pay any Subcontractor, (iv) other claims by Owner against Contractor, including indemnity claims, and (v) damages for delay or any agreed upon liquidated damages.

13.1.3 Owner shall pay 90% of each properly submitted and accepted invoice within forty five (45) days of receipt. The release of retention shall become due and payable forty five (45) days after the date of Final Acceptance of the Work.

13.1.4 Each invoice shall contain a statement that all bills for material and labor relating to the Work have been paid in full by Contractor, and there are no unpaid bills for which a lien could be filed. If requested by Owner, Contractor shall provide evidence of such payments. The final invoice for the Work shall be accompanied by a satisfactorily completed Affidavit of Completion in the form attached as Exhibit 1. Payment of the final invoice and retention constitutes a full and final release of Owner from all claims, damages, liabilities and obligations under the Contract.

13.2 Contractor shall promptly pay all of its Subcontractors.

14.0 CHANGES IN WORK AND EXTRA WORK

14.1 Change in Work

14.1.1 "Change Order" means a written order issued in accordance with this Article 14.0 documenting an addition to, deletion from, or other modification to the Work, including a change in the scope of Work, the Contract Price, the payment schedule, the completion dates, or the schedule for the Work.

14.1.2 Owner may issue a Change Order: (i) at Owner's option, or (ii) if requested by Contractor due to the occurrence of an event that entitles Contractor to a Change Order as determined by Owner.

14.1.3 If Owner issues a Change Order, Contractor shall perform the changed Work in accordance with the terms of the Contract and the issued Change Order.

14.1.4 No order, statement or other conduct of Owner shall be treated as a change in Work until such change is authorized in writing by Owner.

14.1.5 Contractor shall not be entitled to a Change Order for conditions such as, but not limited to, (i) work which is of such a nature as to be normally included in the Work or is reasonably inferable from the Contract; (ii) any errors, omissions, non-performance, negligence, deficiencies or improper or defective work on the part of Contractor (including miscalculations, incorrect estimates, or other errors in Contractor's proposal for the Work); (iii) changes relating to refinement, minor correction and detailing of the Work or

any part of the Contract; or (iv) other unallowable claims such as cost impacts not due to Owner and cumulative impact claims.

- 14.1.6 With respect to Contractor claims for additional compensation, Owner shall pay only incremental Direct Costs associated with the proposed changes and only to the extent that Contractor can demonstrate that the changes actually increased its costs of performance. Any claims for additional compensation based on a change to the Work or extra work must be material in nature, and Contractor must provide full documentation supporting all elements of such claims. For a reduction in the scope of Work or a change which reduces Contractor's costs, the Contract Price shall be adjusted downward. The payment for changes to the Work shall be complete compensation to Contractor for performing such changes, including any schedule or cost impacts on the Work.
- 14.1.7 If Owner requests in writing that Contractor furnish materials or Equipment to be permanently incorporated in changed work, extra work or cost-plus work, Owner shall reimburse Contractor for such materials or Equipment at its incremental Direct Cost plus a percentage mark-up to be agreed upon by the parties. Requests for payment for materials and equipment shall be accompanied by copies of receipted invoices. Owner has the right to audit Contractor's requests for changes and the financial basis therefor.
- 14.1.8 If Contractor and Owner disagree on whether any particular work is within the scope of Work and such work must be completed to insure timely progress, Owner will issue a disputed Change Order to cover the disputed work. Contractor shall diligently proceed with the disputed work. By noon on the work day following performance of the disputed work, Contractor shall submit to Owner for review timesheets itemizing all labor and equipment hours expended on the disputed work and an itemized listing of Contractor furnished materials. Such review is not an admission of liability by Owner. Prior to Final Acceptance, each disputed Change Order will be resolved to the mutual agreement of the parties.

14.2 Extra Work

- 14.2.1 "Extra work" is work which is beyond Contractor's scope of Work. At Owner's request, Contractor shall perform extra work at the applicable prices set forth in the Contract. If the Contract prices are not applicable to the type of extra work to be performed, Contractor shall promptly submit a proposal to perform the extra work, which proposal shall become an amendment to the Contract upon acceptance by Owner. If Owner directs Contractor to perform extra work on an overtime basis, Owner shall reimburse Contractor the actual payroll cost of premium time for direct job labor. Contractor shall invoice and maintain separate cost records for each extra work authorization issued by Owner.
- 14.2.2 If Owner elects, Contractor shall perform extra work on a cost-plus basis. Cost-plus extra work shall be paid in accordance with Article 15.0.

- 14.3 Contractor waives all claims for additional compensation for changes in work and extra work not made strictly in accordance with the terms of this Article 14.0.

15.0 REIMBURSEMENT FOR COST-PLUS WORK

- 15.1 Direct labor costs will be reimbursed at the actual payroll costs of direct labor wages, fringe benefits, payroll taxes and insurance required by collective bargaining agreements or by law, plus an agreed wage mark-up. Copies of certified payrolls and time sheets shall be provided to Owner for review and approval. Contractor shall not invoice Owner for social security, unemployment, workers' compensation, or other federal, state or local taxes or insurance at rates which exceed Contractor's actual costs.



- 15.2 Owner will pay Contractor actual invoice costs for subcontracted work, provided Owner has approved payment terms in advance of performing the work plus an agreed mark-up.
- 15.3 Contractor-furnished Equipment costs will be reimbursed at actual invoice costs plus an agreed mark-up.
- 15.4 Construction equipment costs will be reimbursed based on actual usage time during the performance of Work and established rental rates not to exceed monthly rates set forth in the "Rental Rate Blue Book for Construction Equipment" adjusted for geographical region as published by Dataquest or other basis acceptable to Owner. Hourly rates shall be established by taking the monthly rate divided by 176 hours per month.
- 15.5 Small tools and consumables costs will be reimbursed based on agreed rates.
- 15.6 Field supervision, clerical, safety and other non-direct labor costs will be reimbursed at agreed billing rates, except that reimbursement for these costs for cost plus extra work shall require the prior review and approval of Owner.
- 15.7 Project management, engineering, design, procurement, and other home office services will be reimbursed at billing rates contained in the Contract.

16.0 BACKCHARGES

- 16.1 Owner may impose backcharges against Contractor or deduct backcharges from monies owed to Contractor for performance or reperformance by Owner or others of Work, including but not limited to, costs associated with defective work, nonperformance by Contractor, termination for cause, clean-up and disposal of debris, damages to Owner's tools and equipment and warranty repairs. Contractor will be responsible for the cost of such performance or reperformance plus a fifteen percent (15%) administrative charge.

17.0 TAXES

- 17.1 The Contract Price shall include, and Contractor shall pay, all taxes and assessments for unemployment insurance, workers' compensation, social security and disability benefits, and other taxes which are based upon the compensation paid to persons employed by Contractor or its Subcontractors for the performance of any Work under the Contract.
- 17.2 Except as provided below, the Contract Price shall include all applicable foreign, federal, state and local taxes payable by Contractor with respect to the Contract.
  - 17.2.1 Contractor Purchases. If Owner specifies that tangible personal property to be incorporated into real property as defined for sales and use tax purposes or taxable services to be purchased by Contractor from Subcontractors qualify for exemption from sales or use taxes, Contractor shall not include sales or use taxes on such exempt tangible personal property or services in the Contract Price. Unless otherwise specified: a) consumable materials and supplies or Contractor's tools and equipment that are not incorporated into the Work or the overall project are not eligible for exemption and the Contract Price shall include, and Contractor shall pay, any sales or use taxes on such items; and b) Contractor will use its own properly-executed exemption or resale certificate, and not Owner's direct pay permit, to make exempt purchases of tangible personal property or services from Subcontractors.
  - 17.2.2 Owner Purchases from Contractor. With respect to any Owner purchases from Contractor of tangible personal property not incorporated into real property as defined for sales and use tax purposes or taxable services, Owner shall provide to Contractor its

direct pay permit (if Owner has been issued a direct pay permit) or an appropriate exemption certificate required to relieve the Contractor of its responsibility to collect sales or use tax from the Owner. If Owner provides Contractor such direct pay permit or exemption certificate, sales or use taxes on Owner purchases from Contractor of tangible personal property or taxable services shall not be collected from Owner or included in the Contract Price. Unless otherwise approved or directed by Owner in writing, Contractor shall not use Owner's direct pay permit to make exempt purchases of tangible personal property or taxable services from Subcontractors.

- 17.2.3 Contractor Cooperation. Contractor shall take all steps reasonably necessary to ensure that Contractor's purchases from Subcontractors of items of tangible personal property or services are exempt from sales and use tax pursuant to any applicable exemption pursuant to the law of any U.S. jurisdiction or its political subdivisions.

## 18.0 INSURANCE

- 18.1 Contractor shall, at its sole expense, procure and maintain, and shall cause its Subcontractors to procure and maintain, throughout the term of this Contract except as set forth in Section 18.5, the following types of insurance with the following, minimum limits:
- 18.1.1 Workers' compensation insurance limits in accordance with all jurisdictions where Contractor has operations including where the Work is to be performed. If Contractor is a non-subscriber to workers' compensation, evidence of insurance equivalent to workers' compensation must be provided.
- 18.1.2 Employer's liability in an amount not less than \$1,000,000.
- 18.1.3 Business automobile insurance covering all owned, non-owned and hired autos in an amount not less than \$5,000,000 per occurrence.
- 18.1.4 Commercial general liability insurance covering claims of bodily injury and property damage in an amount not less than \$5,000,000 per occurrence.
- 18.1.5 Aircraft liability insurance with a combined limit of not less than \$10,000,000. Such insurance shall be required only if the Contractor or its Subcontractors shall utilize an aircraft in the performance of the Work.
- 18.1.6 If Contractor (or any of its Subcontractors) are engaged in operations which use marine vessels or floating equipment, or which are subject to maritime jurisdiction, the following insurance shall be required: Marine Liability insurance (including Jones Act and maritime employer's liability if operations are subject to federal jurisdiction) and pollution liability (under terms equivalent to current W.Q.I.S. policy provisions if operations are subject to federal jurisdiction) in amounts not less than \$10,000,000 per occurrence.
- 18.1.7 Professional liability insurance and/or errors and omissions insurance in an amount not less than \$5,000,000. Such insurance shall be required only if the Work includes professional liability exposures.
- 18.1.8 "All risk" property insurance covering the full replacement cost of Contractor's personal property.
- 18.2 To the extent permitted by law, Contractor shall waive, and shall cause each of its insurers to waive, any and all rights of recovery, by subrogation or otherwise, against Owner and its affiliates,

officers, directors, employees, agents and assigns of any type. Each of Contractor's insurance policies shall be primary to and non-contributory with any insurance or self-insurance of Owner.

- 18.3 The commercial general liability, the business automobile, and (if applicable) the aircraft liability and Marine Liability insurance shall include Owner as an additional insured with respect to Owner's liability arising out of the operations of Contractor. Such coverage shall also include blanket contractual coverage and contain no exclusion for explosion, collapse, or underground property damage (XCU coverage).
- 18.4 The insurance required by this Article 18.0 is in addition to and separate from any other obligations contained in the Contract.
- 18.5 Products and/or completed operations coverage shall be maintained for a period of five (5) years after the completion of the Work. If any of the policies indicated above are placed on a "claims-made" basis, such coverage shall be maintained for a period of not less than five (5) years following the completion of the Work.
- 18.6 Any deductibles or retentions on any of the policies required herein shall be the sole responsibility of the Contractor.
- 18.7 The above referenced limit requirements may be met by any combination of umbrella or excess and primary policies so long as the total limit of insurance requirement is met. The required coverages referred to herein shall in no way affect, nor are they intended as a limitation of, Contractor's liability with respect to its performance of the Work. The limits of insurance indicated herein are minimum requirements and are in no way intended to limit Contractor's liability.
- 18.8 In all cases where Contractor's employees (defined to include Contractor's direct, borrowed, special, or statutory employees) are covered by the Louisiana Worker's Compensation Act, La. Rev. Stat. Ann. 23:1021 et seq., Owner and Contractor agree that pursuant to Section 23:1061 (A) (1) all Work performed by Contractor and its employees under the terms and conditions of the Contract is an integral part of Owner's operations and is essential to Owner's ability to generate its goods, products and services. Additionally, Owner and Contractor agree that for purposes of Section 23:1061 (A) (3) Owner is the principal or statutory employer of Contractor's employees. Irrespective of Owner's status as the statutory employer or special employer of Contractor's employees, pursuant to Section 23:1031 (C), Contractor shall remain primarily responsible for the payment of Louisiana Worker's Compensation benefits to its employees, shall indemnify Owner from any and all claims of Contractor's employees or its Subcontractor's employees and shall not be entitled to seek contribution for any such payments from Owner.
- 18.9 Upon inception of the Contract and prior to the commencement of Work, Contractor shall provide Owner with an acceptable certificate of insurance evidencing the insurance required under Article 18. Contractor will not be permitted to bring its employees, materials or equipment onto the Site until Owner receives such evidence of insurance. Contractor also must provide an updated certificate of insurance at any time during the Contract term upon Owner's request. Contractor shall immediately notify Owner of cancellation or any material changes in the insurance policies required herein. If such insurance policies are subject to any exceptions to the terms specified herein, such exceptions shall be explained in full in such certificates. Owner may, at its discretion, require Contractor to obtain insurance policies that are not subject to non-standard exceptions.
- 18.10 In lieu of Sections 18.1 thru 18.9, the Owner may elect to implement an Owner Controlled Insurance Program ("OCIP"). If an OCIP is implemented, all Contractor(s) and Subcontractor(s) of any tier and such other persons or entities as the Owner may designate as enrolled parties, may, at Owner's option, be required to enroll and participate. Owner shall procure and maintain at its own expense during the performance of this Contract and a stipulated completed operations period, such

insurance coverage as Owner deems appropriate on behalf of enrolled parties. Eligible Contractor(s) and Subcontractor(s) must submit all necessary enrollment forms for acceptance into the OCIP, and agree to the terms of the Owner's project safety standards. Owner and Contractor agree that the terms of the OCIP as contained in amendments to this Contract and the OCIP Contractor Manual shall control. The OCIP does not relieve any Contractor or Subcontractor from its obligations to procure coverage for offsite operations or coverages not included in the OCIP. In the event an OCIP is implemented, amended insurance requirements for enrolled parties will be provided.

- 18.11 The furnishing of insurance by Owner through an OCIP will in no way relieve or limit any enrolled party of any responsibility, liability, or obligation imposed by the contract documents or by law, including without limitation any indemnification obligations which any enrolled party has to the Owner thereunder.

19.0 INDEMNIFICATION

- 19.1 The laws of the state where the Work giving rise to the claim is performed shall apply to this Article 19.0.

- 19.2 **TO THE EXTENT PERMITTED BY LAW, CONTRACTOR SHALL INDEMNIFY, DEFEND AT ITS EXPENSE, AND SAVE OWNER HARMLESS FROM, ANY LIABILITIES, COSTS AND CLAIMS, INCLUDING JUDGMENTS RENDERED AGAINST, AND FINES AND PENALTIES IMPOSED UPON, OWNER AND REASONABLE ATTORNEYS' FEES AND ALL OTHER COSTS OF LITIGATION (COLLECTIVELY, "LIABILITIES"), ARISING OUT OF THE CONTRACT, INCLUDING INJURIES, DISEASE OR DEATH TO PERSONS, OR DAMAGE TO PROPERTY, AND ENVIRONMENTAL CLAIMS AND LIABILITIES, CAUSED BY CONTRACTOR, ITS EMPLOYEES, AGENTS OR SUBCONTRACTORS, OR IN ANY WAY ATTRIBUTABLE TO THE PERFORMANCE OF THE CONTRACT, EXCEPT THAT CONTRACTOR'S OBLIGATION TO INDEMNIFY OWNER SHALL NOT APPLY TO ANY LIABILITIES ARISING FROM OWNER'S SOLE NEGLIGENCE. TO THE EXTENT PROVIDED IN THIS SECTION, IN STATES OTHER THAN OHIO, MICHIGAN, KENTUCKY, TENNESSEE, MISSOURI, OKLAHOMA, VIRGINIA, AND WEST VIRGINIA, CONTRACTOR AGREES TO INDEMNIFY OWNER FOR LIABILITIES ARISING FROM OWNER'S ACTS AND OMISSIONS, NEGLIGENT OR OTHERWISE. OWNER SHALL HAVE THE RIGHT TO SELECT ITS OWN COUNSEL AND TO HAVE COUNSEL SEPARATE FROM CONTRACTOR, ALL AT CONTRACTOR'S EXPENSE.**

- 19.3 **WITH RESPECT TO CLAIMS AGAINST OWNER BY CONTRACTOR'S EMPLOYEES, CONTRACTOR UNDERSTANDS AND AGREES THAT THIS INDEMNIFICATION OBLIGATION SHALL NOT BE LIMITED IN ANY WAY BY, AND CONTRACTOR EXPRESSLY WAIVES, ITS IMMUNITY AS A COMPLYING EMPLOYER UNDER ANY APPLICABLE WORKERS' COMPENSATION LAW, BUT ONLY TO THE EXTENT THAT SUCH IMMUNITY WOULD BAR OR AFFECT RECOVERY UNDER OR ENFORCEMENT OF THIS INDEMNIFICATION OBLIGATION.** With respect to the State of Ohio, this waiver applies to Section 35, Article II of the Ohio Constitution and Ohio Rev. Code Section 4123.74.

- 19.4 **CONTRACTOR SHALL BE LIABLE FOR REASONABLE ATTORNEYS' FEES AND ALL COSTS OF LITIGATION ASSOCIATED WITH ENFORCEMENT OF ALL INDEMNITY OBLIGATIONS SET FORTH IN THE CONTRACT.**

20.0 LIMITATION OF LIABILITY

20.1 Except as expressly provided herein, neither party shall be liable to the other for any incidental, indirect, special, punitive or consequential damages. Contractor must bring any cause of action arising under the Contract within one year from the time the cause of action accrues.

21.0 LIENS

21.1 To the extent permitted by law, Contractor shall not file or permit to be filed any lien with respect to the Work and hereby expressly waives any right to file or cause to be filed a lien. Contractor, in its subcontracts, shall require all Subcontractors to expressly waive the right to file any liens against Owner's property, and, if requested, provide Owner with copies of such waivers.

21.2 In the event any claim is asserted or any lien filed against Owner or its property, or notice of lien is provided to Owner in violation of this provision, further payment to Contractor shall not become due under the Contract until the claim is satisfied or the lien released without cost to Owner and Contractor shall provide Owner with evidence of payment relating to such claim or lien. If Contractor fails to settle any claim or secure the release of any lien, Owner may take whatever steps it deems necessary to settle the claim or release the lien, including bonding off the lien. Owner may deduct its costs and expenses for settling any claim or securing the release of any lien filed by Contractor or its Subcontractors from any money due or to become due to Contractor under the Contract. If final payment has been made, Contractor shall reimburse to Owner its costs to settle any claim or secure the release of any lien arising out of the Contract.

22.0 INTELLECTUAL PROPERTY

22.1 Contractor warrants that its performance of the Work will not infringe upon or violate any trademarks, patents, copyrights, trade secrets or other third party property rights. If the performance of Work is held in any action to constitute infringement, or the use of the Work is enjoined, Contractor, at its expense, shall procure for Owner the right to continue use of the Work, or replace the Work with non-infringing materials or methods satisfactory to Owner, or modify the Work in a manner satisfactory to Owner so that the Work becomes non-infringing. Contractor agrees to indemnify and save Owner harmless from and against any liability or damages, including attorneys' fees, arising out of any alleged infringement or violation.

22.2 All inventions, discoveries, documents, works of authorship, methods, and the derivative works thereof, resulting from the Work, including patents, patent applications, copyrights, trade secrets and other intellectual property (collectively "Intellectual Property"), shall be the sole and exclusive property of Owner. Contractor shall promptly inform Owner of the development of any such Intellectual Property and does hereby assign and transfer the entire right, title and interest, together with all rights of priority, in and to such Intellectual Property to Owner. Contractor shall promptly cooperate with Owner in signing any additional documentation necessary to assign and perfect ownership of such Intellectual Property in Owner or to allow Owner to register its property rights therein. Contractor warrants that it has obtained written agreements from its employees and agents as necessary to effectuate the purpose of this Section. The Intellectual Property assigned and transferred to Owner shall be the Confidential Information of Owner.

22.3 Contractor grants Owner a nonexclusive, nonrevocable, perpetual, fully paid license to utilize Contractor's intellectual property existing separate from the Contract, including inventions, discoveries, works or authorship, methods, and trade secrets, regardless of whether such are the subject of patents, copyrights or other intellectual property protection, to the extent necessary for Owner to achieve the full benefit of the Work.

22.4 Contractor shall not use Owner's name or logo in marketing, endorsements, or other business purposes without prior written consent from Owner.

23.0 DRAWINGS AND DATA

- 23.1 Contractor shall furnish for Owner's review, prior to commencement of Equipment manufacture or fabrication, general and detailed drawings of the Equipment in the format requested. Such drawings shall be certified as to accuracy and completeness and shall show information adequate to enable Owner to design and provide suitable clearances. If required by the Contract or any code, law or agency, Contractor will provide professional engineer or architect sealed drawings and reports for the state where the Equipment is to be finally installed. Figures shall take precedence in all cases over scaled measurements on drawings. Where obvious discrepancies exist, Contractor shall consult with and follow the instructions of Owner. Owner's approval of Contractor's drawings shall not relieve Contractor of its obligation to comply with the contract requirements.
- 23.2 All written data, such as drawings, plans, reports, designs and specifications, prepared by Contractor for Owner during the performance of Work shall become the property of Owner. Such data, together with all data furnished by Owner and lent to Contractor for return, shall be delivered to Owner upon request, or upon completion of the Work or termination of the Contract. For clarification purposes, Owner shall have the unrestricted right to use, release, disclose, copy and reproduce such data for purposes of operation, maintenance, analysis, testing, cleaning, erection, improvement or modification of any facilities owned or operated by Owner. Contractor shall cooperate with Owner by executing such documents as are necessary to assign and perfect ownership in Contractor provided data to Owner.

24.0 CONFIDENTIALITY

- 24.1 "Confidential Information" means any confidential or proprietary information, whether written, oral, or visual, whether or not it constitutes a trade secret under applicable law. "Confidential Information" includes, but is not limited to, business plans and methods; customer information; engineering, operating and technical data; and the dates of Owner's outage schedule, information concerning the Work, and Owner's activities. "Confidential Information" does not include information that (a) has become part of the public domain other than by acts or omissions of the recipient; (b) has been furnished or made known to the recipient by a third person as a matter of legal right and without restriction on use; (c) was in the recipient's possession prior to disclosure by the disclosing party without restriction on use; or (d) is independently developed by the recipient without access to the Confidential Information.
- 24.2 Subject to Section 24.5, each party agrees (a) to protect the Confidential Information of the other with at least the same degree of care used to protect its own Confidential Information; (b) not to use (except for the purpose described herein), publish or disclose to third parties such Confidential Information; and (c) upon the request of the disclosing party, to promptly deliver to the disclosing party all written copies of its Confidential Information. Notwithstanding the foregoing, a recipient shall be entitled to disclose Confidential Information to its officers, employees, affiliates (including any joint ventures of which Owner or any of its affiliates are a member and the other members of such joint ventures), agents, lenders, attorneys and other advisors (collectively, "Representatives"), provided that the Representatives shall be informed of the confidentiality obligations provided herein.
- 24.3 If either party is required pursuant to applicable law or otherwise becomes legally compelled to disclose any of the Confidential Information, such party shall promptly advise the disclosing party in order that the disclosing party may seek a protective order or such other remedy as the disclosing party may consider appropriate in the circumstances. In any event, the compelled party may disclose only that portion of the Confidential Information which such party is legally required to disclose in the judgment of the party's legal counsel without any liability to the disclosing party hereunder and such disclosure shall not be a breach of this Section.

24.4 Contractor shall require its Subcontractors, if any, to expressly comply with the confidentiality provisions as set forth herein.

24.5 All documents prepared by Contractor for Owner during the performance of Work that incorporate, in whole or in part, information owned or provided by Owner shall not be marked or designated in any way as the confidential or proprietary information of Contractor without also stating that Owner has rights in such documents. Owner shall have the right to question the designation of Confidential Information by Contractor and Contractor agrees to provide Owner with reasonable cooperation in explaining such designation. Contractor agrees that Owner's acceptance of documents containing the Confidential Information of Contractor shall not be construed as a restriction on Owner's rights to use, release, disclose, distribute, copy or reproduce the documents.

25.0 DEFAULT

25.1 The occurrence of any of the following shall constitute an "Event of Default":

25.1.1 Contractor files a petition in bankruptcy, or if its creditors file an involuntary petition in bankruptcy, or if it makes a general assignment for the benefit of its creditors, or if a receiver is appointed on account of its insolvency.

25.1.2 Contractor (a) fails to maintain the schedule set forth in the Contract, or (b) fails to promptly pay Subcontractors for material or labor, or (c) commits repeated or substantial violations of laws, rules, regulations or policies, or (d) fails to perform in accordance with the Contract, and Contractor fails to take corrective action or submit an acceptable plan within two (2) Business Days after the receipt of a notice of non-conformance from Owner.

25.2 Upon an Event of Default, Owner may take any or all of the following actions without affecting the Contract Price or schedule:

(a) Owner may direct Contractor to cease performance on all or part of the Contract until satisfactory corrective action has been taken;

(b) Owner may have others take corrective action necessary to achieve compliance with the Contract. Owner may deduct the cost of such corrective action by others from any monies due to Contractor. Corrective action by others shall be taken when, in the judgment of Owner, the noncompliance threatens safety, unreasonably interferes with or delays the work of others, or otherwise creates a situation the resolution of which cannot be delayed without adversely impacting quality, cost or timely completion;

(c) Owner may pursue damages for delay under the terms of Article 26.0;

(d) Owner may suspend the Contract under Article 28.0; and/or

(d) Owner may terminate the Contract under the terms of Section 29.1

25.3 Each of Owner's rights set forth above shall be cumulative and additional to any other rights or remedies provide in law or equity or otherwise.

26.0 DAMAGES FOR DELAY

26.1 Contractor shall be liable for any direct damages incurred by Owner arising out of Contractor's failure to perform on time.

- 26.2 In lieu of Section 26.1, if the parties have agreed to liquidate the amount of direct damages resulting from Contractor's delay, the parties agree that such damages which might be incurred by Owner as a result of Contractor's delay in performance are uncertain and would be difficult to calculate. The parties agree that the liquidated damages contained in the Contract would be reasonable and fair compensation for late performance. Contractor commits to pay and Owner agrees to accept such sum as liquidated damages and not as a penalty in the event of late performance.

**27.0 FORCE MAJEURE**

- 27.1 Neither party shall be in breach of the Contract to the extent that any delay or default in performance is due to a Force Majeure Event. The term, "Force Majeure Event" shall mean any cause beyond the reasonable control of the delayed or defaulting party, including, but not limited to, acts of God including unusually adverse weather, fire, and epidemic; acts of public enemy including war, acts of terrorism, riot, and civil disturbance; and national labor strikes, which by exercise of due foresight such party could not have been expected to avoid or overcome. Contractor's inability to obtain adequate and sufficient labor in order to maintain progress of the Work shall not constitute a Force Majeure Event. No delay in performance resulting from a Force Majeure Event shall result in any liability on the part of Owner. Notwithstanding the preceding sentence, in the event of a delay caused by any act or failure to act on the part of Owner, Contractor's sole remedy shall be as set forth in Article 14.0.
- 27.2 The delaying party shall immediately notify the other party of the beginning of a delaying event, and shall confirm the notice in writing within ten (10) Business Days of the beginning of the event. The notice shall contain a detailed account of the delay, including the cause of the delay, an estimate of the duration of the delay, an estimate of the delay's impact to the schedule, and the plan to mitigate the effects of the delay.
- 27.3 If Contractor is the delaying party, and the delay is a Force Majeure Event as defined in Section 27.1, Owner shall grant Contractor an extension of the time for performance, to be mutually agreed upon by Contractor and Owner. The extension of time granted as a result of a Force Majeure Event shall in no case exceed the length of the delay and such extension may be withheld or reduced to the extent Contractor does not provide notice in accordance with Section 27.2. If Owner so requests, Contractor shall expedite its schedule to mitigate the effects of the excusable delay. Owner shall pay incremental, Direct Costs incurred by Contractor for expediting at Owner's request.

**28.0 SUSPENSION**

- 28.1 Owner may at any time suspend all or any part of the Work. Owner shall provide Contractor written notice verifying the suspension date. Immediately upon receipt of the suspension notice, Contractor shall take the necessary actions to comply with the suspension notice.
- 28.2 Owner shall pay Contractor in accordance with the terms of payment set forth in the Contract for the Work completed prior to the time of suspension and for the incremental, Direct Costs that result from Contractor's compliance with the suspension notice.
- 28.3 Owner may, at any time during the suspension period, either terminate the Contract in accordance with Section 29.2, or authorize the Work or any portion thereof to be restarted. Owner shall pay Contractor the incremental, Direct Costs associated with the restart of the Work and shall resume payments to Contractor in accordance with the terms of payment under the Contract thirty (30) days after the restart of Work.
- 28.4 The schedule shall be adjusted to provide for a reasonable extension of time for Contractor's performance.



29.0 TERMINATION

29.1 Termination for Cause

- 29.1.1 Upon an Event of Default, Owner may terminate the Contract upon written notice to Contractor.
- 29.1.2 In the event of such termination, Contractor shall immediately prepare and submit to Owner an itemization of the Work completed by Contractor. Owner may require Contractor to leave the Site. Owner may take over such Work and complete it, or have the Work completed by others. Owner may take possession of and utilize in completing the Work Contractor's materials, Equipment to be installed, supplies, tools and equipment at the Site.
- 29.1.3 Contractor shall not be entitled to further payment until all of the Work is completed in its entirety and Final Acceptance has been achieved. If the cost of completion exceeds the unpaid balance under the Contract, Contractor shall pay the difference to Owner within thirty (30) calendar days of demand.
- 29.1.4 In the event that a court determines that the termination was not properly a termination for cause, pursuant to Section 29.1.1, Contractor's remedy shall be limited to the payments permitted in accordance with Section 29.2.

29.2 Termination for Convenience

- 29.2.1 Owner may terminate this Contract, in whole or in part, for its convenience. Owner will give Contractor written notice of termination specifying the extent to which the Contract is terminated and the date, immediately or otherwise, on which termination becomes effective.
- 29.2.2 Upon termination for convenience, Contractor will comply with instructions in the notice of termination regarding delivery to Owner of all Work in progress and all completed Work, which shall become the property of Owner upon delivery.
- 29.2.3 In the event of such termination, Contractor shall receive payment, including the retained percentage, for the Work satisfactorily performed up to the time of such termination. In addition, Owner shall reimburse Contractor for incremental, Direct Costs resulting from the termination, provided that compensation was not otherwise made for such costs. Final payment shall be made upon the parties' agreement of the amount of the final invoice and Owner's receipt of an Affidavit of Completion in the form of Exhibit 1. Owner shall not be responsible for Contractor's lost profit on the terminated portion of the Contract.

30.0 EQUIPMENT AND WORKMANSHIP WARRANTY

- 30.1 Beginning upon Final Acceptance and for a period of one year thereafter, or for such period as may be specified elsewhere in the Contract, Contractor warrants that (a) it will perform the Work in accordance with the accepted standards of care and competence found in the engineering or other applicable profession as such standards relate to and are commonly used in the electric utility industry, and (b) all Equipment and workmanship shall be free of any and all defects and shall be in conformity with the requirements of the Contract.
- 30.2 Subject to the provisions of Section 30.3, in the event that the Equipment or workmanship does not comply with the warranty, Contractor shall, at no cost to Owner, promptly repair or replace such nonconforming Equipment or workmanship with as little disruption to Owner's operations as

practicable. Contractor shall be responsible for the total cost of correcting any defects, including but not limited to, the costs of engineering, design, materials, labor, any necessary equipment removal, disassembly, shipping, reinstallation and retesting of the installation. Owner shall give Contractor notice of observed defects with reasonable promptness. If nonconforming Equipment or workmanship causes an outage or other delay of operations, Contractor shall make the repair or replacement on an overtime, maximum effort basis, at Contractor's expense.

- 30.3 If Owner directs Contractor to repair or replace any defect and Contractor fails to do so within a reasonable time, or If an emergency exists rendering it impracticable for Contractor to perform the repair or replacement, Owner may make or cause to be made such repair or replacement without affecting the validity of the warranty. Owner's cost for making the repair or replacement shall be deducted from the Contract Price or any unpaid portion thereof. If the unpaid portion of the Contract Price is insufficient to cover such cost, Contractor shall reimburse Owner.
- 30.4 Owner will not pay for any defective portion of the Equipment or workmanship until remedied by Contractor at Contractor's expense in accordance with the Contract requirements.
- 30.5 Owner must approve any proposed correction or alteration by Contractor of the Equipment or workmanship, or parts thereof, made at any time or at any location, before such correction or alteration is undertaken. Approval by Owner shall not relieve Contractor from responsibility for complying with the requirements of the Contract and all applicable codes.
- 30.6 Any Equipment or workmanship which are repaired or replaced pursuant to this Article 30.0 shall be warranted for a period of one year from the date of completion and acceptance of such repair or replacement, or for the remainder of the original warranty period, whichever is longer.
- 30.7 Contractor shall obtain, for the benefit of Owner, all available warranties from Subcontractors of Contractor. Such warranties shall be in addition to the warranties set forth in this Article. If such warranties are in written form, Contractor shall provide Owner with the original warranties.

#### 31.0 REPORTING OF COMPLAINTS

- 31.1 Contractor shall immediately report to Owner, in accordance with Article 35.0, the complete details of all complaints, including any OSHA violations and complaints received from governmental authorities, Subcontractors, laborers, other third parties or members of the public relating to the Work.

#### 32.0 RETENTION AND EXAMINATION OF INFORMATION, BOOKS AND RECORDS

- 32.1 Owner reserves the right to audit records necessary to permit evaluation and verification of (i) claims submitted, (ii) Change Orders, and related overhead and general and administrative costs, and (iii) Contractor's compliance, in the performance of the Contract and its dealings with Owner with (a) the Contract requirements; and (b) Owner's Code of Business Conduct governing business ethics. Owner's right to audit shall not extend to fixed, lump-sum or unit pricing.
- 32.2 Contractor shall cooperate with Owner and provide Owner with information and records ("information") pertaining to the Work as requested by governmental agencies, Owner, or courts of law.
- 32.3 Contractor shall retain for a period of three years after Contract termination or expiration all information relating to the Work. Owner may audit and copy such information at Contractor's premises during regular business hours. If requested by Owner, Contractor shall submit to Owner a copy of each of its subcontracts. Contractor shall include in its subcontracts a provision granting Owner the rights against Subcontractors contained in this Article 32.0.

33.0 COMPLIANCE WITH LAWS

- 33.1 Contractor warrants that all materials and Equipment supplied and all Work performed will comply with, and be manufactured, priced, sold and labeled in compliance with all applicable federal, state and local laws, rules, regulations, orders and ordinances, including, without limitation, environmental protection, energy, safety and health, and labor laws and regulations and applicable industry codes and standards.
- 33.2 Unless exempted, Contractor shall comply with the equal employment opportunity clause in Section 202 of Executive Order 11246, as amended, and all applicable rules, regulations, and relevant orders pertaining to Executive Order 11246, Section 503 of the Rehabilitation Act of 1973, Section 4212 of the Vietnam Era Readjustment Assistance Act of 1974, as amended, the Veteran's Employment Opportunities Act of 1998, as amended, and Executive Order 13201. Contractor represents that it does not, and shall not for the term of the Contract, provide or maintain for its employees facilities that are segregated on the basis of race, color, religion, sex or national origin. Contractor represents that it will not assign its employees to perform any work related to the Contract at a location where facilities are segregated on the basis of race, color, religion, sex or national origin. Contractor agrees that it will not enter into any agreement to obtain goods or services relating to the Contract with any entity that provides, maintains or assigns its employees to work at locations where facilities are segregated on the basis of race, color, religion, sex or national origin. As used herein, "facility" means waiting rooms; work areas; restaurants and other eating areas; time clocks; locker rooms and other storage or sleeping areas, except as necessary to ensure privacy between male and female employees; parking lots, drinking fountains; recreation or entertainment areas; and transportation. If not otherwise exempted by Title 48 and to the extent applicable, Contractor will comply with 48 CFR §52.219-8, Utilization of Small, Small Disadvantaged, and Women-Owned Small Business Concerns, and 48 CFR §52.219-9, Small, Small Disadvantaged, and Women-Owned Small Business Subcontracting Plan. If not otherwise exempted by 41 CFR §60-1.5, Contractor represents that it will file all reports or other required information specified in 41 CFR §60-1.7.
- 33.3 Contractor shall indemnify and save Owner harmless from any and all costs or expenses arising out of any violations of such laws, ordinances and regulations.

34.0 PERMITS AND LICENSES

- 34.1 Contractor shall obtain all permits and licenses required by any regulatory authority for the performance of any portion of the Work, except that Owner shall obtain permits and licenses for all structures which are to become a permanent part of the Site. Before starting Work, Contractor shall submit to Owner a copy of all permits and licenses required by any such regulatory authority.
- 34.2 Contractor shall obtain and maintain all professional licenses necessary to perform the Work.
- 34.3 Contractor shall indemnify and save Owner harmless from any and all costs or expenses arising out of the failure of Contractor to obtain such permits and licenses.

35.0 NOTICES

- 35.1 Each party shall designate in writing a representative to receive any and all notices required under the Contract. Notices shall be in writing and shall be given to the representative designated to receive them, either by personal delivery, certified mail, facsimile, e-mail (with confirmation of receipt) or any similar means, properly addressed to such representative. All notices shall be effective upon receipt, or upon such later date following receipt as set forth in the notice. Either party may, by written notice to the other, change the representative or the address to which such notices are to be sent.

36.0 SEVERABILITY

36.1 In the event that any of the provisions, or portions thereof, of the Contract are held to be unenforceable or invalid by any court, the validity and enforceability of the remaining provisions, or portions thereof, shall not be affected.

37.0 WAIVER

37.1 Either party's waiver of any breach of the Contract shall not be deemed to be a waiver of any other breach of the same or a different term of the Contract.

38.0 NON-DISCLOSURE

38.1 Except as required by law, regulation, or judicial or administrative order, neither party shall disclose the terms of the Contract without the consent of the other party. Notwithstanding the foregoing, Owner may disclose the terms of the Contract without the consent of Contractor (a) to any of its affiliated companies (including any joint ventures of which Owner or any of its affiliates are a member and the other members of such joint ventures); and (b) to any prospective transferee or purchaser of assets of Owner or any of affiliates.

39.0 HEADINGS

39.1 Headings are provided for the convenience of the parties, and shall not affect the interpretation of any provision.

40.0 AFFILIATED COMPANIES

40.1 Any indemnification of Owner or any limitation of Owner's or Contractor's liability under this Contract shall to the same extent apply to Owner's or Contractor's directors, officers, employees, agents, and affiliated companies (including any joint ventures of which Owner or any of its affiliates are a member and the other members of such joint ventures), including any directors, officers, employees and agents thereof.

40.2 The affiliated companies (including any joint ventures of which Owner or any of its affiliates are a member and the other members of such joint ventures) of the American Electric Power System are severally and not jointly liable for obligations arising hereunder.

41.0 APPLICABLE LAWS AND JURISDICTION

41.1 Except for Article 19.0, the rights and obligations of the parties arising out of the Contract shall be governed in all respects by the laws of the State of Ohio, excluding any conflict-of-law rules. Any reference herein to the laws of other states is made only to the extent that the laws of that state might apply, notwithstanding the intent of the parties that the laws of the State of Ohio should apply.

41.2 Contractor agrees that all actions and proceedings brought by Owner against Contractor may be litigated in courts located in the State of Ohio or the state where work was performed. Contractor agrees that such courts are convenient forums and Irrevocably submits to the personal jurisdiction of such courts. Contractor waives personal service of process and consents to service of process by certified or registered mail at the address designated for receiving notices under this Contract.

42.0 ENTIRE AGREEMENT

42.1 The Contract constitutes the entire agreement between the parties and supersedes all previous and collateral agreements or understandings with respect to the subject matter of the Contract. No

waiver, alteration, amendment or modification of any of the provisions of the Contract shall be binding unless in writing and signed by duly authorized representatives of the parties.

**43.0 BINDING EFFECT; NO THIRD-PARTY BENEFICIARIES**

43.1 Subject to the restrictions on assignment in Section 5.1, this Contract shall be binding upon and shall inure to the benefit of the parties of their respective successors and permitted assigns.

43.2 No provision of the Contract is intended or shall be construed to be for the benefit of third party other than as set forth in Article 38.0.

**44.0 EXECUTION; COUNTERPARTS**

44.1 The Contract shall not be binding or effective until properly executed by each of the parties hereto. The Contract may be executed in any number of counterparts, each of which shall be deemed to be an original, and all of which, taken together, shall constitute but one and the same Contract, which may be sufficiently evidenced by one counterpart.

**45.0 SURVIVAL**

45.1 All of the terms of the Contract which by their nature extend beyond the expiration or termination of the Contract, including indemnification obligations, confidentiality obligations, limitations of liability, shall survive expiration or termination of the Contract and remain in full force and effect.

EXHIBIT 1  
Page 1 of 1

AFFIDAVIT OF COMPLETION

State of \_\_\_\_\_

County of \_\_\_\_\_

\_\_\_\_\_, being duly sworn, states that:  
(Name of Affiant)

1. S/He is the \_\_\_\_\_ of  
(Office held by Affiant)  
\_\_\_\_\_  
(Legal Name of Contractor) (Contractor)

that has a contract with \_\_\_\_\_  
(Legal Name of Owner)

(Owner) dated \_\_\_\_\_ (Owner's Contract No. \_\_\_\_\_)  
(Contract Date) (Contract No.)

involving work on the Owner's property at \_\_\_\_\_  
(Project Name)

located near \_\_\_\_\_  
(City, State)

2. All of the Work required to be performed by the Contractor under said Contract has been performed. All bills and claims for material, labor and services to employees and Subcontractors covering the Work required to be performed under the Contract, have been paid in full by the Contractor. There are no unpaid amounts on the basis of which a lien has been filed, or can be filed, in connection with the Work performed under the Contract.

\_\_\_\_\_  
Signature of Affiant

Sworn to before me and subscribed in my presence this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

\_\_\_\_\_  
Notary



**GEK 110483c**  
**Revised, July 2009**

**GE Energy**

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## **Cleanliness Requirements for Power Plant Installation, Commissioning, and Maintenance**

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*These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes the matter should be referred to the GE Company.*

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## **I. INTRODUCTION**

### **A. Purpose and Scope**

To Provide general rules and guidance for field activity and Users regarding system cleanliness acceptance criteria for power plant installations, commissioning and maintenance when specific procedure are not available. Cleanliness issues during manufacturing, installation, and commissioning can cause delays in delivery, performance degradation, and unit damage. 182 cases involving cleanliness issues were submitted to the Power Answer Center (PAC) from the beginning of 1998 through June 2000. Analysis of the cases revealed a need for clear and specific acceptance criteria.

The present GEK is not applicable when specific procedure are available, eg: commissioning procedure, specification from MLI A125, etc.

### **B. General**

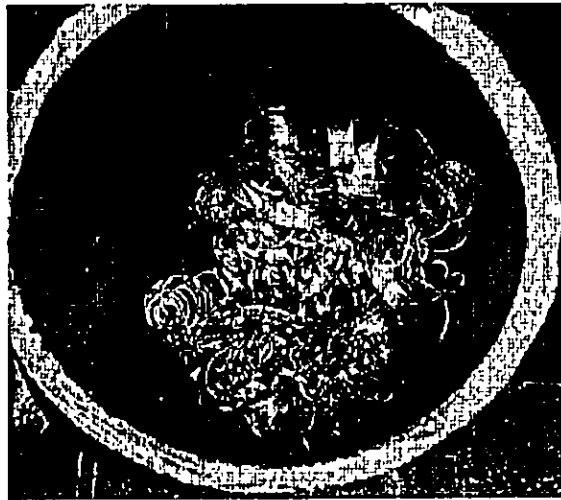
Technological advancements in the field of power generation have raised the level of importance for maintaining system cleanliness during all phases of manufacturing, installation and operation. Each improvement to efficiency and reduction in emissions require a further tightening in clearances and reduction in the margins for error. The level of cleanliness control which the new power plant installations demand, require a change in the approach to maintaining system cleanliness.

System cleanliness must be a plant lifetime approach ranging from design to plant operations and maintenance. Strict, in-process controls to prevent contamination and to maintain the system cleanliness level are essential to the successful installation and long term reliability.

The best practices learned during installations have decreased the average amount of time required to deliver a cleaner, more robust system. Applying these practices is important to obtaining expected performance and equipment life.

## **II. DEFINITIONS AND CONTROL**

The purpose of performing a flush or air/steam blow is to remove any and all foreign material from a system or component. Foreign material is defined as any material or object that should not be on or within the system hardware (Figure 1).



**Figure 1. Metal Shavings found in piping following the Fitting Process**

**A. System Criticality Definitions**

Cleanliness control levels will be defined in three categories: Critical, Controlled, and Foreign Material Exclusion (FME). If the system medium flows through components that can be considered to fall into more than one of these categories, the overall requirements for the entire system are categorized to the higher level of control.

**Critical** systems are defined as those systems where contamination of the system can cause a catastrophic failure. These systems require additional attention to ensure that system integrity is maintained.

**Controlled** systems are defined as those systems where contamination will cause degradation in unit or component performance or reduced component life.

**Foreign Material Exclusion** systems are defined as those connected to and have the potential to contaminate systems that are Critical or Controlled.

**B. Control of Foreign Material**

To most efficient method of maintaining system cleanliness is to prevent entry of foreign material into system piping or components during installation and maintenance. The following steps should be observed to prevent entry of foreign material into Power Plant systems:

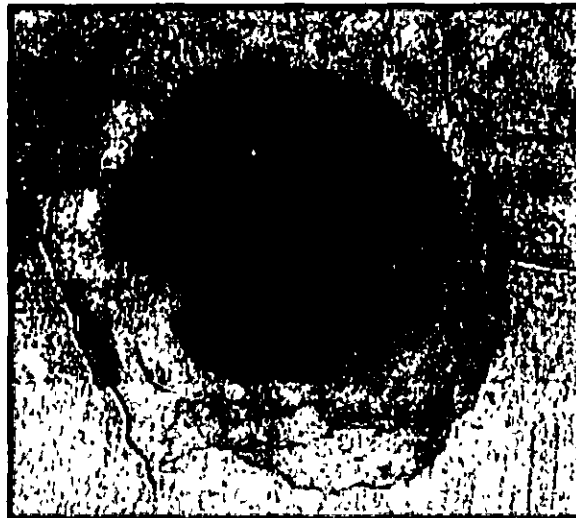
- Temporary covers or plugs (FME covers) shall be installed on all system piping, components, or tank connections opened for work or inspections, except during the time the opening must be uncovered to perform the evolution. This requirement also applies to material in staging and lay down areas.
- FME covers shall be designed such that they cannot fit inside the system opening or have an installed capture device that guarantees their retrieval prior to component installation. The FME cover should cover the entire system opening. FME covers shall be constructed of a rigid, non-fibrous material. The use of wood, especially chip board or plywood, is not a recommended material as it can splinter or shed and deposit material within the system. The use of rags or foam is also not a recommended practice (Figure 2 and Figure 3). The soft material may be pushed into

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a system opening thus becoming foreign material. Tape may be used to fasten the covers in place, but should not be used as a sole source of material exclusion.

- When the work is complete and prior to removal of the FME covers, inspect and thoroughly clean the work area to ensure that no foreign material is present. This includes the removal of loose or flaking rust and residue from grinding, chipping, welding, blasting, or other maintenance activities. It is important that FME devices be accounted for when system closeout is performed.
- Following fit-up of piping or installation of vital system components, a Quality Assurance or individual of supervisory authority should closeout and certify the cleanliness of that portion of the system.



**Figure 2. 12" Piece of Foam Material used as an FME Cover, Removed from a Pipe Using Air Blows (Material was not detected during visual inspections)**



**Figure 3. Examples of FME Covers utilizing Paper, Linen and Plastic Bags (Not a Recommended Practice)**

### **C. In-Process Controls**

A pareto of system contamination PAC case root causes show inadequate in-process controls to be a leading contributor. Understandably, it is necessary to remove FME covers to perform different maintenance and installation related evolutions. When the covers are removed, appropriate measures should be taken to prevent the introduction of foreign material as a result of the evolution.

All tools and maintenance related material and debris should be removed from the work area and be accounted for prior to replacing the FME cover on the system opening. This requirement would also apply to any material that is to be installed into a system. During maintenance evolutions, care should be taken to prevent foreign material from entering areas that are inaccessible for cleaning and visual inspections. Finally, visual inspections remain an excellent traditional manner of detecting foreign material. This is discussed later in the article.

### **III. LUBRICATING/HYDRAULIC OIL FLUSHING AND ACCEPTANCE CRITERIA**

Hydraulic Systems that operate at working pressures of greater than 3000 psi or are supply systems incorporating servo valves are critical systems. Combined lubricating oil and hydraulic systems that supply high pressure or servo valves are considered critical systems.

The values listed in this section (III) are representative of the requirements for clean operation, but specific requirements for cleanliness are defined in GE specifications (MLI A125, MLI A160, etc.) or in GE commissioning procedures and shall take precedence over this GEK.

**Critical oil systems medium is to be maintained at an NAS class 6 specification (refer to Table 1 and Table 2) with water content of <100 ppm (.01%).**

Bearing Lubricating or Hydraulic systems that operate at working pressures of less than 3000 psi and do not have servo valves in the system are controlled systems.

**Controlled oil system fluids are to be maintained at an NAS class 8 specification (refer to Table 1 and Table 2) with water content of <100 ppm (.01%).**

Drain piping is an example of a foreign material exclusion system.

**Foreign Material Exclusion oil systems are to be maintained free of debris with water content of <100 ppm (.01%).**

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**Table 1. Cleanliness Level Particle Count**

NAS 1638 (1964)	Based on 100 ml sample				
	5-15 micron	15-25 micron	25-50 micron	50-100 micron	>100 micron
12	1,024k	182k	32,400	5,760	1,024
11	512k	91,200	16,200	2,880	512
10	256k	45,600	8,100	1,440	256
9	128k	22,800	4,050	720	128
8	64,000	11,400	2,025	360	64
7	32,000	5,700	1,012	180	32
6	16,000	2,850	506	90	16
5	8,000	1,425	253	45	8
4	4,000	712	126	22	4
3	2,000	356	63	11	2
2	1,000	178	32	6	1
1	500	89	16	3	1

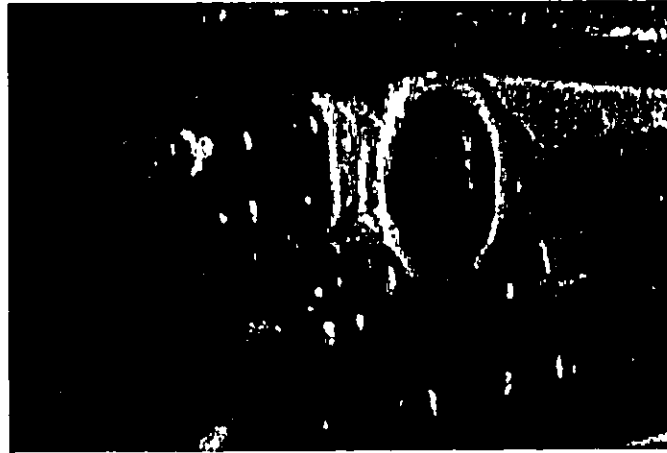
**Table 2. NAS versus ISO**

NAS	12	11	10	9	8
ISO	23/21/18	22/20/17	21/19/16	20/18/15	19/17/14
NAS	7	6	5	4	3
ISO	18/16/13	17/15/12	16/14/11	15/13/10	14/12/9

**A. General Guidelines on Flushing**

Flushes must take place after piping installation, but prior to system operation. The success of an oil flush is dependent on: Success of efforts to keep contaminants out, and the proper conduct of the flush. A successful flush means that system piping components and piping meet acceptance criteria in a minimum of time with a minimum of effort.

The proper performance of a flush depends on: the ability of the pump to provide sufficient flow rate to ensure turbulent flow in the system (typically two to three times normal velocity), control of the flushing fluid temperature (from 105°F [40°C] to 169°F [76°C] according to delivery state), the use of vibrations (Rawhide hammer, Rubber mallet, or Pneumatic Vibrator – Figure 4) to loosen solids, the actual condition of the material : storage condition, inside access for visual inspection, trace of rust, trace of grease, etc. The use of high velocity fluid in a properly sequenced flush is the most important of these flushing factors.



**Figure 4. Pneumatic Vibrator**

If 2-3 times normal flow is not achievable, turbulent flow must be ensured ( $Re > 4000$ ).

**Table 3. Example: Minimum flow to achieve turbulent flow**

	For typical ISO VG 32 Oil at 170°F	
Flow (gpm) = $1.268 * ((4)*d)$	6" pipe	75 gpm
(4)- Kinematic viscosity (in centistokes) of	4" pipe	50 gpm
flush fluid at 170°F	3" pipe	40 gpm
d - Pipe diameter measured in inches	2" pipe	25 gpm
	1" pipe	12 gpm

A minimum flushing time of 6 hours may be necessary to ensure cleanliness within a system or portion thereof. Review GE documentation to verify minimum flushing times, if applicable. System size and complexity will determine if additional flush time is required. It is impractical to flush through certain system components that are assembled, cleaned and sealed in the factory. Protect these components carefully against contaminants.

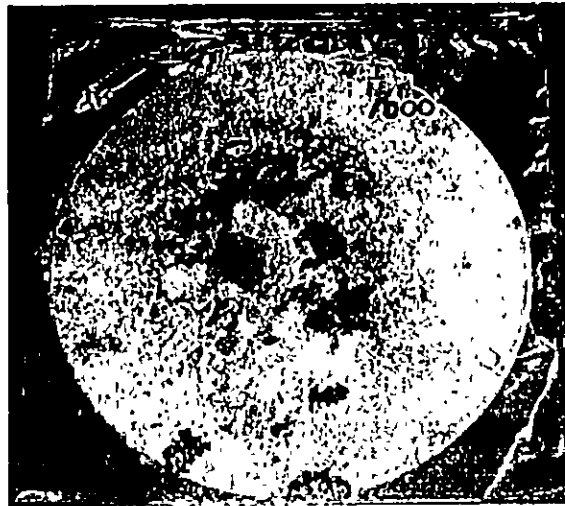
**B. Recommendations**

**Air Blows** - In an effort to remove debris resulting from fabrication, storage, and installation, sites should perform air blows on system piping during the installation process. The piping should be blown down during initial fit-up and prior to final installation. The air used for the blows can either be instrument air or clean dry air from an off-base air compressor. After the pipe is installed, any open ends should be capped using a suitable FME cover. This procedure can be applied to nearly any system during the fit-up phase of installation as a useful precautionary measure. Figure 5 and Figure 6 show the effect of proper air blows on flushing effectiveness.

**Maintenance Practices** - Cleanliness controls in maintenance practices are critical in preventing system contamination. The use of FME covers on system/pipe openings, good housekeeping/clean work areas (free of debris from related or non-related work) and visual inspections cannot be overstated.

**Visual Inspections** - Visual inspections are essential to ensuring that foreign material is not introduced into or left in the system. All piping and system openings should be inspected prior to final installation/closeout.

**Filter Allignment** - Sites should, where possible, align the flushing filters such that oil will not flow through the filter when the system is opened for inspection (Figure 7). Care must be taken when inserting filter baskets as the edges of the basket can rub on the filter body. This can introduce contaminants into the system and provide false positives. The basket should be inspected for this condition at each flush iteration. Temporary filter or basket shall not be installed in drain line to avoid risk of clogging and upstream overflowing-flooding.

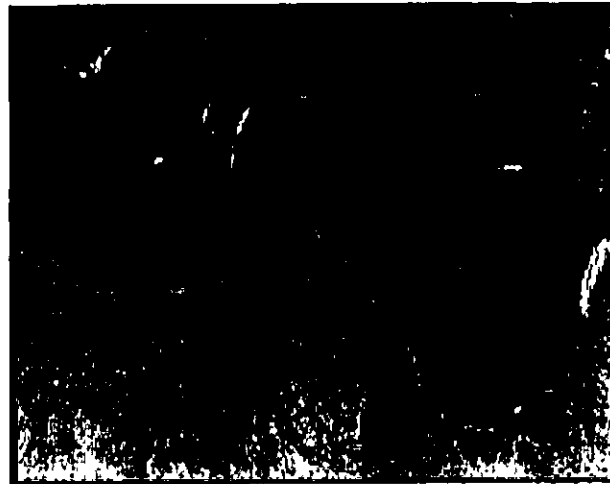


**Figure 5. Initial #1 Bearing Flush Results from Lube Oil Piping without Air Blow.  
Flushes required 18 days**





**Figure 6. Initial #1 Bearing Flush Results from Lube Oil Piping after Air Blow.  
Flushes required 10 days**



**Figure 7.**

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**C. Contamination Measuring Technique**

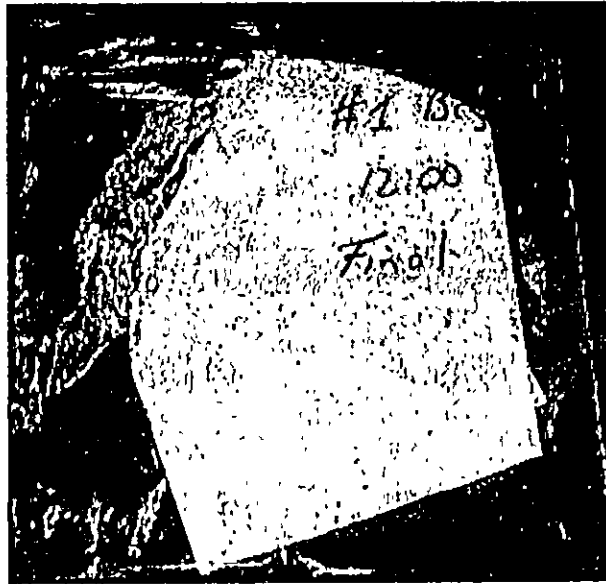
Sites should use the following guidelines to measure flush performance and system cleanliness:

**WARNING**

**A CUP OF BRAKE SOLVENT CAN DESTROY THE CHEMICAL PROPERTIES OF A 3000 GAL OIL SUMP. CARE MUST BE TAKEN TO ENSURE THAT ELEMENTS ARE CONTAMINATE FREE WHEN RETURNED TO THE SYSTEM.**

- The sample should be free of visual contamination and debris for an acceptable level of cleanliness (Figure 8). Two acceptable samples, obtained at least two hours apart, are required to verify the cleanliness of the system or portion of the system that is being flushed. Specific sampling requirements may take precedence over this GEK.
- At the conclusion of a successful whole system flush, if the flush oil is removed the tank must be cleaned with lint free rags. Use of a truck as storage or source of replenishment fluid should be scrutinized closely. A typical sample of replacement fluid from a truck yields a contamination level of NAS class 10. This is a common source of post-flush contamination. When feasible, replenishment fluid should be polished prior to introduction into the system. It is the responsibility of the installer to insure that proper filtration, on the order of  $\beta_{10} = 200$ , is installed between the tanker truck and the oil reservoir to insure the installed oil meets a minimum cleanliness level. Although, the practice of reusing oil is strongly discouraged by engineering, it is recognized that this practice is occasionally utilized in the field. In the event that the site personnel, end user, and oil vendor all concur that reusing oil is acceptable, it shall not be done without reconditioning. Reconditioned oil shall meet the requirements of the applicable GEK's by full spectrum oil analysis by the Original Equipment Manufacturer (OEM) of the lubricant or a qualified third party.
- After the operating oil is charged back into the system, oil analysis should be performed. The quality of the oil shall meet the requirements defined in the appropriate GE specifications.
- Fill oil must be verified to meet cleanliness specifications of the system. Sampling and analysis should be performed at the beginning, middle and end of a oil transfer to verify cleanliness level. Typical refresh oil is several NAS classes less than required.

Verifying and maintaining a clean oil system will help to ensure proper operation and gain maximum performance of the system and components.



**Figure 8. Visually Acceptable Filter Sample Unrelated to NAS Class**

#### **IV. LIQUID FUEL OIL FLUSHING AND ACCEPTANCE CRITERIA**

Liquid Fuel Oil systems are controlled systems.

Controlled fuel oil system fluids are to be maintained at an NAS class 10 specification (refer to Table 1 and Table 2) with water content of <1.0 vol. %.

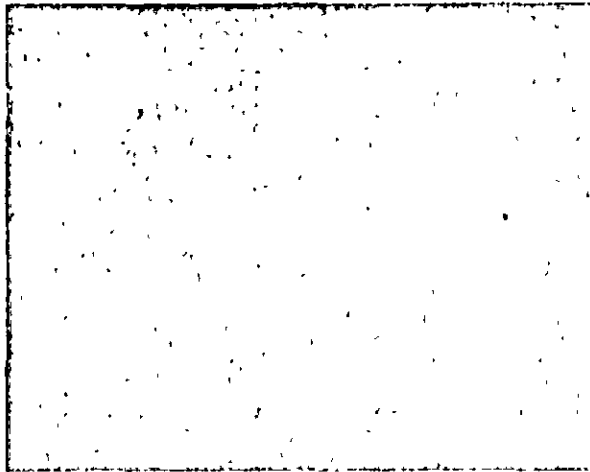
Drain piping is an example of a foreign material exclusion system.

Foreign Material Exclusion fuel oil systems are to be maintained free of debris and water.

##### **A. Contamination Measuring Technique**

Sites should use the following guidelines to measure flush performance and system cleanliness:

- Remove the filter element from the system and place on a clean coffee filter or lint free rag. The coffee filter/lint free rag will provide an area for sample collection and inspection.
- The sample should be free of visual contamination and debris for an acceptable level of cleanliness. Two acceptable samples obtained at least two hours apart, are required to verify the cleanliness of the system or portion of the system that is being flushed (Figure 9).



**Figure 9. Acceptable Filter Sample - Unrelated to NAS Class**

- If normal system fuel oil is used for the flush, the fuel oil may be pumped back to the holding tanks during the course of the flush to be used for subsequent system operation.

Verifying and maintaining a clean fuel oil system will help to ensure proper operation and gain maximum performance of the system and components.

## **V. GAS FUEL SYSTEM CLEANLINESS AND ACCEPTANCE CRITERIA**

Gas Fuel systems are controlled systems.

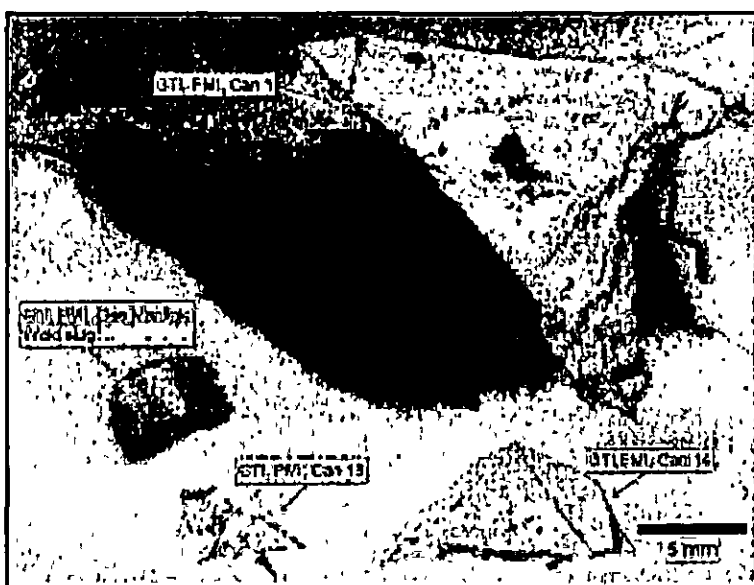
### **A. Gas Fuel System Air Blow Procedure**

A recommended method of blowing down the gas fuel system is to purge the off-base and on-base piping separately. For the off-base piping, blows should be performed from first through the customer's piping up to the fuel gas skid, FG-1. Once complete, blows should continue through the accessory module and the interconnect piping by stroking the fuel gas valves. Blows should last approximately 10 seconds and should be performed at least 3-5 times per gas line and until the gas lines are verified as clean. Following the blows the flanges should be inspected and either connected to downstream piping or covered with temporary FME covers.

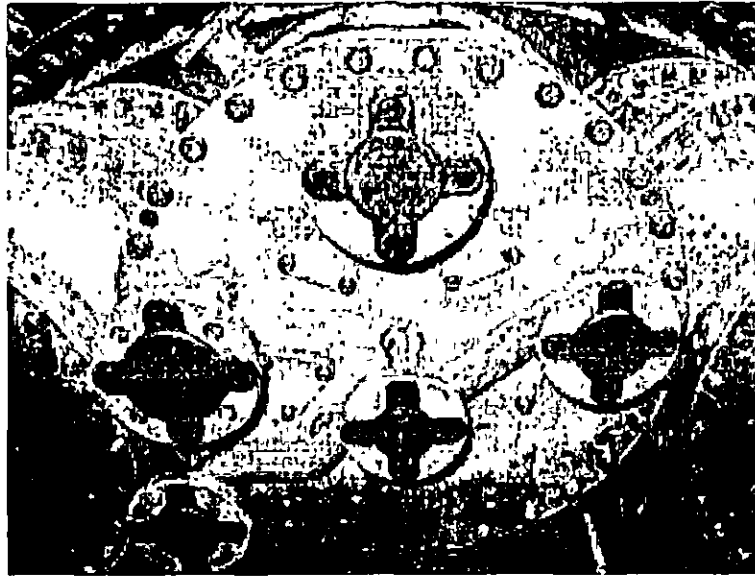
For the on-base gas fuel piping, the gas manifolds and each pig tail line to the end-cover assembly connection is to be air pressure tested and blown in order to ensure all lines are free of contaminants. The following procedure should be followed for each gas manifold.

1. The individual pigtails are disconnected from the end-covers and blanked. This is done for one gas manifold system at a time.
2. FME covers are placed on the exposed combustion end-cover openings.
3. An air source is connected upstream of the on-base piping with a fast actuating valve installed to control the airflow. Air source examples are: a pressurized receiver, the CO<sub>2</sub> tank pressurized with air or the upstream piping up to the customer's control valve (in this case the control valve is opened and the stop valve acts as the fast actuating valve).

4. Prior to performing the blows, the piping system should be air pressure tested for leaks.
5. Each manifold is then blown for approximately 10 seconds per blow. Blows should be performed at least 7-12 times for each manifold and until the gas lines are verified as clean. Air velocities can be increased, as needed, by performing blows on half of the manifold pigtails at a time while the other half is blanked.
6. Once a gas manifold is complete, the pigtails and end-covers should be inspected and re-connected immediately prior to moving to the subsequent manifold. This should prevent delays in startup associated with debris fouling fuel nozzles.



**Figure 10. Example Contaminants found in Gas Piping**



**Figure 11. FME Covers On A Combustion Can End-Cover**

#### **B. Contamination Measuring Technique**

Sites should use the following guidelines to measure and verify system cleanliness:

- During the performance of an air blow to either establish or verify cleanliness, a 100-mesh strainer (140  $\mu\text{m}$ ) should be placed in the discharge path to collect any debris from the piping or system. When performing blows of individual gas piping pig tails, a clean white cloth placed at the exit may be used in lieu of the strainer.
- The sample should be free of visual contamination and debris for an acceptable level of cleanliness. Two consecutive acceptable samples are required to verify the cleanliness of the system or portion of the system that is being air blown.
- The piping ends should also be swabbed by wiping the internal surfaces with a white cloth to verify cleanliness.
- Additionally, the gas fuel should be analyzed to ensure GEI 41040 specifications are met.

Verifying and maintaining a clean fuel system will help to ensure proper operation and gain maximum performance of the system and components.

#### **VI. AIR SYSTEM CLEANLINESS AND ACCEPTANCE CRITERIA**

All air systems; excluding service or shop air are controlled systems.

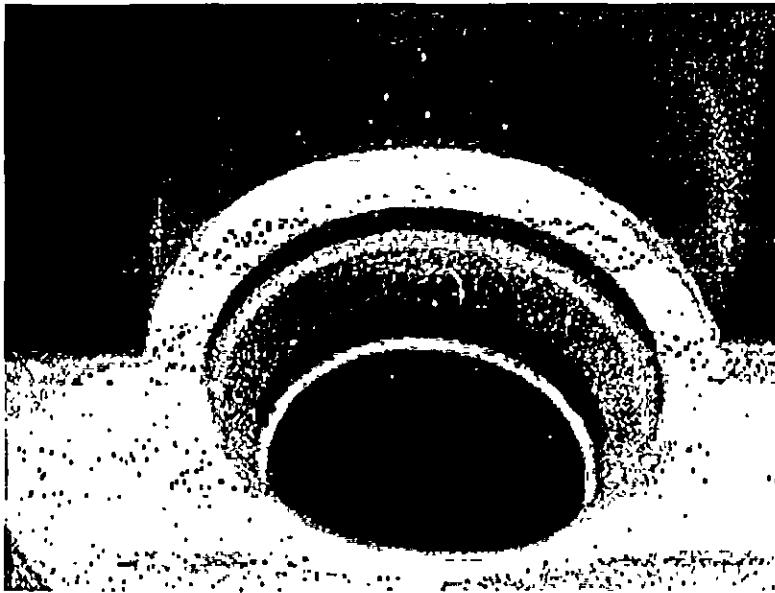
Service/shop air systems are foreign material exclusion systems.

The blowdown of air systems should be conducted.

**A. Contamination Measuring Technique**

Sites should use the following guidelines to measure and verify system cleanliness:

- During the performance of an air blow to either establish or verify cleanliness, a 100-mesh strainer (140  $\mu\text{m}$ ) should be placed in the discharge path to collect any debris from the piping or system.
- The sample should be free of visual contamination and debris for an acceptable level of cleanliness. Two consecutive acceptable samples are required to verify the cleanliness of the system or portion of the system that is being air blown.



**Figure 12. Fine Contamination causing a purge check valve to fail**

**B. Recommendations**

**Air Blows** - In an effort to remove debris resulting from fabrication, storage, and installation, sites should perform air blows on system piping during the installation process. The piping should be blown down during initial fit-up and prior to final installation. The air used for the blows can either be instrument air or clean dry air from an off-base air compressor. After the pipe is installed, any open ends should be capped using a suitable foreign material exclusion (FME) cover.

The air blows will significantly reduce the amount of debris in the piping. Air blows have proven successful in removing debris when using a 200-gallon receiver charged to 100-125 psig and discharged through a two-inch hose. The blow should last between 5-10 seconds and should be repeated 4-5 times unless cleanliness levels dictate that more blows should be performed. The size of the hose used for the blows should be such that the hose is able to fit into the pipe opening and still allow the maximum flow rate possible. For example, a two-inch hose used to blow a six-inch pipe proved to be successful.

**Maintenance Practices** - Cleanliness controls in maintenance practices are critical in preventing system contamination. The use of FME covers on system/pipe openings, good housekeeping/clean

work areas (free of debris from related or non-related work) and visual inspections will reduce the possibility of introducing foreign material or debris into a piping system.

**Visual Inspections** - Visual inspections are key to ensuring that foreign material is not introduced or left in the system. All piping and system openings should be inspected prior to final installation/closeout. Inspections should be performed using a flashlight and a mirror where practical and a borescope if required. A visual inspection, with no contamination visual to the naked eye, is sufficient to call an air system "clean".

Obtaining a smear of a dry area of piping near an exit and comparing the smear sample to the examples in paragraph 10 of reference 1 is an option to further confirm the cleanliness of air systems. This is not required but represents another opportunity to verify system cleanliness. Table 2 of reference 1 provides recommended contamination levels in mg/m<sup>2</sup> for air systems.

Verifying and maintaining a clean air system will help to ensure proper operation and gain maximum performance of the system and components.

## **VII. STEAM PIPING CLEANING AND ACCEPTANCE CRITERIA**

First stage cooling steam used in the H-type gas turbine is a critical system.

Procedures and criteria that are recommended in this document are not applicable to an H-type installation as it pertains to conducting a liquid flush of steam piping. Consult Dwg 362A2412 for further guidance regarding this matter.

Steam Supply and Steam Seal systems are controlled systems.

Experience has shown the importance of thoroughly cleaning the main steam, reheat steam, and steam seal systems prior to turbine operation or after the completion of a new installation or major repair work to the steam system. Debris left in the system would otherwise be blown into the turbine and cause serious damage to the steam path parts. The temporary fine mesh screens installed on the main stop and combined reheat valves during initial startup are not intended to be a substitute for cleaning the steam lines.

The objective of a chemical cleaning and air or steam blowdown is to minimize the possibility of damage to the turbine by removing pipe scale and other foreign material, which might otherwise be carried over into the machine.

The following equipment and steam piping should be chemically cleaned and air blown or steam blown prior to undertaking plant startup testing.

1. Each heat recovery steam generator and its steam lines.
2. The main steam lines and header from each heat recovery steam generator through to the turbine bypass piping just upstream of the turbine bypass desuperheater valve. The turbine bypass desuperheater valve must not be in the steam path during blowdown. The Purchaser shall supply temporary piping including a blowdown valve to be connected at a point just upstream of the turbine bypass desuperheater valve.
3. The main steam lines and header through to the turbine stop valve(s).
4. The steam seal piping. Acid cleaning of steam seal piping is not recommended.



**A. General Guidelines on Chemical Cleaning of Steam System Piping**

Chemical cleaning of the piping upstream of the main stop valve or combined reheat valve will require the installation of special chemical cleaning hardware to protect the turbine and valve internal parts. General Electric can supply the hardware as extra cost items when required.

The acids or caustics used during chemical cleaning attack certain materials commonly used in these turbine assemblies and must be protected. Hydrostatic tests should be completed prior to the installation of the chemical cleaning fixture(s). The chemical fixture may collapse if installed during the hydrostatic tests. The fixture should be installed during the blowdown in order to prevent foreign matter from depositing adjacent to the valve seat and plug.

**B. Chemical Cleaning Process**

One proven chemical cleaning process for steam system piping consists of a three-phase process that accomplishes alkaline degreasing, corrosion product and millscale removal, and passivation of active metal surfaces; all in a single fill of the system.

The system is initially filled with demineralized water and heated, the alkaline degrease chemistry is injected into the system. The alkaline degrease stage may be considered complete when the Sodium hydroxide concentration has leveled out and the minimum contact time of 12 hours has been met. Following completion of the alkaline degrease stage, a corrosion inhibitor is injected into the system. After a ninety minute circulation period, additional chemistry adjustments are injected into the circulating system to affect the removal of millscale and corrosion products. This is followed with a circulation of a passivation solution.

**C. General Guidelines on Air Blowdowns**

There are several proven methods available for cleaning steam pipes by blowing down with either steam or air. A method of cleaning that has been used with success is the compressed air blowdown. This procedure is similar to a saturated steam blowdown, except that compressed air is used as the cleaning medium. General Electric has studied the theoretical potential cleaning ability of air versus steam and found that for the same initial boiler pressure the cleaning force with either would be about the same. Although thermal cycling is not present, experience has shown that cleaning with compressed air, when specifically preceded by a proper chemical cleaning, is nearly as effective as steam blows. It is during the chemical cleaning that the millscale removal is achieved, which is the value of the thermal cycling found in the steam blows. Compressed air blowdown is preferred by some because it allows for increased construction scheduling flexibility. This is particularly applicable in the case of combined cycle gas and steam power plants.

A log sheet should be used to record data for each blow. Data that should be recorded includes air blow number, date, time, blow starting pressure, blow ending pressure, blow duration, and visual observation (wet, some moisture, dry, debris, etc.). One log sheet should be kept for each system being blown down.

The HP steam system and LP steam system will be air blown to targets.

**D. General Guidelines on Steam Blowdowns**

Blowing down the steam piping with saturated steam is a cleaning method that has traditionally been the method of choice in the power industry. The use of steam causes thermal cycling which helps to loosen debris, allowing it to be blown out. The procedure consists of pressurizing the boiler, terminating firing, and rapidly opening the temporary blow valve to depressurize the system. This

cycle is repeated until the system is judged to be clean. The steam is essentially saturated as the water stored in the boiler flashes as pressure decays. The procedures and sample calculations in reference 14 are based on the saturated steam blowdown procedure.

Certain considerations that might not make this the procedure of choice include scheduling restrictions that do not allow for work stoppage during steam blows. Also, if the risk of encountering heat-related injuries from potential steam leaks outweighs the benefit of conducting a steam blow instead of an air blow, a steam blowdown may not be the preferred method. However, one advantage of a steam blow is that opportunities exist to run the plant, test the plant, and discover system flaws that might require attention before official startup.

Thorough conduct of either an air (in conjunction with a chemical cleaning) or steam blowdown can produce a clean steam system. Specific procedural guidance for a steam blow are contained in References 14 and 15.

**Maintenance Practices** - Cleanliness controls in maintenance practices are critical in preventing system contamination. The use of foreign material exclusion (FME) covers on system and pipe openings, good housekeeping/clean work areas (free of debris from related or non-related work), and visual inspections will reduce the possibility of introducing foreign material or debris into a piping system.

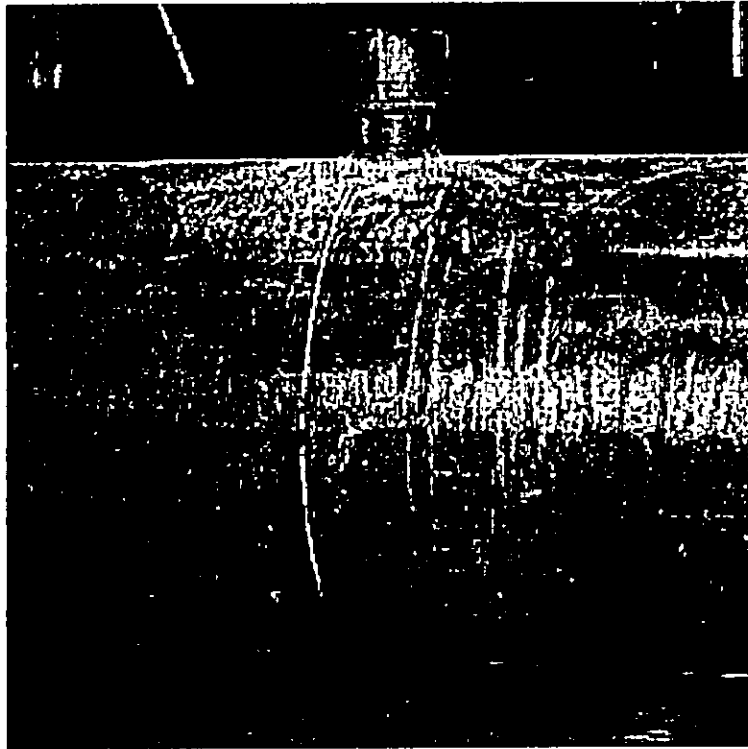
**Visual Inspections** - Visual inspections are essential to ensuring that foreign material is not introduced or left in the system. All piping and system openings should be inspected prior to final installation/closeout. Inspections should be performed using a flashlight and a mirror where practical and a borescope if required.

**External Vibration** - Vibration is not necessary in cleaning or blowing down the steam system because the medium reaches near supersonic speeds during the air or steam blow, thereby creating a greater vibrating force. For a typical steam piping diameter (16"), external attachments to produce a viable vibration would be cumbersome and redundant and, most likely, would add little to no value.

#### **E. Contamination Evaluating Technique**

Contained within this section are two evaluating techniques. Both utilize steel targets to evaluate the cleanliness of the steam system at maximum blowing pressures during a steam or air blow. The first target assembly is in-line to the temporary piping (Figure 10), and the second assembly is attached to the discharge end of the piping, without the use of a silencer. Certain noise ordinance restrictions or personal choice may dictate which method is employed.

The targets used for the in-line target assembly should be 1" square mild steel polished on two opposite sides with the length fitted to just greater than the diameter of the temporary piping (most likely 16"). Dimensions of the targets for the open-discharge method are contained in Figure 11.



**Figure 13. In-Line Target Assembly**

Assuming that sufficient mass velocity has been achieved in the blowdown, the progress of the blowdown should be monitored by placing polished targets in the blowdown flow. Particles carried with the flow will cause pitting of the targets. The conduct of the blowdowns and calculations governing the determination of sufficient mass velocity can be found in References 14 and 15.

Once a plume, clear of moisture or debris, is observed discharging from the silencer or end of the piping, a polished target should be inserted in the target assembly. The target strips used in the open discharge method should be made of steel, polished on both sides to obtain double use from each. In accordance with reference 15, the strips can be made of steel, aluminum, or copper, but steel is recommended. Figure 11 shows the second possible target assembly and a suitable method for fastening this type of target to the open discharge end of the blowdown piping. Both of the target arrangements shown (Figure 10 and Figure 11) permit easy replacement of the target.

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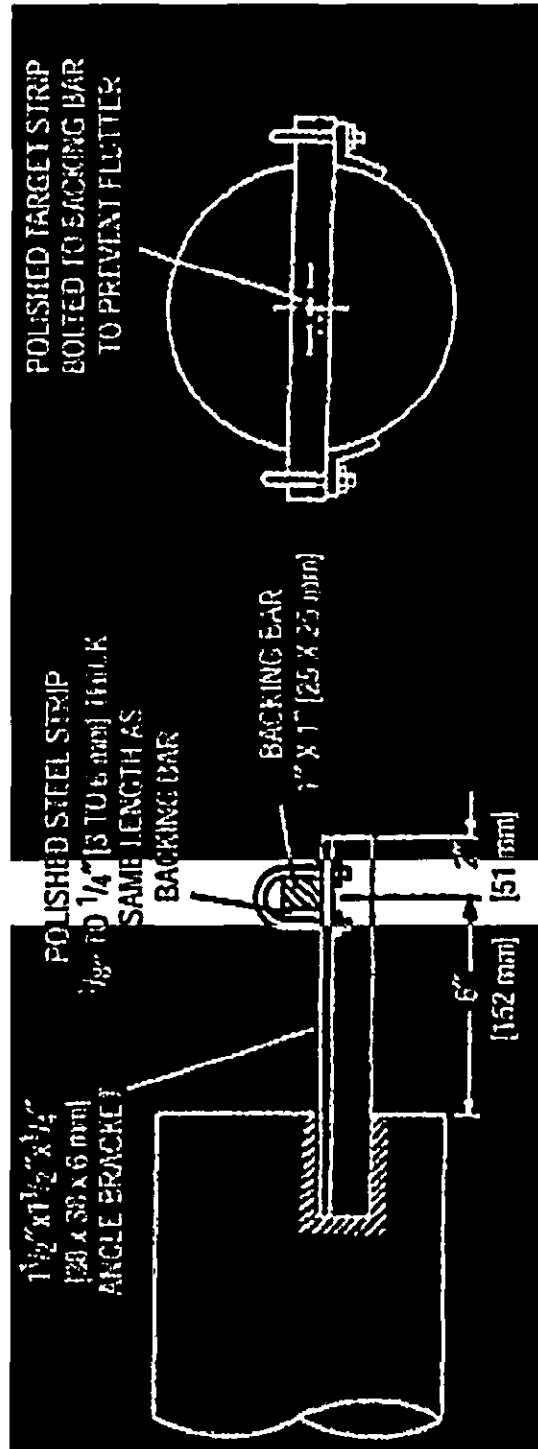


Figure 14. Open-Discharge Method Bracket Support for Polished Target

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Following the initial evaluated blow, three to four cycles for each particular pipe run should be completed prior to performing an evaluated blow with another polished target. Evaluation intervals for subsequent blows are at the discretion of the evolution manager.

The number of polished targets required to ascertain that the steam piping is adequately clean will vary dependent on the interpretation of the targets taken from the previous blows. Two consecutive targets are required to achieve final acceptance of each run of targeted steam systems.

General Electric recommends that the Cleaning Force Ratio (CFR) be greater than or equal to 1.5 at the start of the piping run that is the focus of the cleaning cycle and no less than 1.03 throughout the entire length of the pipe.

**CAUTION**

Must be taken to prevent piping configurations that require excessive inlet CFR's. Inlet CFR's, that significantly exceed 1.5 (i.e., 1.8 or greater), may cause system damage and should be avoided.

CFR is calculated using where:

$$CFR = \left( \left( \frac{Q_c}{Q_{max}} \right) \right)^2 \times \frac{(PV)_c}{(PV)_{max}} \times \frac{(P_{max})}{(P_c)}$$

$Q_c$  = calculated flow during cleaning (lb/hr)

$Q_{max}$  = max load flow (lb/hr)

$(PV)_c$  = pressure-specific volume product during cleaning at boiler outlet (ft<sup>3</sup>/in<sup>2</sup>)

$(P_{max})$  = pressure at max load flow at boiler outlet (psia)

$(P_c)$  = pressure during cleaning at boiler outlet (psia)

$(PV)_{max}$  = pressure-specific volume product at max load flow at boiler outlet (ft<sup>3</sup>/in<sup>2</sup>)

GE recommends that the acceptance criteria for the completion of air blow be no gouge of 40 mils (.040 in [1.0 mm]) or more in length or depth per 6 square inches [38 cm<sup>2</sup>] of surface area on a 1 inch [25 mm] wide polished mild steel (A36, ASTM 1006) target that spans the entire diameter of the pipe, a general clear background is required, whereby the target polish is not fogged. These criteria shall be met for two consecutive targets taken. Data verification records of these targets are to be submitted to Product Services during the Red Flag Review. The targets shall be placed as close to the end of the permanent piping but prior to the temporary piping, as possible.

In addition, there shall be no more than 5 hits visible to the naked eye of any size Greater than .010 in a six square inch area [0.25 mm in a 38 cm<sup>2</sup> area]. No raised surface hits, no irregular pockmarks or raised pits and no embedded material visible to the naked eye on the target. A 5X magnification triplet should be used in classifying the size of the any hits in question.

Deviating from this standard, thereby falling short of meeting these acceptance criterion, could endanger the safe and efficient operation of the steam turbine and associated components, shorten the operating life cycle of the turbine or components, and negatively impact the long-term performance of the turbine.

#### **F. Safety Considerations**

Among many other safety items to bear in mind in an industrial environment, the following apply to the material discussed in this article. Low point collection of chemical cleaning solution in valves and drains can be a personnel hazard. Site management should be aware of it, and supervisors should prevent craft labor from putting themselves in such a position to be endangered by that possibility. During air blows, there exists a danger when purging low point drains due to the very low temperatures that could cause cold-related injuries. Conversely, during steam blows, personnel should be aware of the inherent danger in working with and around the high temperatures of steam.

### **VIII. WATER SYSTEM CLEANLINESS AND ACCEPTANCE CRITERIA**

Water wash, water injection, and cooling water are all controlled systems. Water wash and systems should be maintained at NAS 10 level, water injection at NAS 8 level, cooling water systems should be maintained at NAS class 12 level (refer to Table 1 and Table 2).

#### **A. Contamination Measuring Technique**

Sites should use the following guidelines to measure system cleanliness.

During system flushes, flushing effluent should be captured through a flushing cloth (lint free rag) until no debris is found. A water wash flushing procedure for F class units is contained in reference 16. This section serves as contamination measuring augmentation to that procedure.

- The effluent sample is measured against Table 1 to ensure the system meets NAS level requirements.
- The sample should be free of visual contamination and debris for an acceptable level of cleanliness. Two consecutive acceptable samples obtained are required to verify the cleanliness of the system or portion of the system that is being certified.

Verifying and maintaining a clean water system will help to ensure proper operation and gain maximum performance of the system and components.

**IX. SUMMARY**

The values listed in table 4. System Summary Chart are representative of the standard requirements for clean operation.

Specific requirements for cleanliness written in GE specifications (MLI A125, MLI A160, etc.) or in GE commissioning procedure might be different from the table below according to product factory cleanliness and scope of work at site and shall take precedence over the present GEK.

**Table 4. System Summary Chart**

System Noun Name	Criticality	NAS Class	Specifics
Lubricating Oil	Controlled	NAS 8	H <sub>2</sub> O content <100 ppm (.01%).
Hydraulic Oil	Critical	NAS 6	H <sub>2</sub> O content <100 ppm (.01%) High Pressure, Servo Valve use.
Liquid Fuel	Controlled	NAS 10	H <sub>2</sub> O content <100 ppm (.01%).
Gas Fuel	Controlled	NAS 10	Gas Fuel Specs in GEI 41040F
Air Systems-General	Controlled	N/A	
Air Systems-Service/Shop Air	FME	N/A	
Steam-First Stage Cooling (H-Type)	Critical	N/A	
Steam-General	Controlled	N/A	
Water Wash Systems	Controlled	NAS 10	
Water Injection Systems	Controlled	NAS 8	
Cooling Water Systems	Controlled	NAS 12	

**References**

1. D 6439-99, Standard Guide for Cleaning, Flushing, and Purification of Steam, Gas, and Hydroelectric Turbine Lubrication Systems.
2. ISO TR 10949, Hydraulic Fluid Power-Methods for Cleaning and for Assessing the Cleanliness Level of Components.
3. ML A125, Lubricant Oil System Flushing Instruction
4. GEK 37971D, Flushing Procedure for Steam Turbine Lubrication and Hydraulic System Piping
5. GEK 46506D, Steam Turbine Lube Oil (Recommended Properties & Maintenance Practices)
6. Global Filtration Technology Handbook of Hydraulic Filtration, Parker Filtration
7. GEI 41047H, Turbine Liquid Fuel Specifications
8. GE specification 362A2412, Gas turbine System and Component Cleanliness Requirements
9. GEI 41040F, Process Specification Fuel Gases for Combustion in Heavy-Duty Gas Turbines
10. TIL 1192-2, DLN: Fuel Gas Cleanliness
11. DWG 366A2803, General Piping Cleanliness, Pipe
12. DWG 361A6439, Cleanliness Spec, On-Base Piping

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***Cleanliness Requirements for Power Plant Installation, Commissioning, and Maintenance***

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13. TIL 1278-2, Steam Supply Piping and Steam Seal Piping Blowdown Criteria
14. GEI 69688E, Cleaning of Main Steam Piping and Provisions for Hydrostatic Testing of Reheater
15. GEK 41745A, Cleaning of Main Steam Piping for Combined Cycle Plant
16. Dwg 363A4220, Water Wash Flushing Procedures
17. PFI Standard ES-5, Cleaning of Fabricated Piping
18. National Aerospace Standard (NAS) Bulletin 1638



***GE Energy***

*General Electric Company*

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**Work Description**  
**Work Location**

The scope of this Work may involve certain hazards requiring Contractor to implement controls to eliminate or mitigate personnel exposures. The hazards and hazard-producing activities checked below are anticipated as best as can reasonably be determined by Owner to be those with the potential to pose risks to safety and health during the Work. This list has been developed by Owner for its and Contractor's initial planning purposes only. No claim or representation is expressed or implied that it is comprehensive, all-inclusive, accurate, or complete, or that items not listed will not be present or pose no threat to personnel safety or health.

**Work Activities**

- \*Numerous, deep, or complex excavation or trenching\*
  - Drilling, augering, boring, or other soil disturbances in areas with congested buried utilities
  - Working over water
  - Operating equipment under or near overhead power lines
  - Crane use > \_\_\_ tons, > \_\_\_' reach, > \_\_\_' lift
  - Multiple cranes operating simultaneously
  - Exposed energized electrical lines or equipment\*
  - Working at heights
  - Scaffolding > \_\_\_' in height
  - Stacked work (i.e., working above & below)
  - \*Permit-required confined space entry\*
  - Explosive use/blastng
  - Highly flammable gases or chemicals > \_\_\_ (qty)
  - Diving operations
  - Prolonged work in tight or awkward locations (ergonomics)
  - Other: \_\_\_\_\_
- \*Open, installing, removing grating\*
  - Demolition
  - Helicopter operations
  - Pile driving
  - Water impoundment (dam, dike, etc.)
  - Heavy earth-moving equipment
  - \*High pressure (air, water, steam, gas)\*
  - Rotating equipment
  - \*Hot work\*

\* May require site permit

**Worksite Conditions**

- High water table, site subject to flooding, or heavy rains
  - Contaminated soil or water
  - Congested work site
  - Adjacent activities: \_\_\_\_\_
  - Combustible dust
  - High winds
  - Ice/snow/freezing temperatures
  - Other: \_\_\_\_\_
- Rugged, uneven, treacherous terrain or site conditions
  - Animals/insects: \_\_\_\_\_
  - Heat Stress
  - Abandoned-in-place utilities or equipment
  - Vehicular traffic
  - Low lighting

**Human Performance**

- Distractive environment
  - Confusion/Mix-up potential (labeling, look-alike equipment, etc)
  - Other: \_\_\_\_\_
- First time evolution
  - Schedules

**Environmental/ IH**

- Arsenic
- Asbestos
- Chemical
- Cadmium
- Noise > \_\_\_dB
- Heat stress
- Hazardous Waste
- Herbicide/pesticide
- Hexavalent Chromium
- IDLH atmosphere
- Legionella/biological
- PCB
- Lead
- Plant
- Animal
- Insect
- Mercury
- Radiation (ionizing & non ionizing)
- Silica
- Welding Fume
- Other: \_\_\_\_\_

**General Comments**

The following work requires the selected contractor to prepare a Health and Safety Plan (HASP) in accordance with the Safety and Health Requirements:

Work involving the use of subcontractors  
Construction and projects led by EP&FS  
ARA Contracts  
Blanket Contracts

Owner will use the following guidelines to determine whether other work requires the preparation of a HASP. If a HASP is determined to not be needed, the selected contractor will be required to prepare a comprehensive Job Hazard Analysis (JHA) prior to starting work, in accordance with the Safety and Health Requirements. Owner, at its discretion, may waive the HASP requirement if all of the following conditions are met:

1. Low or Limited exposure to the following:
  - Hazardous energy (such as electrical, pneumatic, hydraulic, etc)
  - Crane use or any rigging or hoisting
  - Excavation
  - Working at heights greater than 6' without primary fall protection (i.e., handrail)
  - Asbestos
  - Confined Space Entry
  - Lead or Heavy Metals, including fumes
  - Potential for high severity consequences
2. Contractor safety and health manual which adequately covers the scope of Work.
3. Contractor prepares a quality JHA for the Work.
4. Contractor demonstrates effective hazard control.
5. Contractor has an effective safety and health training program for its employees.


In accordance with the PSHA and the above guidelines, the contractor who will be selected to perform this work:

\_\_\_\_\_ is required to prepare a Health and Safety Plan (HASP) and follow the Safety and Health Requirements in their entirety.  
\_\_\_\_\_ may prepare a comprehensive Job Hazard Analysis (JHA) in lieu of a HASP and paragraph 2.11 applies.  
\_\_\_\_\_ exempt with management approval (see Contractor Safety and Health Requirements Exemption Guidance and Form)

The HASP or JHA shall be submitted to Owner for review and discussion before Contractor may start work.

Owner Signature: \_\_\_\_\_

Date: \_\_\_\_\_

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## 1.0 PURPOSE AND SCOPE


- 1.1 Purpose:** This procedure is to:
- 1.1.1 Ensure that natural gas not be used as the cleaning media for internal pipe cleaning in new construction or cleaning of existing or repaired pipe.
  - 1.1.2 Be used to ensure that natural gas is not introduced or evacuated from process vessels or piping in a manner that would result in a flammable, combustible or explosive mixture inside the vessel or piping.
  - 1.1.3 Ensure that any venting of a flammable gas is performed in a safe manner and that vents discharge to a "Safe Vent Point Location" (*see 2.1.19*).
  - 1.1.4 Be used as a basis to develop site-specific procedures (*see appendix A for template*) for compliance with NFPA 56. This procedure shall not serve as a substitute for site-specific, system-specific procedures.
- 1.2 Scope:** This applies to AEP Fossil Power Generation facilities downstream of the custody transfer meter where natural gas is used for industrial purposes such as power generation and burner ignition, including new construction. Any deviation from purging requirements must be approved by Plant Manager; One Level above Plant Manager; and Director of Generation Safety and/or their designees.
- 1.2.1 Applicability
    - 1.2.1.1 This procedure is to be used for new construction as well as maintenance activities that allow process vessels and piping containing natural gas to become exposed to an air atmosphere. To determine applicability, use the Gas Purge Inert Decision Tree found in Appendix D
    - 1.2.1.2 This procedure is to be used for Purging Into Service and Purging Out of Service as defined in NFPA 56.
  - 1.2.2 Non-applicable
    - 1.2.2.1 This procedure does not apply to appliance type equipment such as: ovens, wall mounted space heaters and domestic hot water heaters or where deemed not required per the Gas Purge Inert Decision Tree found in Appendix D.
    - 1.2.2.2 Maintenance work may take place when small leaks from charged natural gas-fed piping or equipment are present. The key determination is if the atmosphere where work is being performed can be maintained below 10% of the LEL. Work may take place, but safeguards such as ventilation, continuous atmospheric monitoring, a hot work permit, fire resistant clothing, and an Emergency Action Plan, must be in place as well.
- 1.3 Alternative:** When applying this procedure and the natural gas cannot be vented to a Safe Vent Point Location or a location that has been deemed safe by an engineering evaluation, then the safeguards defined in section 4.5 must be in place.

## 2.0 DEFINITIONS AND ABBREVIATIONS

### 2.1 Definitions:

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- 2.1.1 **Continuous Monitoring** – The process of sampling the gas being discharged or the piping internal gas concentration at regular intervals to ensure the effectiveness of the purging out of service or the purging into service.
- 2.1.2 **Exclusion Zone** – The area around the natural gas venting process that has been cleared of all ignition sources, electrical equipment, hot work, and non-essential personnel.
- 2.1.3 **Flammable Material** – Liquids or gases that are considered flammable by National Fire Protection Association (NFPA 704 flammability rating of 1 or higher) or by U.S. Department of Transportation (DOT). Some examples of flammable materials typically used within the AEP Generation system include, Natural Gas, Propane, Propylene, Hydrogen, Acetylene, Gasoline, and Fuel Oil.
- 2.1.4 **Flammable Mixture** – A mixture of flammable vapor with air that will sustain combustion.
- 2.1.5 **Gas Detector** – A gas monitor, such as Industrial Scientific MX6 or an equal is to be used to verify elimination of oxygen by inert gas purging and complete reintroduction of gas into the system.
- 2.1.6 **Incident Commander** – AEP Representative assigned the responsibility of overseeing the venting process.
- 2.1.7 **Inert Gas** – A non-reactive gas that is used to displace oxygen and prevent combustion. Examples of inert gases are Argon and Nitrogen. (Note: Carbon Dioxide is used for Hydrogen Cooled Generators).
- 2.1.8 **JSA** – Job Safety Analysis. Briefing conducted prior to the commencement of the venting operation with all persons involved in performing the operation to review the procedure, hazards, communication plan and Emergency Response Plan. The JSA discussion will be led by the Incident Commander.
- 2.1.9 **Lower Explosive Limit (LEL)** – The minimum concentration of a flammable gas mixed with an air atmosphere that will sustain combustion. Also known as the Lower Flammable Limit (LFL).
- 2.1.10 **Maximum Allowable Operating Pressure (MAOP)** - The normal operating pressure of a vessel or piping. The MAOP is typically less than the maximum allowable working pressure (MAWP) established by the manufacturer.
- 2.1.11 **Maximum Allowable Working Pressure (MAWP)** – The maximum pressure that a vessel or piping is designed to operate within.
- 2.1.12 **Minimum Oxygen Concentration (MOC)** – The oxygen concentration, when oxygen is mixed with a flammable material, below which ignition cannot be supported (also known as Limiting Oxygen Concentration).
- 2.1.13 **Pressure Relief Device (PRD)**– A protection device designed to prevent personnel injury and equipment damage from overpressure.
- 2.1.14 **Pressure Purge** – The technique of purging process equipment and piping from a zero pressure state by adding an inert gas to the system at a low pressure (typically atmospheric) and raising it to a higher pressure (typically normal operating pressure of the system or 200 psig, whichever

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is lower) and then venting the system back to the starting pressure. This process is repeated for a predetermined number of cycles to reduce the air concentration below the minimum oxygen concentration level to eliminate flammable conditions.

- 2.1.15 Purge Cycles** – The number of times the pressure purge process is completed to ensure that an air atmosphere that will support combustion does not exist.
- 2.1.16 Purge Into Service** – The act of replacing the air or inert gas in a closed system by a flammable gas.
- 2.1.17 Purge Out of Service** – The act of replacing the normal flammable content of a closed system by inert gas.
- 2.1.18 Safe Location** – an area that is below 10% LEL
- 2.1.19 Safe Vent Point Location** – Natural gas shall not be vented indoors. Natural gas vents are to be located outdoors at elevations 10 feet above any building or structure, including overhead electric lines, within a 50 feet radius column (right-circular cylinder) above the point of discharge. Nearby structures may block air currents and not allow for dilution which, in turn, may allow natural gas being vented to accumulate. If the natural gas were to ignite and explode, a structure typically reflects the blast wave and increases the force of the explosion. In addition, buildings typically have walking/ working platforms that may expose personnel. Overhead electrical lines and, in particular, Transmission equipment is a potential ignition source due corona effects and other operations such as reclosures, and air breakers. In lieu of criteria above, an engineering evaluation shall be used to determine a Safe Vent Point Location.
- 2.1.20 Sweep Purge** – The technique of purging process equipment and piping by adding inert gas at a constant velocity for a specified period of time. The inert gas displaces the flammable gas or air over a period time.
- 2.1.21 Upper Explosive Limit (UEL)** – The maximum concentration of a flammable gas mixed with an air atmosphere that will sustain combustion. Also known as the Upper Flammable Limit (UFL).

**2.2 Abbreviations:**


- 2.2.1 AEP** – For the purposes of this document, American Electric Power, Inc. and all of its subsidiaries responsible for generating power using fossil fuels.
- 2.2.2 CEC** – Construction Environmental Coordinator
- 2.2.3 NFPA** – National Fire Protection Association
- 2.2.4 PEC** – Plant Environmental Coordinator
- 2.2.5 P&IDs** – Process and Instrument Diagrams

**3.0 ROLES AND RESPONSIBILITIES**

**3.1 Facility Manager shall:**

- 3.1.1** Ensure this procedure is communicated to facility personnel and that they are trained in using this procedure.

**3.2 Persons working for or on behalf of AEP Shall:**

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**3.2.1** Be trained in the use of this procedure.

**3.2.2** Follow this procedure when process vessels or piping that contains natural gas is exposed to an air atmosphere.

**3.3 Supervisors shall:**

**3.3.1** Conduct a JHA/JSA and ensure that all parameters of this procedure are clearly identified and followed including:

- Number of purge cycles
- Initial purge pressure
- Maximum purge pressure
- Ending cycle pressure
- Appropriate purging equipment
- Final oxygen concentration
- System isolation points (clearance boundaries)
- Inerting location(s)
- Go / no-go, criteria
- Venting location(s)
- Gas detection sample points

**3.4 Safety & Health Professionals shall:**

**3.4.1** Provide resources necessary for supervisors to follow this procedure and conduct the JHA/JSA.

**4.0 DETAILS**

**4.1 General Requirements**

**4.1.1** Personnel working in the affected area(s) as determined by this procedure shall be informed of the hazards associated with this activity prior to the initiation of any purging/inerting/recharging activities. All non-essential personnel must be removed from the affected area(s) during these activities.

**4.1.1.1** Affected personnel shall successfully complete Key Course SAF-Nat Gas Awareness and repeat as defined in the training matrix.

**4.1.1.2** Affected personnel shall successfully complete the Key Course SAF-NatGasPurgeVent-O and repeat as defined in the training matrix.


**4.1.1.3** Affected personnel shall follow the site specific Job Hazard Analysis (JHA)

**4.1.1.4** Affected personnel shall use Mechanical Design Standard document: MDS-PI-20-001 (Nitrogen Purge/Vent Maintenance Tool Assembly) or equivalent to construct the Nitrogen Rig.

**4.1.2** P&IDs or Flow Diagrams (whichever is available) shall be assembled for the affected system(s).

**4.1.3** SDS or MSDS shall be on hand for the fuel gas as well as the inert purge media.

**4.1.4** A thorough assessment of the piping system including determination and evaluation of discharge points, design of temporary piping, location of and access to control valves and the possibility of trapped liquids/solids/deposits shall be prepared.


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- 4.1.5** Any valve which must be operated during this procedure shall be located in a safe location.
- 4.1.6** Continuous monitoring using gas detectors (Refer to specific gas monitor OEM manual for sample time vs. length of tubing, etc), whether by use of a sample port within the piping system or taking a sample at the point of discharge must be included with steps 4.2, 4.3, 4.4, and 4.5 of this procedure. The monitor shall be located such that levels can be read and recorded from a safe location.
- 4.1.6.1** The gas detectors are to be configured for the specific measurement needed. For example, when measuring a lean mixture of natural gas, a gas detector configured with oxygen, LEL, and IR sensors is appropriate. The oxygen sensor is used to confirm that the atmosphere is acceptable for the LEL detector to function properly. The LEL detector typically requires at least 10% oxygen to read LEL. The IR sensor is used to measure 0-100% LEL methane in an oxygen deficient atmosphere. It is recommended that dedicated detectors are used for this process and are calibrated and bump tested. When configuring these instruments, one is to be designated for measuring fuel rich mixtures and will be configured only with the IR cell (0-100% Methane by volume) and oxygen since the Catalytic LEL cell will become saturated and quickly be consumed at high concentrations of natural gas. An oxygen sensor is still recommended since high concentration of methane can lead to an oxygen deficient atmosphere. Do not use these dedicated gas detectors for confined space entry since they do not have the standard four gas configuration.
- 4.1.7** Prior to discharging any gases to the environment, the PEC or CEC shall be contacted to ensure regulatory compliance.
- 4.1.8** Environmental conditions such as wind, temperature, barometric pressure, topography, and their impact on this procedure shall be evaluated.
- 4.1.9** Control of ignition sources within the affected area(s) such as smoking, hot work, and static electricity (bonding and/or grounding) shall be addressed.
- 4.1.10** A communications plan for this procedure which addresses topics such as emergency response, general facility notification of procedure start/stop, and notification of local emergency responders shall be prepared.
- 4.1.11** Personnel responsible for using monitoring instruments as part of this procedure shall have training on the equipment that will be used.
- 4.1.12** Where an inert gas is to be used with this procedure, the possibility of an asphyxiating atmosphere exists. A plan to prevent personnel from being exposed to oxygen-deficient atmospheres shall be developed in conjunction with this procedure. All personnel using this procedure shall be informed of the hazards of nitrogen/inert gas through a detailed JSA discussion regarding the hazards and controls to prevent exposure.

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- 4.1.13** Site-specific, system-specific procedures (*see Appendix A*) shall receive an independent safety validation, and the safety validation shall be approved by the Facility Manager prior to the conduct of any purging/inerting/charging activities covered under this procedure.
- 4.1.14** During the execution of these procedures, atmospheric monitoring with a gas detector is to be conducted as close as practical to the 50' zone around the gas vent location. For vents that are located in safe locations, this is to be conducted as a first time evolution to validate the procedure. Periodic reviews or spot checks of these safe location vents should be conducted to ensure the effectiveness of this procedure. These will be based on the frequency of the use of the procedure and the previous results. The Facility Manager will use these effectiveness tests to review the site's procedures.
- 4.1.15** Establish Go / NO Go Criteria such as: inverted atmosphere (fog), rain, lightning, or if personnel cannot be located or removed from exclusion zone. Action levels at 10% LEL and 25% LEL must be clearly identified.
- 4.2 Purge Into Service:** Prepare equipment for initial fill or reintroduction (charge/pack) of natural gas {equipment starting in a 100% air-state condition}.
- 4.2.1** The system is to be controlled by a clearance permit.
- 4.2.2** Nitrogen is to be used to purge the air from the system and provide an inert atmosphere inside the piping/vessels prior to introduction of natural gas.
- 4.2.3** Nitrogen may be delivered from cylinders, tube trailers, or cryogenic storage depending on the size of the system to be placed into service.
- 4.2.4** For inerting, nitrogen is controlled at pressures to optimize purging while preventing overpressure of the system. Table 1 (below) lists the maximum nitrogen pressure, pressure relief device setting, and number of pressure purge cycles for typical maximum allowable operating pressures.
- 4.2.5** Natural gas vents are to be located outdoors at elevations 10 feet above any building or structure, including overhead electric lines, within a 50 foot radius column (right-circular cylinder) above the point of discharge.
- 4.2.6** With the vent valve closed and the nitrogen purge valve open, slowly open the nitrogen flow valves to allow the system to reach the nitrogen purge pressure as determined in Table 1 (below) based on the system's maximum allowable operating pressure.
- 4.2.7** Close the nitrogen flow valve and hold for approximately 10 to 15 minutes to allow the gases to mix.
- 4.2.8** Use approved leak-testing medium (Snoop®, RC Snoop®, and/or Sherlock5®) or other leak testing procedure (i.e. ultrasonic leak detection, helium test, etc.) to check for leaks in the piping system being placed into service. Leak testing shall be performed on any section of piping which is disturbed and any other areas with suspected or probable leaks. Leak testing is to be performed to avoid the need for another inerting purge cycle after the system is purged into service to make repairs on additional leaks. Depressurize the system and repair any leaks before proceeding.




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- 4.2.9 Slowly open the nitrogen vent valve allowing the system to displace the air and nitrogen mixture and reach a pressure of approximately 0 psig.
- 4.2.10 Repeat steps 4.2.6 through 4.2.9 for the number of pressure purge cycles as indicated in Table 1 for the nitrogen purge pressure and system maximum allowable operating pressure. When using the same connection for the nitrogen introduction and to vent the system down, additional purge cycles may be required than the number listed in Table 1.

Table 1 – Purging	MAOP 40psig ≤ 80psig	MAOP >80psig ≤ 200psig	MAOP >200psig ≤ 1000psig
N2 Purge Pressure	35 psig	80 psig	200 psig
Into Service Purge Cycles	3	3	2
Out of Service Purge Cycles	4	3	2
Purge System Pressure Relief Device (PRD) Setting	40 psig*	100 psig*	250 psig*

\*If the purge system PRD setting is greater than the MAWP (Maximum Allowable Working Pressure), this table cannot be used. Must use engineering calculation worksheet (Appendix C) and a properly sized PRD for the system.


- 4.2.11 Close the nitrogen vent valve.
- 4.2.12 Vent down the nitrogen fill hose and disconnect the nitrogen purge system from the system that was purged and inerted.
- 4.2.13 Measure the oxygen concentration with the gas detector to ensure the oxygen concentration is below 5% (see Appendix B).
- 4.2.14 The system is ready for gas introduction.
- 4.2.15 With the system purged of air and inerted, verify that there is natural gas supply pressure and a calibrated and bump tested gas detector that will measure natural gas in nitrogen (i.e. utilizes an infrared, or IR, sensor). The range of the instrument must be 0 to 100% methane by volume. The detector must also be equipped with a sample pump.
- 4.2.16 Locate the sample point in the vent line that will be used to monitor natural gas introduction. The sample point shall be brought to a safe location for personnel to access throughout the gas charging procedure.
- 4.2.17 Place the gas detector sample tube into/near sample point and begin gas introduction.
- 4.2.18 Slowly open the natural gas supply valve to the system and purge nitrogen from the system with natural gas through the vent.
- 4.2.19 Closely monitor the gas detector watching for natural gas breakthrough (the reading will change from 0%).
- 4.2.20 The purging process is complete when the gas detector reads 90% by volume or greater.
- 4.2.21 Close the natural gas supply valve and natural gas vent.
- 4.2.22 As an alternative for systems that are controlled by Burner Management Systems or Turbine Gas Control Systems, those systems may be placed into service directly from the inert gas state at zero pressure to charging of natural gas to the operating gas pressure state without venting gas to bring the gas composition to the minimum 90% methane level. This is an

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alternative permitted under NFPA 56 rules where systems with a fuel/burner management system permits and controls a lean fuel mixture during startup.

**4.3 Purge Out Of Service:** Preparing equipment for maintenance (venting and purging, system that is in the 100% natural gas state).

- 4.3.1 The system is to be controlled by a clearance permit.
- 4.3.2 The natural gas that is in the system is to be vented to a Safe Vent Point Location.
- 4.3.3 The amount of gas to be vented is to be kept to a minimum. Consider consuming as much gas as is possible in the fueled process (i.e. by gradually lowering system pressure as the unit is running, provided it will not impact flame stability or operability) prior to conducting the maintenance activity.
- 4.3.4 Isolate the natural gas supply from the system to be maintained.
- 4.3.5 Slowly vent down the natural gas until the system reaches a zero psig state. Take a pressure reading at this time and note this as time zero. The value should be approximately 0 psig.
- 4.3.6 Install a low pressure pressure gauge to detect a small increase in pressure due to leakage (Dwyer series LPG4 0-35" water column gauge or equivalent). Close the vent valve and allow the system to stabilize for approximately 5 minutes. Take a pressure reading at this time. Ideally this pressure should be approximately 0" water column, indicating that the supply valve has zero leakage. A pressure rise of 15" water column or greater over a 5 minute period may indicate the boundary isolation valves may not be holding and requires a more in-depth questioning attitude.
- 4.3.7 Nitrogen is to be used to purge the residual natural gas from the system and provide an inert atmosphere for the maintenance activities.
- 4.3.8 Nitrogen may be delivered from cylinders, tube trailers, or cryogenic storage depending on the size of the system to be placed into service. Careful planning is required to match the source of nitrogen (cylinders, tube trailers, cryogenic supply) for the specific job that is going to take place.
- 4.3.9 For inerting, nitrogen is controlled at pressures to optimize purging while preventing overpressure of the system. Table 1 lists the maximum nitrogen pressure, pressure relief device setting, and number of pressure purge cycles for typical maximum allowable operating pressures.
- 4.3.10 Natural gas vents are to be located outdoors at elevations 10 feet above any building or structure, including overhead electric lines, within a 50 foot radius column (right-circular cylinder) above the point of discharge.
- 4.3.11 With the vent valve closed and the nitrogen purge valve open, slowly open the nitrogen flow valves to allow the system to reach the nitrogen purge pressure as determined in Table 1 based on the system's maximum allowable operating pressure.
- 4.3.12 Close the nitrogen flow valve and hold for approximately 10 to 15 minutes to allow the gases to mix.

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- 4.3.13 Slowly open the nitrogen vent valve allowing the system to displace the air and nitrogen mixture and reach a pressure of approximately 0 psig.
- 4.3.14 Repeat steps 4.3.11 through 4.3.13 for the number of pressure purge cycles as indicated in Table 1 for the nitrogen purge pressure and system maximum allowable operating pressure. When using the same connection for the nitrogen introduction and to vent the system down, additional purge cycles may be required than the number listed in Table 1.


Table 1 - Purging	MAOP 40psig ≤ 80psig	MAOP >80psig ≤ 200psig	MAOP >200psig ≤ 1000psig
N2 Purge Pressure	35 psig	80 psig	200 psig
Into Service Purge Cycles	3	3	2
Out of Service Purge Cycles	4	3	2
Purge System Pressure Relief Device (PRD) Setting	40 psig*	100 psig*	250 psig*

\*If the purge system PRD setting is greater than the MAWP (Maximum Allowable Working Pressure), this table cannot be used. Must use engineering calculation worksheet (appendix C) and a properly sized PRD for the system.

- 4.3.15 Close the nitrogen vent valve.
- 4.3.16 Measure the system contents with the gas detector that is configured with the 0-100% LEL Methane IR to ensure that it is at or below 10% of the LEL of methane.
- 4.3.17 Vent down the nitrogen fill hose and disconnect the nitrogen purge system from the system that was purged and inerted.
- 4.3.18 The system is ready to perform the maintenance activities. Danger: Pure nitrogen is heavier than air. Asphyxiation can occur when there is a static head in the piping (vertical runs of pipe) and when there is work being performed below the release area, allowing nitrogen to flow to the work area; therefore, nitrogen shall be air-purged to remove such hazard
- 4.3.19 When the maintenance work is completed, follow the steps in 4.2 to purge into service.

**4.4 Sweep Purge** – Sweep purging can only be performed on systems that have injection fittings and vent fittings at the extremities of the piping section. The sweep purge introduces a gas (inert gas in purging out of service) into one end of the piping section and in a slow, controlled manner and shoves out the gas that is inside of the piping system thru the vent at the opposite end of the piping section. In a straight piping section where little mixing occurs, a volume of purging gas greater than the internal volume of the piping is required to shove out the gas being removed. In piping sections where there are complex piping configurations, differing piping sizes, vessels as part of the section, liquid traps, and elevation changes significantly, an amount of purging gas many times the internal piping system volume is required. Dead legs, closed branches, and large eddy spaces are to be avoided.


- 4.4.1 When the sweep purge technique is selected for purging a flammable gas piping system into or out of service, substitute the sweep purge at steps 4.2.6 and 4.3.11 and follow the steps below.

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- 4.4.2 Nitrogen may be delivered from cylinders, tube trailers, or cryogenic storage depending on the size of the system to be placed into or out of service.
- 4.4.3 In sections with relatively straight and same diameter piping starting at 0 psig in the piping, use a low pressure purge (20 psig at injection point) and introduce 2 times the volume of purging gas as the internal volume of the pipe. Ensure that the regulator pressure is set prior to use to prevent stratification of the natural gas and nitrogen.
- 4.4.4 In piping sections that have non-uniform piping diameters, vessels as part of the piping section, or elevation changes, inject purging gas at a higher pressure (max. operating pressure of the section or 100 psig, whichever is lower) to provide mixing of the purging gas and gas initially inside the piping section. Inject at least 4 times the volume of purging gas as the internal volume of the pipe.
- 4.4.5 At the completion of injection of gas (in 4.4.3 or 4.4.4), sample the composition of the gas at the vent to ensure that the gas concentration expected is attained (less than 10% of the LEL of methane when purging out of service, and less than 5% O<sub>2</sub> when purging into service).
- 4.4.6 Vent to a Safe Vent Point Location.

#### **4.5 Vent Not to Safe Location Requirements**

- 4.5.1 Establish an exclusion zone beginning 10 feet below the point of discharge and extending in a radius of 50 feet (right-circular cylinder) around and above the point of discharge. During the purge process, remove or isolate all potential sources of ignition inside the exclusion zone.
- 4.5.2 Procedures written for the venting process shall include emergency response planning, incident command roles and responsibilities, JHA/JSA and PPE.
- 4.5.3 Atmospheric monitoring (weather conditions), continuous gas monitoring of the exclusion zone boundaries, and go / no-go criteria (such as lightning near the venting activity) are to be part of the venting process safeguards.
- 4.5.4 Intrinsically rated (Class I, Div. 1, Group D) radios, lights and Gas Detectors must be used.
- 4.5.5 Only Gas Detectors with a recent calibration and bump-tested prior to the venting operation shall be used. Redundant Gas Detectors which display combustible gas levels in % LEL are required.
- 4.5.6 Establish roles and responsibilities including an Incident Commander.
- 4.5.7 Conduct a JSA prior to conducting the venting operation.
- 4.5.8 Communication with local emergency responders shall be established.
- 4.5.9 PPE requirements (such as hard hat, safety glasses, safety toed shoes, Fire Retardant (FR) top layer, FR or cotton under layer and hearing protection) within the exclusion zone and outside of the exclusion zone shall be identified.
- 4.5.10 Communication and alarm requirements such as use of the phonetic alphabet and three way communication techniques shall be clearly defined.

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**4.5.11** Establish a headcount system, evacuation routes and muster points.

**5.0 REFERENCES**

- 5.1 Crowl, Daniel, Chemical Process Safety: Fundamentals with Applications, Prentice Hall, 1990
- 5.2 NFPA 56PS, Standard for Fire and Explosion Prevention During Cleaning and Purging of Flammable Gas Piping Systems 2012 Edition
- 5.3 Key Course SAF-NatGasAwareness-O (online)
- 5.4 Key Course SAF-NatGasPurgeVent-O (online)
- 5.5 Mechanical Design Standard document: MDS-PI-20-001 (Nitrogen Purge/Vent Maintenance Tool Assembly)


**6.0 APPENDICES**

- 6.1 Reference A: Frequently Asked Questions
- 6.2 Appendix A: Site Specific JHA templates for Pressure Purge & Sweep Purge
- 6.3 Appendix B: MX-6 Dilution Tube Use
- 6.4 Appendix C: Engineering Calculation Worksheet
- 6.5 Appendix D – Gas Purge Inert Decision Tree

**7.0 REVIEW AND REVISION HISTORY**

7.1 Annually or more often if required to address management of change

DATE	REVISION #	COMMENTS	REVIEWER
1-1-2013	Rev 0	Original	Gas Vent Team


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Reference A: Frequently Asked Questions

1. **Why do maintenance activities on natural gas facilities, that would expose employees to natural gas release or a potentially explosive mixture inside of a pipe/vessel that they are working on, require purging out of service?**  
 Answer: NFPA 56 defines purging out of service. Purging out of service protects employees from the hazards of explosive mixtures of gas and air by displacing flammable natural gas with an inert gas in such a process where the lower explosive level is not exceeded and the inerting gas is replaced with air to avoid a hazard from the inerting gas. NFPA 56 does not specifically define the tasks that require purging out of service, but the Committee Scope covers maintenance and the AEP safety practices require that for maintenance the equipment/process be brought to a zero energy state. Zero energy state for natural gas piping is equivalent to NFPA56 Purging Out of Service.
  
2. **Do I need to purge out of service for piping upstream of confined spaces being entered for inspections such as combustion turbine internals borescope, HRSG entry, and boiler entry?**  
 Answer: No, follow your standard confined space entry procedures
  
3. **When purging out of service, when can the inerting gas be left in the system during maintenance work?**  
 Answer: When the volume of the system is very low, where the release of the inert gas is in a well-ventilated area such that it does not create an oxygen deficient atmosphere, where there is minimal static head in the piping (vertical runs of pipe) and when there is no work being performed below the release area.
  
4. **Why are some piping systems, components, etc. exempt as indicated in the decision tree (i.e. 2 ft<sup>3</sup> Internal volume of piping of process volume for systems operating at or below 125 psig or 19 scf of Natural Gas Volume for systems greater than 125 psig).**  
 Answer: This volume has been established and recognized in good engineering practices as a de-minimis amount to be released. Other exemptions are based on being conducted at zero pressure, short duration with minimal exposure to the hazard such as these examples:
  - a. Replacing a safety valve with the system under zero pressure minimizing the amount of time the line is exposed to atmosphere (i.e. using a plug to close opening until a new safety valve is replaced)
  - b. Installing a slip blank into a flanged connection and exposed for 5 minutes or less
  - c. Replacing a gasket in a flanged connection that requires only sliding the gasket into place and exposed for 5 minutes or less
  - d. Replacing an in-line strainer or filter and not an absorber or scrubber

To Calculate Standard Cubic Feet follow this formula:

$$V_{SCF} = \frac{(P_{SystemAbsolute}) \times (V_{System})}{P_{AtmosphereAbsolute}}$$

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5. **Why does deviation from the purging procedures as identified in the scope require such significant management and safety department sign-offs?**

Answer: OSHA officials have stated that NFPA56 is to be used for venting and purging activities and if not followed, citations can be issued per the General Duty Clause 29CFR1910. NFPA56 has an Equivalency Clause that allows activities where appropriate analysis and technically sound judgment may be used in lieu of following the prescriptive requirements of the standard.

6. **Where determined that purging and inerting is not required per the "Gas Purge Inert Decision Tree, what PPE is required?**


Answer: The PPE required for this activity shall include a 100% cotton undergarments, 3 second gas extraction suit and hood or HRC 2 clothing and faceshield with Balaclava, hard hat, safety glasses with sideshields, safety-toed leather boots, leather gloves, and hearing protection where needed.

7. **Is hot tapping permitted?**

Answer: Hot Tapping (welding, cutting, burning, brazing, grinding) on a pipe or component containing natural gas is permitted only when all other alternatives have been exhausted and a qualified Hot Tapping contractor approved by AEPSC Engineering Services is selected to perform the work.

8. **How do you prevent accumulation of flammable vapors in previously inerted piping systems?**

Answer: After the inerting process, utilize a properly bonded venturi air mover to continuously provide air exchanges within the piping system during maintenance or operational activity or continuously sweep with dry air. Note: Hydrocarbons can impregnate piping walls or exist in liquid pools or low spots of the piping system after confirmed inerting process. Continuous air purging will dilute the hydrocarbon concentrations to a safe level. It is imperative to drain all liquid pools or low spots prior to inerting or purging especially in separation vessels such as knockout drums and filter separators.

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**Appendix A: Site Specific JHA templates for Pressure Purge & Sweep Purge**  
CTRL + Click Link Here =>  
<http://ehap/Pages/LaunchJHA.aspx?JobId=8860>

**Appendix B: MX-6 Dilution Tube Use**  
CTRL + Click Link Here =>  
<http://aepsharepoint/EnvSafetyandHealth/shdocs/Shared%20Documents/Dilution%20Tube%20Instructions.pdf>

**Appendix C – Engineering Calculation Worksheet**  
CTRL + Click Link Here =>  
<http://aepsharepoint/EnvSafetyandHealth/shdocs/Lists/Natural%20Gas%20Safety/AllItems.aspx>

**Appendix D – Gas Purge Inert Decision Tree**  
CTRL + Click Link Here =>  
<http://aepsharepoint/EnvSafetyandHealth/shdocs/Shared%20Documents/Gas%20Purge%20Inert%20Decision%20Tree.pdf>



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## **1.0 DEFINITIONS AND ABBREVIATIONS**

Unless otherwise defined below, capitalized terms shall have the same meaning as assigned to them in the Contract terms and conditions.

- 1.1 Competent Person** - An OSHA "competent person" is defined as "one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them". By way of training and/or experience, a competent person is knowledgeable of applicable standards, is capable of identifying workplace hazards relating to the specific operation, and has the authority to correct them. Some standards add additional specific requirements which must be met by the competent person.
- 1.2 Health and Safety Plan (HASP)** - A Health and Safety Plan is a written description of the manner in which Contractor will manage the Work under the contract in order to ensure (1) the health and safety of all personnel involved in or affected by the work, including but not limited to Contractor and Subcontractor employees, Owner employees, other contractors' employees, visitors, vendors, and the general public, and (2) the protection of the surrounding environment from potential impacts associated with the Work.
- 1.3 Job Safety/Site Assessment (JSA)** - A job briefing process that includes 5 main steps to prepare employees to work safely during the task. The five main steps include: 1) identifying and talking about the job scope; 2) identifying the hazards associated with the job and controls to protect employees; 3) considering the environmental aspects of the job, 4) visiting the job site and assessing hazards and; 5) cleaning up after the job.
- 1.4 Job Hazard Analysis (JHA)** - A detailed 3-step analysis that helps eliminate and/or reduce risk. This 3 step process breaks each task down into basic job steps, identifies existing and potential hazards associated with each step and provides recommendations/procedures to eliminate, reduce or control hazards, and the option of assessing potential severity.
- 1.5 Pre-Work Hazard Assessment (PWHA)** - Owner's initial hazard assessment for the Work to be executed by Contractor that identifies anticipated hazards as best as can reasonably be determined by Owner that may require elimination or mitigation. The PWHA will be provided to Contractor and is intended to provide a basis for initial planning purposes only and no warranty is expressed or implied that it is accurate, complete, comprehensive, or all-inclusive, or that items not listed will not be present or pose no threat to personnel safety or health.
- 1.6 Owner's Site Safety, Health and Target Zero Orientation Training** - Owner's site specific Safety and Health Orientation and any additional safety and health awareness training the site may require such as STAR training.
- 1.7 Safety and Health Coordinator** - Individual responsible for assisting Contractor supervision in carrying out its responsibilities for job site safety and health and other loss prevention programs associated with the Work.

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- 1.8 Superintendent** - Contractor's senior most person responsible for the day to day execution of Work and coordination of lower levels of supervision that directly report to them. There may be multiple superintendents who report to a more senior person on site such as a project manager.
- 1.9 Supervision** - Personnel employed by Contractor with responsibility for planning, implementing, and overseeing the Work, including but not limited to superintendent, project manager, general foreman, and foreman.
- 1.10 Worker** – Individual employed by Contractor assigned to perform the physical activities required to complete the Work.
- 1.11 Abbreviations:**
  - 1.11.1 ACM** –Asbestos Containing Materials
  - 1.11.2 AEP** – American Electric Power
  - 1.11.3 EMR** - Experience Modification Rate
  - 1.11.4 HASP** - Health and Safety Plan
  - 1.11.5 JHA** - Job Hazard Analysis
  - 1.11.6 JSA** - Job Safety/Site Assessment
  - 1.11.7 MSDS** - Material Safety Data Sheets
  - 1.11.8 OSHA** - Occupational Safety and Health Administration
  - 1.11.9 PACM** - Presumed Asbestos-Containing Material
  - 1.11.10PWHA** - Pre-Work Hazard Assessment

<b>2.0 INTRODUCTION</b>
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- 2.1** These Safety and Health Requirements replace the previous Revision #7 of the Supplemental Safety Terms and Conditions.
- 2.2** These Safety and Health Requirements shall be used in conjunction with the-applicable AEP System General Terms and Conditions for Work performed at AEP's Generation facilities. These Requirements convey Owner's minimum expectations regarding safety and health practices and may exceed the requirements of federal, state, and local regulatory agencies. These Requirements are in addition to any of Contractor's own policies, procedures, guidance, instructions, or other requirements. Contractor shall submit to Owner a copy of their Environmental, Health and Safety manual.

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- 2.3** These Safety and Health Requirements shall also apply to any Subcontractor, agent, manufacturing representative, or other such person(s) that Contractor may use for the Work on site. Contractor is responsible for ensuring such persons and entities comply with these Safety and Health Requirements.
- 2.4** Contractor and its subcontractors are required to have an interstate experience modification rate (EMR) of 1.0 or less. Contractor shall promptly notify Owner if its or its subcontractor's EMR exceeds 1.0, for review and disposition.
- 2.5** Contractor shall comply with and enforce all laws, rules and regulations applicable to safety and health standards, including, but not limited to those of the Occupational Safety and Health Administration (OSHA). Contractor's failure to comply with these Safety and Health Requirements may be cause for the Contract to be terminated and may prevent eligibility for future Work.
- 2.6** Contractor shall perform the Work in a safe and careful manner, provide first aid treatment and transportation, and use such safety devices and methods as are necessary to protect its employees, agents, Subcontractors, Owner's employees and agents, other contractors and the public from bodily injury and property damage. Nothing herein shall relieve Contractor of its obligation to use due care in performing work and its sole responsibility for the safety of its employees.
- 2.7** Contractor shall comply with project and site safety and security rules and all procedures issued by Owner, provided that such rules and procedures do not conflict with OSHA or other safety laws, rules or regulations. Contractor shall assign a competent person at all times to manage, coordinate and enforce its safety program during performance of the Work.
- 2.8** In the event Owner determines that an unsafe condition exists at the site, Owner shall have the absolute right to immediately order corrective measures or stop the Work until the unsafe condition is corrected by Contractor without advance written notice. To the extent Contractor or its subcontractors have caused the unsafe condition and subsequent delays or impacts to the Work, Contractor shall be solely responsible for any costs it incurs associated with the Work stoppage and shall not be allowed additional time to complete the Work. This provision does not relieve Contractor of its exclusive responsibility for safe work practices nor impose upon Owner any obligation to supervise Contractor's work practices.
- 2.9** Contractor understands that any safety requirements as may be provided by Owner are not intended to (and do not) provide legal or other professional advice. Owner makes no representations or warranties that the information contained therein satisfies federal, state or local laws. Contractor agrees that it shall consult with its own legal Counsel or other qualified persons with respect to satisfying requirements of any such laws as may be applicable to its Work. Contractor acknowledges and agrees that (i) it is not relying on any claim or representation of Owner relative to any safety requirement, (ii) Owner expressly disclaims any claim or representation that the information contained in any safety requirement will produce any particular result, and (iii) Owner shall not be responsible for any errors or omissions in the design, implementation, and/or enforcement of any safety requirements.

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**2.10** Contractor is responsible for supplying competent personnel who are trained and qualified for the Work they will be performing, and providing all applicable safety instructions and training except as noted in Paragraph 4.0.

**2.11** These Safety and Health Requirements apply in their entirety to the Work unless Owner has waived the requirement for the Health and Safety Plan (HASP) described in Paragraph 3.2 in writing. In such case the following highlighted paragraphs do not apply to the Work:

- Paragraphs 3.2, 3.6, 4.1.2, 4.3.1, 4.3.2, 4.4.1, 5.4, and 6.1

### **3.0 HEALTH AND SAFETY PLANNING**

Owner expects each Contractor to exercise planning and forethought regarding the safety and health aspects of all Work performed.

#### **3.1 Pre-Work Hazard Assessment (PWHIA)**

**3.1.1** Owner will provide Contractor with Owner's completed PWHIA. Contractor shall consider the PWHIA and understand that the PWHIA is informational for initial planning purposes only. The PWHIA does not relieve Contractor of its obligation to conduct its own hazard assessments of the Work.

#### **3.2 Health and Safety Plan**

**3.2.1** Contractor is required to prepare and submit a Health and Safety Plan (HASP) to Owner for review and discussion prior to the start of Work under the contract unless Owner waives or modifies this requirement in writing. The HASP shall cover the Work of Contractor and its subcontractors, agents and representatives. (See Attachment 1)

**3.2.2** Proposed revisions to the HASP during the course of the Work require discussion and review with Owner.

#### **3.3 Job Hazard Analysis (JHA)**

**3.3.1** If Owner requires a HASP, Contractor shall prepare Job Hazard Analyses in accordance with its HASP. Where a HASP is not required, Contractor shall prepare a JHA for the planned Work subject to review by Owner prior to starting Work. In either case, Owner may require Contractor to prepare additional JHAs. Contractor shall use and update JHAs to consistently apply proper safeguards. All Job Hazard Analyses are subject to review by Owner. (See Attachment 2)

#### **3.4 Job Safety/Site Assessment (JSA)**

**3.4.1** Before any Work begins at the start of each shift and whenever job scope, activity, procedures, or location changes, Contractor shall conduct a JSA utilizing Owner's JSA form or Owner-approved equivalent form. In the preparation of the JSA, Contractor shall consult applicable JHA's that may exist for the Work. (See Attachment 3)

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- 3.4.2 Whenever a problem, circumstance, or result that was not covered in the JSA is encountered during the course of the Work, Contractor shall stop Work immediately, evaluate the situation, and conduct a new or revised JSA before resuming Work.
- 3.4.3 No work shall be performed without a JSA. Only persons signed onto the JSA may perform the Work covered by the JSA.
- 3.4.4 Contractor front line supervision and above shall attend at least one JSA discussion daily and audit at least two jobs in progress each shift for adherence to the JSA process requirements, including thoroughness and quality, and shall sign the JSA to document these actions. JSA's are subject to observation, review, and audit by Owner. (See Attachment 4)
- 3.4.5 Contractor is expected to take appropriate action for individuals who fail to comply with the JSA requirements including performing Work outside the parameters of the JSA.
- 3.4.6 Contractor shall retain completed JSA forms for 30 days or as directed by Owner.

### 3.5 Continuous Hazard Assessment

- 3.5.1 Owner expects all of Contractor's personnel to continuously assess their Work locations and Work activities for hazards throughout the work day.
- 3.5.2 Assessments performed by individual employees prior to the start of the shift and after morning break, lunch break and afternoon break are particularly important. As an aid in performing these four dedicated assessments, some sites may require each employee to document their assessments using an Owner-supplied STAR Card or equivalent means.
- 3.5.3 Assessments performed prior to performing certain routine or repetitive activities may also be required at some sites. As an aid in performing these dedicated assessments, these sites may require the individuals or foremen to document the assessments on Owner-supplied checklists or equivalent means to supplement the JSA form.

### 3.6 Safety and Health Coordinator

Contractor shall provide an on-site full-time Safety and Health Coordinator for each shift of Work in which the total of craft personnel (Contractor and its Subcontractors) exceeds 40 personnel. Contractor shall provide Owner with the resumes of proposed Safety and Health Coordinator personnel. While the Owner may not designate an individual or individuals to perform the role of Safety and Health Coordinator, qualification for these individuals shall include completion of the OSHA 500 or 510 training and satisfactory work experience as determined by Owner. Owner may request Contractor to provide for a fulltime Safety and Health Coordinator for Work with fewer than 40 craft personnel per shift if Owner determines the nature of the Work justifies additional safety oversight:

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### **3.7 Commencement of Work**

- 3.7.1** Contractor shall not begin any Work until Owner's designated site representative has provided written authorization such as a letter of authorization, service agreement or contract.
- 3.7.2** Contractor shall request the necessary clearance permits from Owner prior to the execution of the Work. Owner will arrange all necessary clearance permits on energized equipment, electrical and communications circuits, piping systems or other operational equipment. Contractor shall comply with Owner's Clearance Permit Policies and Procedures regarding isolation of electrical and mechanical systems and other equipment.
- 3.7.3** Contractor shall obtain site permits or approval from Owner for its vehicles, excavation activities, use of explosives, access to restricted areas, use of Owner's equipment, tools and facilities, hot work and other similar activities.

### **3.8 Working Hour/Day Limitations**

- 3.8.1** Contractor shall staff and plan in a manner that prevents any person from working more than 13 consecutive days without a 24 hour rest period. Exceptions shall be pre-approved in writing by Owner's representative at the Director level or above.
- 3.8.2** Contractor shall staff and plan in a manner that prevents any person from working more than 16 hours in any rolling 24 hour period. After working 16 hours a minimum of 8 hours of rest shall occur before returning to work. A two hour exception may be granted in order to arrange for relief if a job has gone longer than expected. Exceptions shall be pre-approved by Owner's representative at the Director level or above.

## **4.0 TRAINING AND QUALIFICATION REQUIREMENTS**

### **4.1 General**

Personnel shall successfully complete training as described below prior to being allowed to commence Work on site.

- 4.1.1** Contractor shall maintain up-to-date documentation of training and have it readily available on site for Owner's inspection upon request.

**4.1.2** Contractor is responsible for the cost of all OSHA 10- and 30-Hour Training or equivalent training.

- 4.1.3** Owner will reimburse Contractor the cost of its personnel attending Owner required training specified in Paragraphs 4.2.1.1, 4.3.3, 4.3.4, and 4.4.2.

- 4.1.4** Owner, at its sole discretion based on Work observations or for other reasons, may at any time withdraw its acceptance of any previously approved or completed training and require personnel to repeat the training.



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## 4.2 All Personnel

4.2.1 Contractor shall assure all personnel arriving on site successfully complete the following:

4.2.1.1 Owner's Site Safety, Health, and Target Zero Orientation. Initial orientation takes up to two hours and an annual refresher is required. Additional training may be required as determined by Owner.

4.2.1.2 Contractor's own Asbestos Awareness Training in addition to specific safety and health training required to complete the Work.

## 4.3 Supervision

All personnel in Supervisory roles also are required to successfully complete the following:

4.3.1 All superintendents are required to have OSHA 30-Hour Construction Training. A two-week grace period may be granted at Owner's sole discretion for those who have successfully completed the OSHA 10-Hour Construction Training.

4.3.2 For all supervision below the level of superintendent, OSHA 10-Hour Construction Training, or equivalent training deemed acceptable to Owner, is required.

4.3.3 Some sites may require Supervision to attend Owner's "Supervisors' Responsibilities and Expectations Briefing" program. If required the program must be completed within two weeks after arrival at Owner's site and takes approximately one hour.

4.3.4 Contractor shall utilize Owner's briefing on procedures and controls in addition to Contractor's own written procedures for Work activities involving confined space entry, clearance permits, work on or near energized circuits, etc.

## 4.4 Workers

Workers also are required to successfully complete all of the following training:

4.4.1 OSHA 10-Hour Construction Training or equivalent training deemed acceptable to Owner is required. A two-week grace period may be granted at Owner's sole discretion.

4.4.2 Owner's briefing on procedures and controls that Contractor shall utilize in addition to Contractor's own written procedures for Work activities involving confined space entry, clearance permits, work on or near energized circuits, etc.

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<b>5.0 ADMINISTRATIVE</b>
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**5.1 Record Availability**

Contractor shall maintain accurate documentation of all required personnel training and qualifications, equipment maintenance and inspection, and similar documentation and provide it to Owner promptly upon request.

**5.2 Regulatory Inquiries**

**5.2.1** Contractor shall immediately inform Owner of any contacts or inquiries made by a regulatory agency.

**5.2.2** When a representative of a regulatory agency is on-site, Contractor shall immediately notify Owner for Owner to coordinate entry and re-verify credentials.

**5.2.3** The regulatory agency personnel shall be escorted and accompanied at all times by Contractor's superintendent and Owner's designated representative(s).

**5.2.4** A closing conference shall be conducted with the regulatory agency personnel, Owner, and Contractor after completion of the inspection tour to review any findings, observations and any "apparent violations" found during the inspection.

**5.2.5** Contractor shall provide Owner, for Owner's review, all written reports and copies of all documents prior to submittal to a regulatory agency.

**5.2.6** Contractor shall inform Owner of all regulatory citations, notices of violation, penalties, etc., no later than the next business day.

**5.3 Incident Reporting and Investigating**

**5.3.1** Contractor shall promptly notify Owner of all safety related events. These include near-miss incidents; self-aid, first-aid, and minor incidents; exposure incidents; OSHA recordable injuries and illnesses; and vehicle accidents.

**5.3.2** Contractor shall submit a written summary to Owner's representative by 8.00 a.m. each scheduled Work day listing all safety related events that occurred the previous scheduled Work day.

**5.3.3** Contractor shall immediately secure the scene of an incident and not disturb the scene or items at the scene unless necessary to attend to injured personnel or to prevent additional injury or property damage. Work may not resume and no items at the scene may be moved or discarded until authorized to do so by Owner's designated Safety and Health representative.

**5.3.4** The injured/involved person's immediate supervisor shall submit a completed Report of Injury or Illness Form PS-138A to Owner within 24 hours of the event. (See Attachment 5)

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**5.3.5** Contractor shall promptly initiate an investigation into the facts and circumstances leading up to the event and submit a report to Owner within 48 hours unless granted an extension by Owner. Contractor's Superintendent or most senior representative on site shall conduct or lead the investigation. The immediate supervisor may not serve on the investigation team unless no other supervisory personnel are available. Owner may choose to participate in the investigation. Based on the actual or potential severity of event, Owner may require Contractor to form an incident investigation committee, the makeup of which is subject to Owner's approval. Notwithstanding Contractor's obligations as specified herein, Owner reserves the right to conduct its own independent investigation, with support or input from the Contractor as requested by Owner

**5.3.5.1** Investigator(s) shall examine the scene of the event and promptly interview the injured/involved persons and witnesses.

**5.3.5.2** The names of the injured/involved persons, supervisors, and witnesses, investigation findings, causal factors, and corrective/preventive actions shall be documented in the investigation report.

#### **5.4 Weekly Reporting**

**5.4.1** Contractor shall report the following to Owner each week:

- Direct and Indirect hours worked weekly and year-to-date at Owner's worksite.
- A summary of recordable injuries, first aids, near misses, etc. that occurred during the week
- Year-to date severity rate calculations on Owner's worksite
- Up to date list of employees with last four digits of their social security numbers in order for Owner to implement random drug testing

#### **5.5 Individuals Restricted from Access to Owner's Work Sites**

**5.5.1** Contractor shall provide to Owner a list of all individuals (whether Contractor's or its Subcontractor's personnel) which Contractor intends to use at Owner's sites. The list shall identify the individuals by name and the last four digits of their Social Security numbers.

**5.5.2** Owner may provide Contractor with a list of persons that are restricted from Owner's worksite. Prior to commencement of the scheduled Work and during the duration of the Work, Contractor shall ensure that no person on the list shall be admitted to the site.

**5.5.3** Owner may deny access to its work sites to any individual who fails to comply with the provisions set forth in these Health and Safety Requirements, or who, in Owner's discretion, otherwise demonstrates unsafe or unacceptable behaviors. Examples include, but are not limited to, the following:

- Unsafe job performance.
- Failure to follow Owner's JSA process
- Failure to pass drug/alcohol test.

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- Displaying incompetence in performing their job.
- Personnel that are determined to be unfit for the project.
- Participating in pranks, horseplay or practical jokes.
- Failure to report injuries and/or accidents.
- Fighting or acts of aggression.
- Making threats.
- Theft or vandalism.

**5.5.4** Contractor may request that a restricted employee be cleared for work. A letter addressing the original safety violations or reasons for suspension with any documentation supporting the request shall be sent to Owner's Corporate Director of Safety and Labor Services. The employee shall not work at any of Owner's work sites until approval is granted.

**5.5.5** Contractor shall provide Owner with the name of each employee removed by Contractor from Owner's property and the reason(s) for their removal.

## **5.6 Communication**

**5.6.1** Contractor shall ensure that its personnel clearly understand oral and written instructions, signs and labels associated with Work. This includes but is not limited to ensuring they understand the scope of Work they are to perform; Owner's Site Safety, Health and Target Zero Orientation Training; the hazards associated with the Work; the necessary precautions to protect themselves from the Work hazards; site specific Hazard Communication plans; and Emergency Action Plans.

**5.6.2** Contractor shall provide signage, such as, but not limited to, barricade signs and labeling (Caution, Danger, Asbestos, Arsenic, Radiation, Authorized Personnel only, etc.), hazardous material signs (Gasoline, Used Oil, Caustic, Acid, Oxygen, etc.), HazCom labels, key information signs (Exit, No Exit, High Noise Area, Wet Floor, Universal Waste, No Smoking, Wetlands-Keep Out, etc.), and all legally required employment posters. All signage, labeling and barricade tape shall be UV protected. Contractor shall routinely inspect and replace signage, labeling and barricade tape that is damaged, missing, etc.

**5.6.2.1** Whenever temporary barricades are erected Contractor shall post barricade tags or signs around the perimeter that identify the nature of the hazard, person to contact about the hazard, signature and date. There must be 360 degree coverage with the barricade tape, and barricade signs must be posted on all sides and at all normal entrances to the area. Contractor shall promptly remove barricade tape once the hazard has been abated.

**5.6.3** When Contractor employs workers that are not fluent in or understand English, Contractor shall provide the following:

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5.6.3.1 Barricade tape, signs and labeling that are either bilingual or pictorial for any areas it is working where there is a danger to any of its personnel or its Subcontractor's personnel.

5.6.3.2 A translator who is working or supervising in the immediate work area where there are workers not fluent in the English language. Additional translators will be required if ready communication cannot be established with any worker who is not fluent in English. Contractor's translator shall be easily identifiable by Owner such as by the color of their hardhat, clothing etc.

5.6.3.3 Protocols to assure a translator are available to support nursing or EMT responses to injuries or accidents.

<b>6.0 SUBSTANCE ABUSE PROGRAM</b>
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- 6.1 Contractor and all subcontractors performing Work at Site must have a substance abuse program. This program must apply to all personnel.
- 6.2 Minimum requirements shall include pre-hire testing, post accident testing for cause and when requested, random testing. Screening substances and their associated cut-off limits are listed below.

Drug Screening Classes	Screening Cut-Off Limit*** (ng/ml)	Confirmation Cut-Off Limit (ng/ml)
Amphetamines	500*	250*
Methamphetamines	500*	250**
MDMA	500*	250*
MDA		250*
MDEA		250*
Barbiturates	300	200
Benzoylcegonine (Cocaine Metabolite)	150*	100*
Cannabinoids (THC)****	50*	15*
Opiates	2000*	2000*
Codeine	2000	2000
Morphine	2000	2000
Oxycodone	100	100
Hydromorphone	300	300
Hydrocodone	300	300
6-Acetylmorphine	10	10
Phencyclidine (PCP)	25*	25*
Benzodiazepines	300	300
Methadone	300	300
Propoxyphene	300	300
Breath alcohol content	.040g/210L	.040g/210L

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- \* Cut-off limits established by the Department of Health and Human Services in their mandatory Guidelines for Federal Workplace Drug Testing Programs.
  - \*\* To be reported positive for methamphetamine, a specimen must also contain amphetamine at a concentration equal to or greater than 100ng/ml.
  - \*\*\* In no event will the cutoff limits set forth in this paragraph be less than the cutoff limits set forth in the Technical Guidelines adopted from time to time by the United States Department of Health and Human Services.
  - \*\*\*\* The Medical Review Officer will not accept assertions that a positive THC resulted from the use of hemp oil or the injection of hemp products, and therefore verify a marijuana test negative. Individuals should avoid use of such products.
- 6.3 Testing shall be performed by a testing facility certified by Department of Health & Human Services. The analytical method for a confirmatory drug test must combine chromatographic separation and mass spectrometric identification (i.e. GC/MS, CL/MS). Alcohol testing shall be performed only by certified Breathalyzer equipment (appearing on the Department of Health and Human Resources conforming product list) and trained breath alcohol technician. All positive breath alcohol tests shall be confirmed by an Evidentiary Breath Test that provides a print out.
- 6.4 Contractor's personnel must have evidence of having tested negative within a year prior to employment. Owner will accept conditional employment predicated upon (a) employee(s) furnishing evidence that they have submitted to testing within forty-eight (48) hours of initial employment and (b) employee(s) furnishing evidence of negative test results within five (5) workdays of initial employment. Contractor shall ensure personnel are "drug free". Owner reserves the right to examine evidence outlined herein. Contractor's program shall incorporate reciprocity on "drug free" employee verification to minimize Owner's economic impact and employee recertification while maintaining the program's intent.
- 6.5 Owner's reimbursement of the costs for testing shall be in accordance with the applicable Building Trades Council, Association or Craft program terms, whether based upon a per-hour contribution or unit price per test rate or at actual cost to Contractor, without additional markups, predicated upon Contractor's submittal of copies of the actual invoice(s) for the testing to Owner. Owner will recognize established area programs provided the aforementioned base line parameters are met.
- 6.6 For Work not covered by Paragraph 6.5 above, Owner will reimburse Contractor at its actual cost, without additional markups, predicated upon Contractor's submittal of copies of the actual invoice(s) for the testing to Owner.

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**7.0 ADDITIONAL HEALTH AND SAFETY REQUIREMENTS**

**7.1 Personal Protective Equipment**

Contractor shall provide Personal Protective Equipment to its employees appropriate for the hazards they may face. Contractor shall train employees in the proper use, care, inspection and function of the personal protective equipment. In addition Contractor shall comply with the following:

**7.1.1 Hearing Protection:** Contractor personnel shall wear hearing protection at all times while on site unless the requirement has been waived by Owner. Owner will communicate additional protection or administrative controls over and above standard (earplugs, muffs, etc.) protection required around Owner's operating equipment.

**7.1.1.1** Contractor shall identify noise levels to which their employees will be exposed and take appropriate action to reduce noise levels through the following priority of controls: (1) Engineering controls, (2) Administrative controls, and (3) Personal protective equipment.

**7.1.2 Footwear:** With the exception of site office buildings, Contractors personnel shall wear appropriate safety toed work boots which meet the requirements of ASTM F2412-05 and ASTM F2413-05. (See Attachment 6)

**7.1.3 Respiratory Protection:**

**7.1.3.1** Contractor personnel required to wear respiratory protection shall be medically qualified, have no facial hair which would impede the respirator sealing surface and function and be successfully fit tested.

**7.1.3.1.1** Owner's trace metal oxide respiratory protection requirements are defined in Attachment 8. Only filtering face piece respirators may be used on a voluntary basis (not OSHA required) and only in areas where there will not be an exposure above the Permissible Exposure Limits (PEL). Filtering face piece respirators include any fabric "dust mask" type respirators with filter efficiencies from 95 through 100.

**7.2 Industrial Hygiene Practices for Metals and Heavy Metals**

**7.2.1** Contractor shall take all appropriate measures to limit and control personal exposures to trace metal oxides such as but not limited to arsenic, lead, mercury, hexavalent chromium and cadmium in accordance with Owner's policies at a minimum. Contractor is responsible for personal hygiene sampling and providing copies of industrial hygiene test results to Owner. See Paragraph 7.1.3 for respiratory requirements.

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**7.2.2** Owner requires regulated areas for all work involving potential exposure to hexavalent chromium regardless of the type of work conducted (General Industry or Construction). Owner's competent person for hexavalent chromium shall be consulted regarding the appropriate size, location and demarcation of the regulated area.

**7.2.3** Effective 10-31-2011, work activities involving welding, cutting and brazing may require additional protection in the form of respiratory protection and ventilation in accordance with Owner's Welding, Cutting, and Brazing Policy (See Attachment 9).

### **7.3 Confined Space**

**7.3.1** All entries into confined spaces by Contractor's personnel shall be made in accordance with 29 CFR 1910.146. Contractor shall submit to Owner, prior to beginning Work in a confined space, a written program for the confined space entry.

**7.3.2** Prior to entry into the confined space, Contractor shall be briefed by Owner and complete Owner's confined space entry form (See Attachment 7). Contractor shall submit Owner's completed confined space entry form upon closure of the confined space.

### **7.4 Lead/Cadmium Based Paint**

**7.4.1** Structural steel and equipment throughout Owner's facilities may have been coated with lead/cadmium based materials including galvanizing. Contractor shall treat all surfaces as containing lead/cadmium unless tested otherwise by Owner prior to performing any grinding, welding, sanding, heating, sandblasting or similar activity.

**7.4.2** Contractor shall submit to Owner, prior to beginning Work, its written lead/cadmium compliance program.

**7.4.3** Contractor shall collect all removed lead/cadmium bearing paint and contaminated materials used for the removal of lead/cadmium bearing paint. These shall be placed in Owner-supplied containers and the proper generator labels applied for disposal by Owner.

**7.4.4** Contractors in some states may be required to have a Contractor's License for lead/cadmium paint removal and have its personnel and supervisors involved in the removal of lead/cadmium based paint certified. If certification is required by the state, proof of certification shall be made available to Owner. The costs associated with obtaining this licensing and worker/supervisor training shall be at Contractor's expense.



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## 7.5 Asbestos Containing Material

7.5.1 Asbestos-containing materials (ACM) may exist in the form of insulating products, siding, coatings, gaskets and similar materials throughout Owner's facilities. Contractor shall conduct ACM Awareness training in accordance with Paragraph 4.2.1.2 to notify employees of the possibility of asbestos on the job and the appropriate response (STOP and report it immediately) if presumed asbestos-containing material is encountered. Contractor shall use care and diligence in the execution of its Work to avoid the disturbance of or damage to asbestos-containing material not specifically identified as a part of the Work. This may include, but is not limited to, the installation of protective barriers, temporary platforms or any other means deemed necessary by Contractor to comply with this requirement. Contractor shall immediately notify Owner of any disturbance of or damage to asbestos-containing material, presumed asbestos-containing material (PACM) or unknown material. Contractor is responsible for ensuring that its personnel and the public are not exposed to ACM material due to Contractor's disturbance of or damage to the ACM.

7.5.2 Contractor personnel shall immediately report the observance of any ACM or PACM that is not intact to their supervision for immediate response.

## 7.6 Firearms, Alcohol, Drugs

7.6.1 Firearms, alcohol, illegal drugs (marijuana, cocaine, etc.) or drugs taken for non-medical purposes are prohibited on all Owner sites.

7.6.2 Contractor is responsible for ensuring its personnel who are under the care of a physician or are taking medication are capable of performing their Work safely.

## 7.7 Hazard Communication

7.7.1 Owner's Material Safety Data Sheets for generated products are located in Attachment 10 and include;

- Ammonia Solution Vapors -2012624
- Ammonium Sulfate Solution -3011517 -Mountaineer
- Coal Ash -2017706
- Flue Gas Desulfurization Gypsum -3007610
- Scrubber Cake -2020660 - Conesville
- Stabilized Scrubber By-Product -2017707 - Conesville Coal Prep.
- Urea Solution -3008618

Note: Contractor shall verify with Owner that these are the most current. Other non-Owner generated MSDS are available for Contractor review.

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**7.7.2** Contractor shall provide a list of the chemicals, materials and products that Contractor intends to bring on-site and the corresponding Material Safety Data Sheets (MSDS) for Owner's approval prior to delivery of the materials to Owner's site. The list and MSDS shall be kept up to date. Chemicals containing 1,1,1-Trichloroethane, methylene chloride, any confirmed human carcinogen, asbestos, lead, or mercury will not normally be approved

**7.7.2.1** Upon request, Contractor shall provide Owner with a detailed list containing the following information to enable compliance with 40 CFR 311-313:

- material name
- manufacturer
- container sizes
- total quantities
- approximate timeframes when chemicals, materials or products will be brought on-site.
- Bills of Lading

**7.7.3** Contractor shall evaluate the hazardous materials under its control and properly segregate incompatible materials. Hazardous materials shall be properly labeled in accordance with appropriate standards (e.g., NFPA or HMIS). Labels shall be weather resistant and utilize Ultraviolet-resistant materials.

## **7.8 Hazardous Materials Management**

**7.8.1** On the materials list required by Paragraph 7.7.2, Contractor shall identify the quantities and Intended use of any hazardous material to be brought on Owner's site; the types and quantities of hazardous wastes being generated from the Work; and Contractor's program for proper storing, handling and disposal of such materials in a safe and secure manner. All disposals of hazardous wastes shall be arranged through Owner.

**7.8.2** Contractor shall minimize the quantities of hazardous materials it intends to use and hazardous waste it expects to generate. Contractor shall keep Owner informed of all generated wastes and its disposal management practices.

**7.8.3** Contractor shall provide appropriate secondary containment for all liquid hazardous materials in containers 55 gallons or larger or in excess of their Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or Emergency Planning and Community Right to Know Act (EPCRA) reportable quantities, whichever is lower. Bulk storage of hazardous materials shall be provided with adequate weather protection. Damaged or leaking containers are unacceptable.

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**7.9 Tools**

- 7.9.1 When material needs to be cut in the work place, cutting tools other than a knife, i.e. wire cutters/strippers, side cutters, snips and other cutting tools shall be considered first. A safety utility knife with an automatic retracting blade or other means of blade protection would be the second selection. The use of a company issued pocket knife or non-safety utility knife is only permitted if a safety utility knife or other cutting tool cannot be used. In these cases, they can only be used in combination with wearing appropriate glove protection, as determined by the JSA.
- 7.9.2 No grinder shall be used with a switch which is capable of being locked in the "ON" position unless a hazard analysis determines it is safer.
- 7.9.3 Job site fabricated tools or tools with no Original Equipment Manufacturer shall be engineered for a specific task and approved by Owner prior to use.

**7.10 Lifting and Rigging**

- 7.10.1 Contractor at a minimum shall comply with Owner's Lifting and Rigging Policy and Procedure in Attachment 11.

**7.11 Safety and Health Audits**

- 7.11.1 Owner conducts random safety and health audits. Contractor shall cooperate fully with Owner's representative during a safety and health audit. A typical audit evaluation form is shown in Attachment 12.

8.0 REVIEW AND REVISION HISTORY			
DATE	REVISION #	COMMENTS	REVIEWER

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**ATTACHMENT 1- HEALTH AND SAFETY PLAN**

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## American Electric Power EP&FS and Fossil Hydro Generation Site Specific Health and Safety Plan (HASP)

(Contractor may use this form as a template for creating a HASP that provides the level of detail appropriate for the scope and complexity of the Work )

**Project Name** \_\_\_\_\_  
**Work Location** \_\_\_\_\_  
**Contract No.** \_\_\_\_\_  
**Projected Job Start Date** \_\_\_\_\_ **Finish Date** \_\_\_\_\_  
**Contractor Name** \_\_\_\_\_  
  
**Submitted By** \_\_\_\_\_ **Title** \_\_\_\_\_  
**Phone ( \_\_\_\_\_ )** \_\_\_\_\_ **Date** \_\_\_\_\_, 20\_\_  
  
**Reviewed By (AEP)** \_\_\_\_\_ **Date** \_\_\_\_\_, 20\_\_

### What is a HASP?

A Health and Safety Plan is a written description of the manner in which Contractor will manage the Work in order to ensure (1) the health and safety of all personnel involved in or affected by the Work, including but not limited to Contractor and Subcontractor employees, Owner employees, other contractors' employees, visitors, vendors, and the general public, and (2) the protection of the surrounding environment from potential impacts associated with the Work.

The following are key characteristics of a HASP:

- It reflects that Contractor has given sound and thoughtful consideration to the identification, analysis, and control of the hazards and impacts that could be expected during the Work.
- It covers the Work of Contractor and its subcontractors, agents, and representatives.
- It is specific to the environment in which Contractor will perform the Work, i.e., the work site, working conditions, work activities, etc.
- It is not a listing or description of Contractor's safety management systems, processes, policies, or procedures. Instead it is a description of how Contractor intends to apply its systems, processes, policies, and procedures to the specific characteristics of this particular Work.
- It recognizes that changes and unforeseen circumstances can occur during the course of Work. As such, revisions to the HASP require discussion and review with Owner
- It is submitted to Owner for review prior to Contractor being allowed to start Work.

**Note:** Contractor is required to prepare a HASP unless Owner has explicitly waived the requirement in writing.

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**A. SCOPE:** Provide an overview of the work to be performed and the sequence of the principle work activities.

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**B. HAZARD IDENTIFICATION:** For each principle work activity noted above, list the anticipated significant hazards and describe your strategy for mitigating them.

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**C. JOB HAZARD ANALYSIS (JHA):** Describe how you will develop and use JHA's including how you will determine the tasks that require development of JHA's, who will prepare and approve them, how they will be used by your employees, how job de-briefing information will be used to revise JHA's, and how you will measure the effectiveness of the JHA process.

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**D. HOUSEKEEPING:** Describe how you will maintain high housekeeping standards (safe access and walking and working surfaces, control and disposal of debris, etc.), including how you will measure the effectiveness of same.

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**E. EMPLOYEE TRAINING AND QUALIFICATION:** Describe the specific health and safety training and qualifications that individuals will need and how you will ensure they are trained and qualified before they perform work.

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**F. COMPETENT PERSONS:** Describe the activities that will require the use of a "competent person" or a "qualified person" as defined by OSHA, the names of the individuals you will designate to serve in these capacities and their training or qualifications, and how you will incorporate their involvement in planning and implementing these work activities

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**G. INDUSTRIAL HYGIENE:** Describe the activities that may potentially expose persons to health hazards and how you will control and monitor exposure (exposure standards, training, engineering and work practices, personal protective equipment, hygiene facilities, medical surveillance, record-keeping and notification, etc.).

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**II. HEALTH AND SAFETY AWARENESS;** Describe the process you will use to share timely information (job scope changes, JIA revisions, lessons learned, HASP, new requirements, etc.) among employees, Owner, and other contractors in order to reinforce Owner's expectations and maintain a high level of safety and health awareness at the site.

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**I. INCIDENT INVESTIGATION;** Describe the process you will use for reporting and analyzing injuries, illnesses, near misses, property damage, and other events including: preserving the scene and other evidence; timeliness; responsibilities and assignments; communicating with Owner; implementing, communicating, and sustaining corrective and preventive actions; and capturing and sharing lessons learned.

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**J. SUBCONTRACTOR(S);** List the Subcontractors you intend to use and describe how you will manage their safety and health performance, including ensuring their compliance with the Safety and Health Requirements and this HASP.

Subcontractor Names:

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**K. CHEMICAL CONTROL;** Describe how you will manage the introduction, use, and disposal of chemical products (solid, liquid, or gas) and the generation and disposal of hazardous and non-hazardous wastes. Describe how you will communicate about and control exposures to these hazards and eliminate their environmental impacts. Describe the process with which you will report the names, quantities and changes in inventory of chemicals brought on site to Owner.

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**L. ENVIRONMENTAL PROTECTION;** Describe how you will assess and control the environmental aspects of the work including fugitive dust control, groundwater protection, and stormwater protection. Describe your spill response plans and procedures.

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**M. EMERGENCY PLAN;** Describe how you will anticipate, prepare for, and respond to natural and human-caused emergencies (medical emergencies, fires, flooding, chemical spills, tornados, pandemic illness, etc.).

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N. **HASP IMPLEMENTATION**; Describe how you will ensure this plan is fully implemented from DAY ONE on site (ramp up and mobilization) and remains in use through the last day on site (ramp down and demobilization).

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**ATTACHMENT 2- JHA FORM (SAMPLE)**



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**ATTACHMENT 3-JSA FORM**

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**GENERATION CONTRACTORS JOB SAFETY ANALYSIS (JSA)**

Revision 4 2011

SUPERVISOR/FOREMAN: \_\_\_\_\_ WEATHER CONDITIONS: \_\_\_\_\_  
 DATE: \_\_\_\_\_ TIME: \_\_\_\_\_ PROJECT: \_\_\_\_\_ LOCATION: \_\_\_\_\_  
 JOB DESCRIPTION (DETAILED): \_\_\_\_\_

Contractor: \_\_\_\_\_ Have you visited your jobsite today to identify hazards? Yes  No

Review the following information carefully and check all items that apply to your work activity and review with your work crews!

<p><b>Permits</b></p> <input type="checkbox"/> Confined Space <input type="checkbox"/> Hot Work # _____ <input type="checkbox"/> Clearance Required <input type="checkbox"/> Yes <input type="checkbox"/> No Clearance # _____ <input type="checkbox"/> Clearance Accepted/Sign on complete <input type="checkbox"/> Grating Removal <input type="checkbox"/> Excavation <input type="checkbox"/> Other _____	<p><b>Fall Protection</b></p> <input type="checkbox"/> Daily PFAS Inspections <input type="checkbox"/> Proper Anchorage Point <input type="checkbox"/> Lifeline <input type="checkbox"/> Other _____	<p><b>General</b></p> <input type="checkbox"/> Flammables - Gases/Liquids <input type="checkbox"/> Combustibles <input type="checkbox"/> Asbestos-gaskets, roofing, insulation, expansion joints, floor tile, etc. <input type="checkbox"/> Lead-painted/coatings/metal leached <input type="checkbox"/> Arsenic <input type="checkbox"/> Hexavalent Chromium <input type="checkbox"/> Chemical (type): _____ <input type="checkbox"/> Explosive <input type="checkbox"/> Radiation/Nuclear Source <input type="checkbox"/> Struck By/Pinch Points <input type="checkbox"/> Snagging <input type="checkbox"/> Ergonomics <input type="checkbox"/> Visibility <input type="checkbox"/> Heat Stress <input type="checkbox"/> Informational Signs/Proper Barricade <input type="checkbox"/> Hole Covers <input type="checkbox"/> Slip/Trip Hazards <input type="checkbox"/> Proper Body Placement <input type="checkbox"/> Lifting Heavy or Awkward Objects (assess for learn or mechanical lifting)	<p><b>Human Performance</b></p> <input type="checkbox"/> Confusion/Mix Up Potentials - (labeling, lock-out tag-out, etc.) <input type="checkbox"/> First Time Evolution <input type="checkbox"/> Distractions <input type="checkbox"/> Lack of Experience/Apprentice <input type="checkbox"/> Work After Long Break <input type="checkbox"/> Nearby Work Activities																								
<p><b>Personal Protective Equipment</b></p> <input type="checkbox"/> Normal PPE - Hard Hat - Safety Glasses - Safety Toed Boots <input type="checkbox"/> FR Clothing/Arc Flash Protection <input type="checkbox"/> Gloves (type): _____ <input type="checkbox"/> Additional Foot Prot.: _____ <input type="checkbox"/> Face Shield _____ <input type="checkbox"/> Respirator (type): _____ <input type="checkbox"/> Hearing Protection (ear plugs/muffs) <input type="checkbox"/> Fall Protection <input type="checkbox"/> Seat Belts <input type="checkbox"/> Burning Goggles <input type="checkbox"/> Welding Sleeve <input type="checkbox"/> Welding Screen <input type="checkbox"/> Monogoggles (type): _____ <input type="checkbox"/> Mechanical Vibration <input type="checkbox"/> Other _____	<p><b>Excavations</b></p> <input type="checkbox"/> Properly Barricaded <input type="checkbox"/> Shoring/Stopping/Benching Required <input type="checkbox"/> Proper Access <input type="checkbox"/> Inspected by Competent Person <input type="checkbox"/> Other _____	<p><b>Welding</b></p> <input type="checkbox"/> Condition of Welding Leads <input type="checkbox"/> Combustibles <input type="checkbox"/> Grounding <input type="checkbox"/> Fire Blanket <input type="checkbox"/> Torch Flash Arresters Installed <input type="checkbox"/> Fire Watch <input type="checkbox"/> Other _____	<p><b>Tools</b></p> <input type="checkbox"/> Daily Inspection <input type="checkbox"/> Proper Tools for the Job <input type="checkbox"/> Proper Cutting Tool for the Job (non-retracting blade-type knives require cut resistant gloves) <input type="checkbox"/> Grinder Guards in Place <input type="checkbox"/> Grinder/Grinder Wheel Speed to Compatible																								
<p><b>Emergency Info/Equipment Location</b></p> <input type="checkbox"/> Fire Hose <input type="checkbox"/> Fire Extinguishers/Inspected <input type="checkbox"/> Safety Shower/Eye Wash Station <input type="checkbox"/> Evacuation Route/Reporting Area <input type="checkbox"/> MSDS Review <input type="checkbox"/> Emergency Phone Location <input type="checkbox"/> Emergency Phone # _____ <input type="checkbox"/> Portable Radio Required <input type="checkbox"/> Other _____	<p><b>Electrical</b></p> <input type="checkbox"/> GFCI Test <input type="checkbox"/> Extension Cord Inspections <input type="checkbox"/> Electrical Tool Inspected <input type="checkbox"/> Adequate Lighting	<p><b>Crane/Lifting Equipment</b></p> <input type="checkbox"/> Critical Lift <input type="checkbox"/> Crew/In-charge Hydraulic Crane <input type="checkbox"/> Pre-Use Inspection <input type="checkbox"/> Proper Maintenance <input type="checkbox"/> Oper./Oper. in Place <input type="checkbox"/> Communications/Signals <input type="checkbox"/> Outriggers Extended <input type="checkbox"/> Manual Lifting Equip. _____ <input type="checkbox"/> Proper Rigging Practices <input type="checkbox"/> Proper Barricades/Signage <input type="checkbox"/> Personnel Platform Prohibit Form <input type="checkbox"/> Overhead Hazards <input type="checkbox"/> Voltage _____ <input type="checkbox"/> Safe Working Distance _____ ft. (refer to electrical chart to the right & the control list below) <input type="checkbox"/> Controls to be used <input type="checkbox"/> Spotter <input type="checkbox"/> Warning Line <input type="checkbox"/> Audible Device <input type="checkbox"/> Other _____	<p><b>Safe Work Distances (ft.)</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Voltage AC (nominal kV)</th> <th>With controls</th> <th>Without controls</th> </tr> </thead> <tbody> <tr> <td>Up to 50</td> <td>10'</td> <td>20'</td> </tr> <tr> <td>&gt; 50 to 200</td> <td>16'</td> <td>30'</td> </tr> <tr> <td>&gt; 200 to 350</td> <td>20'</td> <td>35'</td> </tr> <tr> <td>&gt; 350 to 500</td> <td>26'</td> <td>42'</td> </tr> <tr> <td>&gt; 500 to 750</td> <td>36'</td> <td>52'</td> </tr> <tr> <td>&gt; 750 to 1,000</td> <td>45'</td> <td>60'</td> </tr> <tr> <td>Over 1,000</td> <td>As set by utility</td> <td></td> </tr> </tbody> </table>	Voltage AC (nominal kV)	With controls	Without controls	Up to 50	10'	20'	> 50 to 200	16'	30'	> 200 to 350	20'	35'	> 350 to 500	26'	42'	> 500 to 750	36'	52'	> 750 to 1,000	45'	60'	Over 1,000	As set by utility	
Voltage AC (nominal kV)	With controls	Without controls																									
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> 500 to 750	36'	52'																									
> 750 to 1,000	45'	60'																									
Over 1,000	As set by utility																										
<p><b>Plants and Animals</b></p> <input type="checkbox"/> Poison Ivy/Oak <input type="checkbox"/> Snakes, Animals, Insects, Birds <input type="checkbox"/> Other _____	<p><b>Environmental</b></p> <input type="checkbox"/> Air Emission - Dust, Toxic, etc. <input type="checkbox"/> Waste Generation - Proper Storage, Label, & Disposal <input type="checkbox"/> Spill/Release - Spill Kits, Plans, EIS's, Contain/Notify <input type="checkbox"/> Storm Water - Stabilize Soil, Maintenance Controls, SWP3 Plans <input type="checkbox"/> Clean Up Materials <input type="checkbox"/> Other _____	<p><b>Scaffolding/Ladders/Lifts</b></p> <input type="checkbox"/> Tagged/Inspected by Competent Person <input type="checkbox"/> Special Provisions _____ <input type="checkbox"/> Access Ladder/Inspected/Secured <input type="checkbox"/> Aerial Lift Pre-Use Inspection <input type="checkbox"/> Other _____	<p><b>Safe Travel Distances</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Voltage (nominal kV AC)</th> <th>Min. clearance distance (feet)</th> </tr> </thead> <tbody> <tr> <td>Up to 0.75</td> <td>4</td> </tr> <tr> <td>Over 0.75 to 80</td> <td>8</td> </tr> <tr> <td>Over 80 to 345</td> <td>12</td> </tr> <tr> <td>Over 345 to 750</td> <td>18</td> </tr> <tr> <td>Over 750 to 1,000</td> <td>22</td> </tr> <tr> <td>Over 1,000</td> <td>As set by utility</td> </tr> </tbody> </table>	Voltage (nominal kV AC)	Min. clearance distance (feet)	Up to 0.75	4	Over 0.75 to 80	8	Over 80 to 345	12	Over 345 to 750	18	Over 750 to 1,000	22	Over 1,000	As set by utility										
Voltage (nominal kV AC)	Min. clearance distance (feet)																										
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Over 0.75 to 80	8																										
Over 80 to 345	12																										
Over 345 to 750	18																										
Over 750 to 1,000	22																										
Over 1,000	As set by utility																										

**JOB SAFETY BRIEFING**

Step 1: Job Safety Briefing Checklist: (Below issues to be discussed with work crews daily)

- |   |   |
|---|---|
| <input type="checkbox"/> Hazards Identified<br><input type="checkbox"/> All possible hazards eliminated or mitigated<br><input type="checkbox"/> Risks from the remaining hazards are considered<br><input type="checkbox"/> STAR Card shall be filed out daily<br><input type="checkbox"/> Consider Human Performance Tools<br>- 2-Minute Rule - STAR - Peer Check | <input type="checkbox"/> Technical aspects of work discussed<br><input type="checkbox"/> Past work experience discussed<br><input type="checkbox"/> Is a JHA already on file for this work task?<br><input type="checkbox"/> Review JHA on back page with crew<br><input type="checkbox"/> Has a MELA review been conducted? (Most Error Likely Activity) |
|---|---|

If You are not Getting the Results From Your Work You were Expecting, if You are Unclear, or if Conditions, Job Scope, or Procedures Change



Contact Your Supervisor about Holding Another Job Briefing

033380211

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Step 2: Job Hazard Analysis	Identify Risks	Eliminate/Manage Risks
Sequence of Basic Job Steps	Potential Risks	Preventive Measures

Step 3: Reviewed by Next Level (PRIOR to beginning the work )	
Supervisor/Superintendent: _____	Date: _____
Foreman Signature (AFTER review completed) _____	Date: _____

Step 4: Work Crew: (Your signatures mean that you have participated in the JSA )			
PLEASE PRINT NAME	SIGNATURE	PLEASE PRINT NAME	SIGNATURE
1		11.	
2.		12.	
3		13.	
4		14	
5		15.	
6		16	
7.		17	
8		18.	
9		19.	
10		20	

Step 5: Reviewed by AEP: (Prior to or During the Work Shift.)	
Coordinator/Safety Supervisor: _____	Date: _____

**Post Job Safety Debriefing**  
 (Foreman discusses job with crew, conducts post job debriefing, and returns a copy to AEP Safety Coordinator)

1 Did job task go as planned?  Yes  No If no please explain \_\_\_\_\_

2 Would you perform work any differently if you had to do the task over?  Yes  No If yes please explain: \_\_\_\_\_

3 A. How was the Housekeeping at the end of the shift?  Acceptable  Unacceptable Please explain why below  
 B Potential Safety Hazards in the Work Area  Corrected  Uncorrected Please list potential hazards below


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Supervisor/Foreman Signature \_\_\_\_\_ Date \_\_\_\_/\_\_\_\_/\_\_\_\_ Time \_\_\_\_ am / pm

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**ATTACHMENT 4- JSA AUDIT FORM (SAMPLE)**

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<b>JSA AUDIT FORM</b>			
Post Incident <input type="checkbox"/>		Random <input type="checkbox"/>	
Contractor: Foreman: Job Location: Coordinator:			
Place a "1" in the "Yes" or "No" box out from each question.		<b>Yes</b>	<b>No</b>
1. Did the supervisor check off that he walked the work area down prior to filling out the JSA?			
2. Does the JSA reflect the assigned task? Are/ Were work activities, scope, and methods being performed limited to what is presented on the JSA?			
3. Are all <i>evident</i> hazards listed / covered on the JSA? (Side 1 - check boxes)			
4. Are all applicable permits in place pertaining to this JSA? (i.e. - Clearance, Confined Space, Grating Removal, Excavation, Hot Work, Overhead Power line, Scaffolding, etc...) <i>NOTE: If there are no permits required for the task which this JSA covers, mark this question "Yes"</i>			
5. In the Job Safety Briefing Section (bottom of side 1), Have all applicable boxes been checked? (JHA's, STAR cards being used, etc.)			
6. In the JHA section (top - side 2): Has the job tasks been clearly broken down into <i>basic</i> steps to complete the task?			
7. In the JHA section (top - side 2): Does each job step have potential risks listed in column 2?			
8. In the JHA section (top - side 2): Are preventive measures listed (in column 3) for each risk identified (in column 2)			
9. Did a next level supervisor sign off where required stating that they reviewed the JSA prior to work beginning?			
10. Did ALL the crew members sign off on the JSA after the Foreman's JSA review meeting?			
<b>TOTAL</b>		0	0
		#DIV/0!	
Overall Comments: List any corrective actions, areas for improvement, etc.		 60 / 90 Requires coaching the foreman and adjustments to existing JSA & crew made aware of changes/improvements	



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**ATTACHMENT 5- PS138A**

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- Near-Miss/Hazard Recognition
- Minor/First Aid
- Medical
- Illness

**Report of Generation Contractor Event**  
**Revision 7**  
**2/5/10**

**PS-138 A**

Facility/Plant \_\_\_\_\_ Contractor/Sub \_\_\_\_\_

- Outage    
  FGD    
  SCR    
  New Generation    
  Plant ARA/Maintenance

Date & Time of Accident: \_\_\_/\_\_\_/\_\_\_ :\_\_\_am \_\_\_pm Day of Week: \_\_\_\_\_ Shift  1<sup>st</sup>  2<sup>nd</sup>  3<sup>rd</sup>

Start Time: \_\_\_:\_\_\_am \_\_\_pm Work Schedule: \_\_\_\_\_ Consecutive Days Worked: \_\_\_\_\_

Employee Name: \_\_\_\_\_ Craft \_\_\_\_\_

- Classification:  Permit   
 Apprentice   
 Journeyman   
 Journeyman 10 yr +   
 Journeyman 20 yr +

Immediate Supervisor: \_\_\_\_\_ Date & Time Notified \_\_\_/\_\_\_/\_\_\_ :\_\_\_am \_\_\_pm

Location of Event \_\_\_\_\_

Time Worked on this Job Site: \_\_\_\_\_ Date Started with Company: \_\_\_/\_\_\_/\_\_\_

Describe What the Pre-Job Briefing Covered to Address the Hazard(s) that Resulted in this Injury: \_\_\_\_\_

Weather/Environmental Conditions: \_\_\_\_\_

Witness(es): \_\_\_\_\_

Describe the Event Fully: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**List the Main Causat Factors:**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Recommended Corrective or Preventative Measures:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Was Employee Drug Tested?  Yes  No Location: \_\_\_\_\_

Was this Injury (Check all that apply):  Task Related   
 Job Related   
 Unsafe Act   
 Unsafo Conditions  
 Did You Go to and Examine the Scene of the Accident?  Yes  No

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Did You Interview the Employee and Witnesses?  Yes  No  
 Where Were You at the Time of the Event? \_\_\_\_\_

Signature of Supervisor: \_\_\_\_\_

To be completed by Safety after completion of investigation:

**Type of Injury (Check all that apply):**

- |  |   |  |                                  |
|--|---|--|----------------------------------|
| <input type="checkbox"/> Abrasion                  | <input type="checkbox"/> Cut (Laceration) | <input type="checkbox"/> Fracture        | <input type="checkbox"/> Rash    |
| <input type="checkbox"/> Amputation                | <input type="checkbox"/> Dislocation      | <input type="checkbox"/> Foreign Object  | <input type="checkbox"/> Rupture |
| <input type="checkbox"/> Burn (Flash) _____ deg.   | <input type="checkbox"/> Electrical Shock | <input type="checkbox"/> Heat Exhaustion | <input type="checkbox"/>         |
| Strain/Sprain                                      | <input type="checkbox"/> Contusion        | <input type="checkbox"/> Puncture        | <input type="checkbox"/> Other   |
| <input type="checkbox"/> Burn (Thermal) _____ deg. |   |  |                                  |

**Injured Part of Body: (Check all injured parts)**

- |  |   |  |                                |                                 |
|--|---|--|--------------------------------|---------------------------------|
| L R  | L R   | L R  |                                |                                 |
| <input type="checkbox"/> <input type="checkbox"/> Eye        | <input type="checkbox"/> <input type="checkbox"/> Wrist | <input type="checkbox"/> <input type="checkbox"/> Calf   | <input type="checkbox"/> Head  | <input type="checkbox"/>        |
| <input type="checkbox"/> <input type="checkbox"/> Abdomen    | <input type="checkbox"/> <input type="checkbox"/> Hand  | <input type="checkbox"/> <input type="checkbox"/> Knee   | <input type="checkbox"/> Mouth | <input type="checkbox"/> Groin  |
| <input type="checkbox"/> <input type="checkbox"/> Collarbone | <input type="checkbox"/> <input type="checkbox"/> Thumb | <input type="checkbox"/> <input type="checkbox"/> Ankle  | <input type="checkbox"/> Teeth | <input type="checkbox"/> Finger |
| <input type="checkbox"/> <input type="checkbox"/> Shoulder   | <input type="checkbox"/> <input type="checkbox"/> Hip   | <input type="checkbox"/> <input type="checkbox"/> Foot   | <input type="checkbox"/> Neck  | <input type="checkbox"/> Toe    |
| <input type="checkbox"/> <input type="checkbox"/> Arm        | <input type="checkbox"/> <input type="checkbox"/> Leg   | <input type="checkbox"/> <input type="checkbox"/> Instep | <input type="checkbox"/> Nose  | <input type="checkbox"/> Chest  |
| <input type="checkbox"/> <input type="checkbox"/> Elbow      | <input type="checkbox"/> <input type="checkbox"/> Thigh | <input type="checkbox"/> <input type="checkbox"/> Ribs   | <input type="checkbox"/> Back  | <input type="checkbox"/> Other  |
| <input type="checkbox"/> <input type="checkbox"/> Forearm    |   |  |                                |                                 |

**Nature of Event: (Check all that apply)**

- |   |   |   |  |
|---|---|---|--|
| <input type="checkbox"/> Caught Between     | <input type="checkbox"/> Electrical Flash                     | <input type="checkbox"/> Fall (same level)          | <input type="checkbox"/> Slip/Trip       |
| <input type="checkbox"/> Caught In          | <input type="checkbox"/> Exposure (hot/cold)                  | <input type="checkbox"/> Fall (different level)     | <input type="checkbox"/> Stepped In Hole |
| <input type="checkbox"/> Caught On          | <input type="checkbox"/> Exposure to Caustic/<br>Cutting Edge | <input type="checkbox"/> Hot Surface                | <input type="checkbox"/> Struck Against  |
| Bite  | <input type="checkbox"/> Struck By                            | <input type="checkbox"/> Noxious/Allergic Substance | <input type="checkbox"/> Insect          |
| <input type="checkbox"/> Electrical Contact | <input type="checkbox"/> Falling Object                       | <input type="checkbox"/> Overexertion               | <input type="checkbox"/> Other           |

**Activities Being Performed: (Check All That Apply)**

- |  |   |   |  |
|--|---|---|--|
| <input type="checkbox"/> Asbestos Abatement    | <input type="checkbox"/> Intake Work              | <input type="checkbox"/> Steam Cleaning         | <input type="checkbox"/> Balancing work      |
| <input type="checkbox"/> Line Handling         | <input type="checkbox"/> Technical Work           | <input type="checkbox"/> Barge work             | <input type="checkbox"/> Machine Work        |
| <input type="checkbox"/> Turbine Work          | <input type="checkbox"/> Boiler feed pumps        | <input type="checkbox"/> Mechanical             | <input type="checkbox"/> Utility Work        |
| <input type="checkbox"/> Coal Handling         | <input type="checkbox"/> Motor Work               | <input type="checkbox"/> Conveyor Work          | <input type="checkbox"/> Non-Destructive     |
| Exam   | <input type="checkbox"/> Operations               | <input type="checkbox"/> Equipment operation    | <input type="checkbox"/> Pulverizer          |
| <input type="checkbox"/> Driving Practices     | <input type="checkbox"/> Rotor Work               | <input type="checkbox"/> Impeller Work          | <input type="checkbox"/> Sand Blasting       |
| <input type="checkbox"/> Generator Field work  |   |   |  |
| <input type="checkbox"/> Walking               | <input type="checkbox"/> Pushing/Pulling          | <input type="checkbox"/> Climbing up/down       | <input type="checkbox"/> Manual              |
| Lifting/handling                               | <input type="checkbox"/> Body Positioning         | <input type="checkbox"/> Hoisting/Rigging/Crane | <input type="checkbox"/> Mobile Equipment    |
| <input type="checkbox"/> Spotting/escorting    | <input type="checkbox"/> JLG/Elevated Platform    | <input type="checkbox"/> Scaffolding            | <input type="checkbox"/> Ladder/Stairway     |
| <input type="checkbox"/> Forklift              | <input type="checkbox"/> Confined Space Operation | <input type="checkbox"/> Clearance Issue        | <input type="checkbox"/> Working at Heights  |
| <input type="checkbox"/> Material Handling Eq. | <input type="checkbox"/> Welding/burning/grinding | <input type="checkbox"/> Housekeeping           | <input type="checkbox"/> Electrical Work     |
| <input type="checkbox"/> Excavation/Trenches   | <input type="checkbox"/> Truck Loading/Unloading  | <input type="checkbox"/> Cooling Tower          | <input type="checkbox"/> Stack Work          |
| <input type="checkbox"/> Lab/Chemical Use      | <input type="checkbox"/> Precipitator Work        | <input type="checkbox"/> Boiler Work            | <input type="checkbox"/> Grounds Work        |
| <input type="checkbox"/> Duct Work             | <input type="checkbox"/> Steel Work               | <input type="checkbox"/> Site Work              | <input type="checkbox"/> Landfill/carth Work |
| <input type="checkbox"/> Concrete Work         | <input type="checkbox"/> Roadway/Highway          | <input type="checkbox"/> Office/Paperwork       | <input type="checkbox"/> Demolition          |
| <input type="checkbox"/> Waterway/waterside    | <input type="checkbox"/> Job setup/breakdown      | <input type="checkbox"/> Lunch/Break/Personal   |  |
| <input type="checkbox"/> Startup               |   |   |  |

Did Work Activity Involve Use of:  Power Tools  Hand Tools  Cutting Tools

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Tool Name, Model, etc: \_\_\_\_\_ Proper Tool for the Job?  Yes  
 No


Used Properly?  Yes  No      Functioning Properly?  Yes  No      Damaged?  Yes  
 No

Compliance with Clearance Permit Procedure?  Yes  No  Further analysis needed

Was Employee Properly Trained for the Task?  Yes  No      Source of Training: \_\_\_\_\_

Date Lost Time Began: \_\_\_/\_\_\_/\_\_\_      Ended: \_\_\_/\_\_\_/\_\_\_

Date Restriction Began: \_\_\_/\_\_\_/\_\_\_      Ended: \_\_\_/\_\_\_/\_\_\_      Date Returned to Work Full Duty: \_\_\_/\_\_\_/\_\_\_

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**ATTACHMENT 6- FOOTWEAR**

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## FOOTWEAR REQUIREMENTS

Minimum requirements for appropriate footwear means ASTM F2412-05 and ASTM F2413-05 approved footwear with a compression rating of C75, with sturdy upper portions, a defined heel, hard and heat resistant sole, sufficient to protect an employee's feet from normal work hazards unless Owner agrees with Contractor's Job Hazard Analysis (JHA) which justifies otherwise.


Additional protection such as metatarsal guards, puncture resistant soles, etc. may be required based upon the job hazard assessment for certain work assignments or special environmental conditions.

The following footwear shall be prohibited except in office areas:

- Open-toed,
- Open-heeled,
- Athletic, and
- Tennis shoes.

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**ATTACHMENT 7- CONFINED SPACE ENTRY FORM**


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INFORMATION DATA: (To Be Filled Out For All Confined Space Entries)			
Date	Permit Number		
Location:			
Unit Number:	Clearance Permit Number:		
Hot Work Permit:	Digging Permit Number:		
Equipment:			
Work To Be Performed:			
Expected Duration: From:		To:	
CONTRACTORS			
Is This Permit For Contractor(s)? Yes <input type="checkbox"/> No <input type="checkbox"/> If "Yes", once the initial permit determination is made, review all hazards and precautions to take inside & outside the confined space as part of the Job Briefing.			
Representatives sign here after job briefing		Contractor Name	
AEP Contact		Contractor Supervisor	
AEP Signature:		Contractor Signature:	
Is Contractor(s) working in confined space with plant personnel?			Yes <input type="checkbox"/> No <input type="checkbox"/>
If Yes, coordinate entry with contractor.			
INITIAL PERMIT DETERMINATION: (To Be Filled Out For ALL Confined Space Entries)			
Atmospheric Monitor Serial No		Field Checked:	Yes <input type="checkbox"/>
Last Calibration Date		(Zero The Instrument In Uncontaminated Atmosphere)	
Time Readings Taken			
Oxygen (Acceptable 19.5% To 23.5%)		%	
% Flammable Accept <10% LFL		Airborne Dust	Yes <input type="checkbox"/> (>5 ft acceptable)
		>5 ft Visibility	No <input type="checkbox"/> (<5 ft hazardous)
TOXICS: The specific toxics monitored will depend upon the space, work or items brought into the space. Example CO, CO <sub>2</sub> , SO <sub>2</sub> , H <sub>2</sub> S, NH <sub>3</sub> , CL <sub>2</sub> , O <sub>3</sub> , Or Other Materials.			
* Carbon Monoxide (CO)	ppm	(Acceptable Less Than 35 ppm)	
* Hydrogen Sulfide (H <sub>2</sub> S)	ppm	(Acceptable Less Than 10 ppm)	
* Sulfur Dioxide (SO <sub>2</sub> )	ppm	(Acceptable Less Than 5 ppm)	
* Other: (Define)			
	ppm		ppm
	ppm		ppm
#1. Does the space contain an actual or potential atmospheric hazard?			Yes <input type="checkbox"/> No <input type="checkbox"/>
#2. Does the space have material that could engulf an entrant (coal, water, fly ash, etc)?			Yes <input type="checkbox"/> No <input type="checkbox"/>
#3. Does the space have an internal configuration that might cause entrapment (sloping)?			Yes <input type="checkbox"/> No <input type="checkbox"/>
#4. Does the space have Any Other Serious, Recognized/ Potential Hazards?			Yes <input type="checkbox"/> No <input type="checkbox"/>
Serious hazards include fall, heat/cold, falling material, unguarded equipment, release of hazardous energy, chemical contact, high noise, trip/slip. Serious Hazards must be eliminated (nullified) to consider reclassifying space. Controlled hazards (ex. Continuous forced air ventilation) still pose a potential and therefore are not considered for non-permit status.			
Read All Of The Following Statements.			
* If The Answer to all questions 1-4 is "No", then This is A <b>Non-Permit Required Space (CHECK BOX HERE)</b> Atmospheric Testing Must Be Performed At The Beginning Of Each New Shift And Documented On Form 1 <input type="checkbox"/>			
* If The Answer to question #1 is "Yes" and questions #2, #3 and #4 is "NO", Set Up Continuous Forced Air Ventilation And Go To The <b>Alternate-Procedure Section (CHECK BOX HERE)</b> <input type="checkbox"/>			
* If The Answer to either questions (#2, #3, or #4) is "Yes" go To The <b>Permit-Required Section (CHECK BOX)</b> , <input type="checkbox"/>			
IMPORTANT: If the <u>Only</u> Hazard is an Actual or Potential Hazardous Atmosphere and it can only be controlled by Continuous Forced Air Ventilation complete the Alternate-Procedure Entry Section Below			
SIGN BELOW, INFORM THE ENTRANTS OF THE STATUS OF THE SPACE AND POST AT THE ENTRANCE			
		Entry Supervisor Signature:	
		DATE	



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ALTERNATE - PROCEDURE CONFINED SPACE ENTRY DATA SECTION.					
Retest Atmosphere After Setting Up Continuous Ventilation					Date
Time:	Oxygen:	%	Flammability		%
Toxics:	Carbon Monoxide (CO)	ppm	Sulfur Dioxide (SO2)		ppm
	Hydrogen Sulfide (H2S)	ppm	Other: (Define)		ppm
#5 Did All Tests Pass (After setting up Continuous Forced Air Ventilation?)					Yes <input type="checkbox"/> No <input type="checkbox"/>
#6. Can Continuous Forced Air Ventilation Maintain The Space Safe For Entry?					Yes <input type="checkbox"/> No <input type="checkbox"/>
#7. Is the Only Hazard In The Space Is an Actual Or Potential Atmospheric Hazard.					Yes <input type="checkbox"/> No <input type="checkbox"/>
* If The Answer To #5, #6, and #7 is Yes then This Is An <b>Alternate-Procedure Entry (CHECK BOX HERE)</b>					<input type="checkbox"/>
Perform Atmospheric Monitoring Every Two Hours And Record The Results On Form 1-Additional Atmospheric Monitoring					
* If The Answer To either questions #5, #6, OR #7 is No, Then This Is A <b>Permit-Required Entry (CHECK BOX HERE)</b> Proceed With The Permit-Required Entry Section (see below)					<input type="checkbox"/>
*IF ANY CONDITIONS CHANGE WITHIN A SPACE, EVACUATE THE SPACE, CLOSE PERMIT AND REEVALUATE					
SIGN BELOW, INFORM THE ENTRANTS OF THE STATUS OF THE SPACE AND POST AT OR NEAR THE ENTRANCE					
			ENTRY SUPERVISOR SIGNATURE:		
			DATE:		
PERMIT-REQUIRED CONFINED SPACE ENTRY DATA:					
Date	Time Permit Issued	Expiration Date			
Install A Barricade And Hang Warning Signs. Post Permit At Site					
Perform Atmospheric Monitoring Continuously And Record The Results Every Two Hours On Form 1-Additional Monitoring					
Hazards In Space					
Name Of Entrants					
Name Of Entrants:					
Name Of Entrants:					
Name Of Entrants:					
Name Of Attendant:					
Rescue Services and Telephone Number:					
Rescue Equipment:					
Measures to Isolate Space:					
Communications:					
Personal Protective Equipment:					
			ENTRY SUPERVISOR SIGNATURE:		
			DATE:		
IMPORTANT: IF ANY CONDITIONS CHANGE WITHIN A SPACE, EVACUATE THE SPACE, CLOSE PERMIT AND REEVALUATE.					
PERMIT EXTENSIONS					
If The Permit Needs To Be Extended To Additional Shifts, Attach Form 2-Permit Extensions To Original Permit.					
Contractors Debrief					
Discuss with contractor all hazards encountered during entry					
List Hazards Encountered:					
Discuss with contractors all hazards they created during the entry					
List Hazards Created:					
Contractor Supervisor Signature:					
AEP Contact Signature:					
PERMIT CLOSURE					
Terminate entry and close permit when the work is completed or a condition not allowed under the permit arises					
Return permit to Safety & Health Supervisor					
Date:	Time:	Entry Supervisor Signature:			
Reason For Closure					

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FORM 1 - ADDITIONAL ATMOSPHERIC MDNITORING PERMIT NO. \_\_\_\_\_

**NON PERMIT READINGS SHALL BE TAKEN AT THE BEGINNING OF EACH NEW SHIFT**  
**ALTERNATE PERMIT READINGS SHALL BE TAKEN AT A MINIMUM EVERY TWO HOURS**  
**PERMIT REQUIRED READINGS SHALL BE TAKEN CONTINUOUSLY & RECORDED EVERY**

TWO HOURS

**IF READINGS FALL OUTSIDE SAFE LIMITS, EVACUATE THE SPACE IMMEDIATELY!**

Attach to original permit

LOCATION: \_\_\_\_\_


WORK TO BE PERFORMED: \_\_\_\_\_

DATE / TIME	MONITOR SERIAL NUMBER	OXYGEN % (19.5% - 23.5%)	FLAMMABILITY LIMIT (BELOW 10% LFL)	TDXC NAME	TOXIC % ( )	SIGNATURE

**FORM 2 - PERMIT EXTENSIONS**  
 LOCATION \_\_\_\_\_  
 Permit.

PERMIT NUMBER: \_\_\_\_\_  
**IMPORTANT: Attach to Original**

*A printed copy is UNCONTROLLED, current only for 24 hours from the date and time printed (Last printed 8/9/2011 9 11 AM)*


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THE ENTRY SUPERVISOR IS TO CERTIFY THE CONDITIONS IN THE SPACE HAVE NOT CHANGED AND RESCUE, COMMUNICATIONS AND OTHER EQUIPMENT ARE THE SAME AS LISTED ON THE ORIGINAL PERMIT.

DATE: _____ TIME: _____	ENTRANTS: _____
ENTRY SUPV. SIGNATURE: _____	ATTENDANT: _____
COMMENTS: _____	
.....	
DATE: _____ TIME: _____	ENTRANTS: _____
ENTRY SUPV. SIGNATURE: _____	ATTENDANT: _____
COMMENTS: _____	
.....	
DATE: _____ TIME: _____	ENTRANTS: _____
ENTRY SUPV. SIGNATURE: _____	ATTENDANT: _____
COMMENTS: _____	
.....	
DATE: _____ TIME: _____	ENTRANTS: _____
ENTRY SUPV. SIGNATURE: _____	ATTENDANT: _____
COMMENTS: _____	
.....	
DATE: _____ TIME: _____	ENTRANTS: _____
ENTRY SUPV. SIGNATURE: _____	ATTENDANT: _____
COMMENTS: _____	
.....	
DATE: _____ TIME: _____	ENTRANTS: _____
ENTRY SUPV. SIGNATURE: _____	ATTENDANT: _____
COMMENTS: _____	
.....	

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**ATTACHMENT 8- TRACE METAL OXIDE RESPIRATORY REQUIREMENTS**

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The following chart lists the most common acceptable respirators and their use concentrations.

Airborne Concentration	Required Respirator Type
10 x PEL or less	Half-face air-purifying respirator with P-100/HEPA filters
25 x PEL or less	Powered air-purifying respirator (PAPR) with loose-fitting hood or helmet equipped with P-100/HEPA filters.  PAPR with hood or helmet and tight fitting facepiece, unless manufacturer has test results with higher APF (then 1000).  Supplied-air respirator with a loose-fitting hood or helmet facepiece operated in the continuous-flow mode.
Airborne Concentration	Required Respirator Type
50 x PEL or less	Full facepiece air-purifying respirator equipped with P-100/HEPA filters, or a PAPR with a tight-fitting half mask equipped with P-100/HEPA filters, or a supplied-air respirator with a tight-fitting half mask operated in continuous-flow or pressure demand mode.
1000 x PEL or less	PAPR with a tight-fitting full facepiece equipped with P-100/HEPA filters or a supplied-air respirator with a tight-fitting full facepiece operated in the continuous-flow pressure demand or other positive pressure mode.
10,000 x PEL or unknown	Self-contained breathing apparatus with a full facepiece operated in the pressure-demand or other positive-pressure mode

If previous monitoring results are not available, and respirator requirements are not clear, an Industrial Hygienist or other Safety and Health professional can provide the necessary guidance.

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**ATTACHMENT 9 – WELDING, CUTTING AND BRAZING POLICY**

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**1.1** Effective October 31, 2011, Contractor's shall comply with the following whenever it is welding, cutting, brazing or other hot work. This policy has been developed to comply with OSHA standards 29 CFR 1910 Subpart Q and 29 CFR 1926 Subpart J, while also addressing specific welding fume constituents (metals) which may pose health hazards. Welding, cutting and brazing operations can produce airborne concentrations of various metals. The metals may originate from either the material that is being welded / cut or from the welding rods themselves. In addition to lead, hexavalent chromium and inorganic arsenic, the following metals may also be encountered while performing hot work. The presence of these materials may be determined by referring to the chemical composition of metals and welding electrodes:

- **Beryllium** - Found in some base and filler metals. Beryllium affects the respiratory and digestive systems and the heart.
- **Cadmium** - Present in certain coatings and metal alloys. Chronic overexposures can cause lung cancer and kidney damage. All work with potential cadmium exposure must be conducted in accordance with the AEP Cadmium Exposure Control Policy.
- **Chromium** – Tri-valent chromium is also common in many welding electrodes and is a major component of stainless steel and many paints. Some chromium compounds have been identified as carcinogens.
- **Cobalt** - Found in some welding electrodes. It affects the kidneys, liver, thyroid, blood, and lungs. It is also a known carcinogen.
- **Copper** - Common in welding rods. Acute exposures may cause eye irritation, upper respiratory tract irritation, and Metal Fume Fever. Chronic exposures can lead to lung, blood, liver and pancreas disorders.
- **Fluorides** – Brazing and gas welding fluxes can contain fluoride compounds. When heated, they can produce fumes that are irritating to the eyes, nose, and throat.
- **Nickel** - Found in many welding electrodes and as a component of stainless steel. Some nickel compounds are known to cause lung cancer. Nickel compounds also cause allergic reactions in some people.
- **Manganese** - Present in some metal alloys. Excessive inhalation can lead to manganese poisoning. Chronic exposure may lead to severe neurological problems similar to Parkinson's disease.
- **Mercury** – Mercury may, infrequently, be present in certain coatings. Exposure to mercury can cause respiratory irritation, kidney disorders, and neurological disorders.
- **Vanadium** - Present in some welding electrodes. Can affect the eyes and lungs.
- **Zinc** – Zinc is a common component of galvanized steel. It is also a common cause of Metal Fume Fever.

**1.2** The precautionary measures taken for the above metals are similar to lead, hexavalent chromium and arsenic exposure, and include protective clothing, hygiene, and respiratory protection. 29CFR 1910.252 (c) has specific ventilation and protective equipment requirements for lead, beryllium, cadmium, fluorides,

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mercury, and zinc. OSHA has not established a specific regulation for welding fumes; however, Permissible Exposure Limits (PEL) have been established for each individual constituent of welding fumes. Cadmium, Lead, and Chromium in the hexavalent state have specific AEP policies and OSHA regulations that shall be followed. The remaining metals do not have specific OSHA standards, but do have PEL's. Table 1 below provides a list of metals with OSHA PEL's, and the American Conference of Governmental Hygienists (ACGIH) Threshold Limit Value (TLV) for Manganese:

**Established Exposure Limits for Welding and Cutting Operations**

TABLE 1		
Weld Fume Profile	OSHA PEL	ACGIH TLV
	mg/m <sup>3</sup>	
Aluminum	15	
Beryllium	0.002	
Cadmium	0.005	
Chromium	0.5	
Cobalt	0.1	
Copper	0.1	
Iron	10	
Lead	0.05	
Manganese	5*	0.2
Molybdenum	15	
Nickel	1	
Titanium	15	
Vanadium	0.1	
Zinc	5	

NOTE: \*The PEL for Manganese is a ceiling limit, meaning that level can never be exceeded. All other values are Time Weighted Averages (TWA). The TLV for Manganese is based on the 2009 ACGIH TLV/BEI booklet. For Manganese, use the TLV of 0.2 mg/M3 instead of PEL for airborne concentration when determining required respirator type.


1.3 AEP has monitored employees performing welding and cutting operations to determine exposures to airborne metals listed in the Welding Fume profile. The following activities have the potential to expose employees above these limits:

- Shielded Metal Arc Welding (SMAW)
- Gas Metal Arc Welding (GMAW or MIG)
- Plasma Arc Welding (PAW)
- Plasma Arc Cutting (PAC)
- Air Carbon Arc Cutting (CAC-C or arc gouging/air arcing)
- Oxyfuel Gas Cutting (OFC or torch cutting)



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- Grinding and cutting on coated metals
- 1.4 Welding, cutting and brazing operations that have not shown the potential to expose employees above these limits include:
- Stud Welding (SW)
  - Spot Welding
  - Submerged Arc Welding (SAW or SubArc)
  - Robotic Welding
  - Brazing
  - Exothermic Welding
  - Soldering
  - Grinding on bare metals
  - Tungsten Inert Gas (GTAW or TIG)
- 1.5 Contractor shall designate a competent person(s) who will have the following qualifications and responsibilities whenever its employees are welding, cutting or brazing. No specific training is required for a competent person; however, they must have sufficient knowledge or resources to address the safety and health concerns for the job to which they are assigned and who has authority to take prompt corrective measures to eliminate them:
- 1.5.1 Has a basic knowledge of exposure limits and the principles of personal air monitoring.
- 1.5.2 Has a basic knowledge of the health effects associated with exposures to welding fumes, both acute and chronic.
- 1.5.3 Has a basic knowledge of respiratory protection, including Assigned Protection Factors (APF), various respirator types (i.e., half face, PAPRs, full face), proper filtration for welding and requirements that must be met to allow a worker to wear a respirator.
- 1.5.4 Has knowledge of the Personal Protective Equipment (PPE) requirements as they apply to welding practices, including protective clothing requirements.
- 1.5.5 Can determine proper Engineering and Administrative Control procedures as the first line of defense in protecting workers from hazardous exposures, as defined by OSHA. They include controls such as ventilation, substitution to a less hazardous chemical, isolation of the work, worker rotation and good work practices as methods of minimizing exposures.
- 1.5.6 Has a basic knowledge of local exhaust ventilation (LEV) and general dilution ventilation, including determining capture velocities for LEV and other engineering controls to minimize fume exposures.

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**t.5.7** Can determine when objective or historical air monitoring is available to establish or apply a Job-Specific Negative Exposure Assessment (NEA) with assistance from the local facility's Safety & Health Professional(s) and/or Industrial Hygiene representative. An acceptable (NEA) is one that demonstrates, with a high degree of certainty, that personal exposures are expected to be less than the exposure limit for a specific contaminant. This requires a minimum of 6-9 personal air samples to establish, and results must be less than 75% of the PEL. For jobs that are essentially the same between facilities, persons specifically approved by Owner's Corporate Industrial Hygiene may use data from other facilities to determine if data may be applied to the assigned task for establishing job-specific NEAs. All NEA's submitted by Contractor for Owner approval shall include the following information:

**1.5.7.1** Description of task/work area.

**1.5.7.2** The types of metals and rods used during welding including quantity, concentration of contaminant of interest, etc.

**1.5.7.3** Training and experience of worker(s) performing task.

**1.5.7.4** Other work going on in the area that may affect exposure (# of others doing work producing same contaminant, etc.).


**1.5.7.5** Work conditions that may affect exposure (draft, work location, weather).

**1.5.7.6** Personal air sampling results collected in breathing zone (including all info. on sample sheet).

**1.5.8** Can determine when sufficient air monitoring has been performed to deregulate a regulated area with assistance from Owner's Safety & Health Professional(s) and/or Industrial Hygiene representative.

**1.6** Contractor's employees who will perform welding, cutting, and/or brazing as part of their job duties must be properly trained and qualified to perform this work. Training shall include welding exposure hazards.

**1.7** Prior to beginning work Contractor shall develop a list of all cutting, welding and brazing activities that are part of its work. Contractor shall perform an exposure assessment for each item on this list. This is accomplished by using any combination of historical and/or objective personal air sampling data, and/or initial personal air monitoring to determine the necessity for engineering controls, administrative/work practice controls, and/or respiratory protection. If, historical and/or objective air monitoring is not sufficient to characterize exposures,


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Contractor shall perform representative personal air monitoring to determine employee exposure to metals listed in Table 1 found in Paragraph 1.2. Air monitoring shall be representative of each task that will be performed, and shall be designed to measure the time of greatest exposure. Controls shall be adjusted based on the sampling collected.

- 1.7.1 Contractor shall verify with Owner's Safety & Health Professional(s) and/or Industrial Hygiene representative if Contractor's suggested controls and/or respiratory protection is acceptable for each of the work activities.
- 1.7.2 Contractor shall validate the selected controls being used by taking personal air sampling to ensure employee exposure levels are below acceptable levels.
- 1.7.3 If initial, representative, full shift (at least 7-hours), personal air sampling indicates exposure to the metals listed in Table 1 found in Paragraph 1.2 are at or above the limits listed, Contractor's employees shall use appropriate personal protective equipment. After controls are adjusted (e.g. change to ventilation system, substitution, process change, etc.), personal air sampling must be repeated to verify exposures are below the listed limits. Controls shall be maintained to ensure continued negative exposure. PPE levels shall be adjusted to match the level of exposure.

1.8 If a negative employee exposure is determined a written record shall be maintained by Contractor which includes the following. All air sampling worksheets, laboratory results and associated paperwork shall be maintained and available for review upon Owner's request:

- The type of welding being performed.
- The position of the welder.
- The type of ventilation used, velocity of air, etc.
- The base metal being welded.
- The type of rod being used.
- The diameter of the rod or wire used.
- Duration.
- Work Area Size.
- Coatings on the welding surface.

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**1.9** All welding and cutting operations by Contractor at Owner's facilities shall be adequately ventilated to prevent the accumulation of metal fumes, unless it can be demonstrated that such controls are not feasible. Local exhaust ventilation (vacuum systems, hoods, paint spray booths, fume extractors, etc.) are the preferred method for controlling metals fumes. Freely movable hoods intended to be placed by the welder as near as practicable to the work being welded and provided with a rate of air-flow sufficient to maintain a velocity in the direction of the hood of 100 linear feet (30 meters) per minute in the zone of welding when the hood is at its most remote distance from the point of welding. The rates of ventilation required to accomplish this control velocity using a 3-inch (7.6 cm) wide flanged suction opening are shown in the following table:

Welding Zone	Minimum air flow <sup>(1)</sup> CFM	Duct diameter inches <sup>(2)</sup>
4 to 6 inches from arc or torch	150	3
6 to 8 inches from arc or torch	275	3 1/2
8 to 10 inches from arc or torch	425	4 1/2
10 to 12 inches from arc or torch	600	5 1/2


Footnote <sup>(1)</sup> When brazing with cadmium bearing materials or when cutting on such materials increased rates of ventilation may be required.

Footnote <sup>(2)</sup> Nearest half-inch duct diameter based on 4,000 feet per minute velocity in pipe.


- 1.9.1** Contractor shall verify the effectiveness of its ventilation by air sample analysis.
- 1.9.2** Contractor shall use automated welding processes wherever practical.
- 1.9.3** Whenever Contractor has set up an on-site welding shop, Contractor shall measure the ventilation system air flow before initial use, and then when any changes in flow are noted, and at least annually to determine if the air flow is adequate.
- 1.10** Contractor shall use the following administrative controls for all cutting, welding and brazing it performs:
  - 1.10.1** Welding cutting methods that generate the least amount of metal fumes (e.g. plasma cutting vs. air-arc, TIG vs. SMAW).
  - 1.10.2** At the design level, non-metallic materials shall be used in preference to materials that require welding, provided they do not create additional hazards.

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- 1.10.3 TIG should be the preferred welding method wherever practical due to its having been established as a welding process that produces low levels of metal fumes.
- 1.10.4 Air arcing has been determined to be a high metal fume cutting process. Air-arcing should be used only when alternatives are not practical. Air-arcing (arc-gouging) of any metal requires, at a minimum, a respirator type that will protect at the airborne concentration of 25 times the PEL.
- 1.10.5 All personnel in close proximity to welding and cutting operations shall meet the training requirements of this policy.
- 1.11 For tasks that can be completed in 2 hours or less (*applies to the entire length of the job, not only time that hot work is being performed*), Contractor is exempted from the respiratory protection requirements, if the following criteria are met:
  - 1.11.1 The task does not involve air-arcing.
  - 1.11.2 No additional exposures to welding fumes during the same workday.
  - 1.11.3 Task does not involve metals/materials that are regulated by OSHA standards or this policy.
  - 1.11.4 The exemption is limited to minor maintenance jobs.
- 1.11.5 Ventilation requirements still apply

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**ATTACHMENT 10 - MSDS**

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American Electric Power Service Corporation  
 1 Riverside Plaza  
 Columbus, Ohio 43215-2373

**AMERICAN ELECTRIC POWER SERVICE CORPORATION**  
**MATERIAL SAFETY DATA SHEET FOR**  
**Ammonia Solution Vapors**  
 From Urea in AOD and U2A Systems

Revised 12/1/2009

**WARNING: DO NOT ALLOW THIS PRODUCT OR THE CONDENSED LIQUIDS FROM THIS PRODUCT.**

- 1 TO GET INTO THE EYES.
- 2 TO REMAIN ON THE SKIN
3. TO BE INHALED (BREATHED IN CONCENTRATIONS GREATER THAN THE OSHA PEL)
- 4 TO GET INTO THE MOUTH OR TO BE SWALLOWED.

**I. MANUFACTURER**

<b>A</b>	Manufacturer: AEP Plants using Selective Catalytic Reduction (SCR) systems equipped with Ammonia On Demand (AGD) or Urea to Ammonia (U2A) systems.	<b>B</b>	For more information contact: American Electric Power Service Corporation 1 Riverside Plaza Columbus, Ohio 43215 (614) 716-2421
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**II. HAZARDOUS CONSTITUENTS (As determined by 29 CFR 1910.1200 (f) (2) (i) (C) (1))**

CONSTITUENTS	APPROXIMATE CONCENTRATION RANGE
Ammonia	15.3wt% +/- 20%
Carbon Dioxide	19.7wt% +/- 20%
Water Vapor	65wt% +/- 20%

**III. OSHA PERMISSIBLE EXPOSURE LIMITS (PEL) AND ACGIH THRESHOLD LIMIT VALUES (TLV)**

CONSTITUENTS	ACGIH 2000 (PPM) Note 1	OSHA (PPM) Note 2	IDLH (PPM) Note 3
Ammonia	25 TLV 35 ST	50 PEL	300
Carbon Dioxide	5000 TLV	5000 PEL	40,000
Water Vapor	N/A	N/A	N/A

Note 1: This is the ACGIH adopted value for 2000.  
 Note 2: See OSHA 29 CFR 1910.1000 Table Z-1-A, Z3

Note 3: See NIOSH Pocket Guide to Chemical Hazards 2000

**IV. PHYSICAL CHARACTERISTICS AND DATA**

Ammonia solutions in AGD or U2A systems are manufactured from urea solutions using steam. The resulting pressurized vapors present in piping or valves may be up to 400 psig with temperatures of up to 350 F. The vapor and condensed product is an alkali with high pH values in the range of 12 to 14. The material is caustic to skin, mucus membranes, lung tissue and equipment. Do not handle material. The vapors have a very pungent, distinct odor of ammonia. Avoid breathing vapors from releases. Proper precautions should be taken prior to opening valves and breaking lines.

**V. FIRE AND EXPLOSION HAZARD INFORMATION**

Ammonia increases the fire hazard potential of other combustible materials, including oil. Ammonia vapor in the range of 16 - 25 % in air can explode on contact with an ignition source. Use water spray as a fire-fighting medium. Wear self-contained breathing apparatus and proper personal

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protective clothing Thermal decomposition products may be toxic

#### VI. HEALTH HAZARD INFORMATION

The primary routes of entry are through the respiratory system (inhalation), eyes and skin. Material is a severe irritant upon inhalation and may cause pneumonitis or pulmonary edema. Contact with skin, eyes or mucus membranes causes severe burns. May be fatal if inhaled or ingested. Increased temperature of vapor will increase hazard and effects of exposure.

Exposure may result in aggravation of existing lung disease (asthma, bronchitis, emphysema, etc.) and chronic nose, sinus or throat conditions.

##### EMERGENCY AND FIRST AID PROCEDURES:

In case of

1. Eye contact - Immediately flush eyes thoroughly with large amounts water and obtain medical assistance.
2. Skin contact - Immediately rinse skin with water if irritation occurs.
3. Inhalation - Immediately remove affected person(s) to fresh air. If not breathing give artificial respiration.
4. Oral intake - Immediately rinse mouth out with water obtain medical attention.

Immediately contact physician or medical personnel if unusual coughing, tightness in chest, or shortness of breath occurs after exposure or if skin or eye irritation persists. Do not induce vomiting if the material is ingested, obtain immediate medical attention. This material is not listed by IARC, NTP, or OSHA as a cancer-causing agent.

#### VII. REACTIVITY INFORMATION

This product is stable, hazardous polymerization will not occur. Do not mix with strong oxidizers, halogens, dimethylsulfate, acrolein, silver compounds, hypochlorites, bleach or sodium hydroxide. Avoid contact with mercury. Do not use copper, brass, zinc, galvanized metals or other similar metal components in piping or valves.

#### 8.1.1 VIII. SPILL OR LEAK PROCEDURE

Evacuate the area of unnecessary personnel. Remain up wind of the spill or leak. Wear suitable protective clothing. Eliminate any ignition sources until area is deemed free of explosive levels of this product. Contain the leak and eliminate the source if this can be accomplished with out risk. Washing with water will remove condensed material. Small amounts of material may be washed to drains leading to treatment facilities. Large spills, which might affect pH levels in treatment facilities, should be reported to the local environmental officer. See applicable Federal, State, and Local Regulations for reporting requirements.

#### IX. SPECIAL PROTECTION INFORMATION

Wear appropriate personal protective equipment, such as a NIOSH approved full-face respirator with ammonia cartridges or canisters for ammonia gas. At concentrations greater than 300 PPM, (NIOSH Pocket Guide), use a full-face supplied air or self-contained breathing apparatus. Appropriate eye protection such as chemical goggles should be used if face is not covered with respirator. Do not use contact lenses. For routine handling of the material wear a rubber apron, impervious protective clothing and caustic resistant boots. For leaks, spills or other emergencies use full protective clothing. Provide safety showers and eye wash facilities at sites of handling or storage.

#### X. SPECIAL PRECAUTIONS

Industrial hygiene surveys of worker exposure in specific operations are needed to determine the need for engineering controls, respiratory protection equipment, and other measures. Under certain conditions, such as handling in confined areas without adequate ventilation, levels may exceed OSHA permissible exposure levels and require personal protective equipment.

#### XI. LABELING

This is a process chemical and labeling will not normally be necessary. Condensed samples for lab or other use should be labeled. Ammonia Solution. Caustic and contain the necessary NFPA hazard warnings for Health: 3, Flammability: 1, Reactivity: 0. For further information contact: American Electric Power Service Corporation

1 Riverside Plaza  
Columbus, Ohio 43215  
(614) 716-2421



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American Electric Power Service Corporation  
 1 Riverside Plaza  
 Columbus, Ohio 43215-2373


**AMERICAN ELECTRIC POWER SERVICE CORPORATION**  
**MATERIAL SAFETY DATA SHEET FOR**  
 Ammonium Sulfate Solution

Issue Date: 1/28/2009  
 NFPA Health 2  
 Flammability 0  
 Reactivity 0

**WARNING : DO NOT ALLOW THIS PRODUCT:**

1. TO GET INTO THE EYES. 2. TO REMAIN ON THE SKIN IF IRRITATION OCCURS. 3. TO BE INHALED (BREATHED IN)
4. TO GET INTO THE MOUTH OR TO BE SWALLOWED.

<b>I. MANUFACTURER</b>		
<b>A. Manufacturer</b>  AEP system coal fired steam electric generating plants – from Carbon Capture Process	<b>B. For more information contact:</b> American Electric Power Service Corporation 1 Riverside Plaza Columbus, Ohio 43215 (614) 324-6824	
<b>II. HAZARDOUS CONSTITUENTS ( as determined by 29 CFR 1910.1200 (f) (2) (i) (C) (1) )</b>		
	APPROXIMATE CONCENTRATION RANGE	CAS#
Ammonium Sulfate	5 – 25%	7783-20-3
<b>III. OSHA PERMISSIBLE EXPOSURE LIMITS (PEL) AND ACGIH THRESHOLD LIMIT VALUES (TLV)</b>		
CONSTITUENTS	ACGIH TLV	OSHA PEL
Ammonium Sulfate	Not Established	Not Established
<b>IV. PHYSICAL AND CHEMICAL CHARACTERISTICS AND DATA</b>		
Ammonium Sulfate is a by-product of the Carbon Capture Process. The ammonium sulfate solution contains 75-95% water.		
Physical Form: Liquid		
Odor: Ammonia odor		
pH: 3.0 – 6.0 depending on exact concentration of Ammonium Sulfate in the solution		
Specific Gravity: 1.15 – 1.25 depending on exact concentration of Ammonium Sulfate in the solution		
Solubility in water: Complete		
Stability: Stable. Temperatures greater than 250 degrees Fahrenheit will cause decomposition with release of ammonia and sulfur trioxide		
Incompatibilities: Strong oxidizing agents, strong alkalis, strong acids, chlorates and nitrates. May be corrosive to metals.		

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<p><b>V. FIRE AND EXPLOSION HAZARD INFORMATION</b>  Flash Point: Not Applicable</p> <p>Flammable Limits – Lower : Not Applicable                      Upper: Not Applicable</p> <p>Extinguishing Media Use water foam, fog, CO2, or dry chemical</p> <p>Unusual fire and/or explosive hazards: When heated to decomposition, hydrogen cyanide, carbon monoxide, sulfur trioxide and ammonia may be emitted Explosion hazard if mixed with Potassium or Potassium containing oxidizers during a fire. Direct contact with Chlorine or Chlorine Dioxide may present an explosion risk</p> <p>Precautions and Protection: Fire fighters should wear full protective clothing and NIOSH approved self-containing breathing apparatus when this material is involved in a fire</p>
<p><b>VI. HEALTH HAZARD AND FIRST AID INFORMATION</b></p> <p>Inhalation: Should not present a significant inhalation hazard when used under ambient conditions. However, it may cause nose and throat irritation if inhaled as a vapor or mist</p> <p>Ingestion: May cause oral and gastrointestinal irritation. Local tissue damage, nausea, vomiting, diarrhea and gastrointestinal bleeding may occur. Large amounts may cause serious injury.</p> <p>Not listed as a carcinogen by NTP, IARC or DSIIA.</p> <p><b>EMERGENCY AND FIRST AID PROCEDURES:</b></p> <p>In case of:</p> <ol style="list-style-type: none"> <li>1. Eye contact - Immediately flush eyes immediately with large amounts of water for at least 15 minutes. Get medical attention</li> <li>2. Skin contact - Immediately wash skin with large amounts of soap and water. Remove contaminated clothing and wash before reuse. If irritation develops, get medical attention</li> <li>3. Inhalation - Immediately remove affected person(s) to fresh air. If discomfort persists, get medical attention.</li> <li>4. Oral intake - Drink large quantities of water. Do not induce vomiting. Never give fluids or induce vomiting if the victim is unconscious or having convulsions. Get medical attention</li> </ol>
<p><b>VII. REACTIVITY INFORMATION</b></p> <p>This product is stable at normal temperatures. Heating this product to temperatures above 250 degrees Fahrenheit will cause decomposition into hazardous chemicals (See Section V)</p>
<p><b>VIII. SPILL OR LEAK PROCEDURE</b></p> <p>In the event of a release, precautions should be taken to prevent entry into sewers or other bodies of water. See applicable Federal, State, and Local Regulations</p>
<p><b>IX. SPECIAL PROTECTION INFORMATION</b></p> <p>Eyes: Chemical goggles if splashing hazard exists.</p> <p>Skin: Rubber gloves and boots as necessary to minimize contact.</p> <p>Inhalation: None normally required. For prolonged or excessive exposure to heated chemical or mist, a full face chemical respirator with appropriate vapor/dust and chemical cartridge is recommended.</p>
<p><b>X. ADDITIONAL INFORMATION</b></p> <p>This by-product is intended to be used as a fertilizer. Contact the manufacturer if the by-product is to be used in any other manner.</p>
<p><b>XI. ENVIRONMENTAL INFORMATION</b></p> <p>Ammonium Sulfate is not listed as a RCRA waste</p> <p>This product may be subject to SARA 311/312 reporting requirements. Ammonium Sulfate, under the ammonia qualifier for aqueous ammonia, may be subject to the Emergency Planning and Community Right-to-Know (EPCRA) section 313 for toxic chemicals, as defined in 40 CFR Part 372</p>
<p><b>XII. LABELING AND SHIPPING INFORMATION</b></p>

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DOT Proper shipping name: Liquid Ammonium Sulfate

Hazard Class Not Regulated

UN/NA Number: None

Packing Group: None

DOT Label: None

DOT Placard : None required

In the event of a transportation accident, contact CHEMTREC at (800) 424-9300

For further information contact:

American Electric Power Service Corporation  
1 Riverside Plaza  
Columbus, Ohio 43215  
(614) 324-6824

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**AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 MATERIAL SAFETY DATA SHEET FOR  
 COAL ASH (Fly Ash, Cenospheres, Bottom Ash, and Boiler Slag)**

Revised 11/19/04

**WARNING : DO NOT ALLOW THIS PRODUCT OR THE DUSTS FROM THIS PRODUCT:**  
 1. TO GET INTO THE EYES 2. TO REMAIN ON THE SKIN IF IRRITATION OCCURS 3. TO BE INHALED (BREATHED IN)  
 4. TO GET INTO THE MOUTH OR TO BE SWALLOWED

**I. MANUFACTURER**

**A. Manufacturer:**

AEP system coal fired steam electric generating plants

**B. For more information contact:**

American Electric Power Service Corporation  
 1 Riverside Plaza  
 Columbus, Ohio 43215  
 (614) 324-6824

**II. HAZARDOUS CONSTITUENTS ( as determined by 29 CFR 1910.1200 (g) (2) (i) (C) (1) )**

	APPROXIMATE CONCENTRATION RANGE		APPROXIMATE CONCENTRATION RANGE
Amorphous Silica compounds reported as Si	12.6% - 30.4%	Titanium compounds reported as Ti	0.6% - 1.5%
Crystalline Silica (SiO <sub>2</sub> )	<0.1% - 5%	Calcium compounds reported as Ca	0.2% - 18.6%
Aluminum compounds reported as Al	7.9% - 17.5%	Magnesium compounds reported as Mg	0.3% - 3.6%
Iron compounds reported as Fe	1.4% - 29.4%	Sodium compounds reported as Na	0.07% - 1.5%
		Potassium compounds reported as K	0.2% - 3.3%
		Sulfur compounds reported as S	<0.04% - 6.8%
		Phosphorus compounds reported as P	<0.04% - 0.9%

NOTE: See Part VI regarding trace elements

**III. OSHA PERMISSIBLE EXPOSURE LIMITS (PEL) AND ACGIH THRESHOLD LIMIT VALUES (TLV)**

CONSTITUENTS	ACGIH TLV 1990-91 (mg/M <sup>3</sup> )	OSHA PEL (mg/M <sup>3</sup> )	CONSTITUENTS	ACGIH TLV 1990-91 (mg/M <sup>3</sup> )	OSHA PEL (mg/M <sup>3</sup> )
<b>Silica (SiO<sub>2</sub>)</b>					
A. Quartz	0.1 (Note 1)	0.1 (Note 2)	Aluminum compounds reported as Al	10	15
B. Cristobalite	0.05 (Note 1)	0.05 (Note 2)	Iron compounds reported as Fe	5	10
C. Tridymite	0.05 (Note 1)	0.05 (Note 2)	Titanium compounds reported as Ti	10	10
D. Amorphous	10	6.0 (Note 2)	Calcium compounds reported as Ca	2	5
			Magnesium compounds reported as Mg	10	10
			Arsenic compounds reported as As	0.2	0.01
			Sodium compounds reported as Na	(Note 4)	(Note 3)
			Potassium compounds reported as K	(Note 4)	(Note 3)
			Sulfur compounds reported as S	(Note 4)	(Note 3)
			Phosphorus compounds reported as P	(Note 4)	(Note 3)

Note 1: This is the ACGIH adopted value for 1990-91  
 Note 2: See OSHA 29 CFR 1910.1000 Table Z-1-A, Z3

Note 3: The PEL for this constituent does not currently exist.  
 Note 4: The TLV for this constituent does not currently exist

**IV. PHYSICAL CHARACTERISTICS AND DATA**

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**A. Fly Ash/Cenospheres**

Fly ash consists principally of minute, separate glass spheres together with some crystalline matter and varying amounts of unburned carbon. It ranges in color from light tan or light gray to almost black depending on the proportions of carbon and iron. The glass spheres vary in size from approximately 0.001 mm (medium silt) to 0.4 mm (fine sand), or 1 to 400 microns.

**B. Bottom Ash**

Bottom ash is a granular material with about the same upper and lower particle size limits as fine concrete aggregate (concrete sand). The basic particle shape of bottom ash is angular. It ranges in color from a medium brown or medium gray to almost black.

**C. Boiler Slag**

Boiler slag is also granular and angular with almost the same particle size limits as bottom ash. It is a uniform shiny, black color and resembles crushed coal or black glass.

**D. General**

Fly ash, bottom ash, and boiler slag are comprised of the constituents listed in Section II. The majority of these constituents are fused together in a glassy matrix.

All three ashes are moderately soluble in water and have a specific gravity range of approximately 2-3.

Boiling point, vapor pressure, vapor density, percent volatile, and evaporation rate are not applicable to these solid materials.

**V. FIRE AND EXPLOSION HAZARD INFORMATION**

Fly ash, bottom ash, and boiler slag are nonflammable and non-explosive. Flash point, flammable limits, extinguishing media, special fire fighting procedures, and unusual fire and explosion hazards are not applicable to these materials.

**VI. HEALTH HAZARD INFORMATION**

The primary routes of entry are through the respiratory system (inhalation), eyes and skin. Fly ash, bottom ash, and boiler slag are primarily composed of inert dust (irritants to mucous membranes) with low concentrations of calcium oxide (an irritant to mucous membranes and wet skin) and crystalline silica (a pneumoconiosis-producing dust identified by IARC as a carcinogen based on laboratory animal data). Coal ash contains other constituents, including some metals, in trace quantities. When fly ash is handled in confined areas without adequate ventilation, the OSHA PEL may be exceeded for arsenic which is an OSHA-designated carcinogen.

Exposure may result in irritation to eyes, skin, or the respiratory tract. Persistent exposure to airborne dust may decrease pulmonary functions.

**EMERGENCY AND FIRST AID PROCEDURES:**

In case of:

1. Eye contact - Immediately flush eyes thoroughly with water.
2. Skin contact - Immediately wash skin with soap and water if irritation occurs.
3. Inhalation - Immediately remove affected person(s) to fresh air from source.
4. Oral intake - Rinse mouth out with water.

Immediately contact physician or medical personnel if unusual coughing, tightness in chest, or shortness of breath occurs after exposure or if skin or eye irritation persists.

**VII. REACTIVITY INFORMATION**

This product is stable, hazardous polymerization will not occur. There are no chemical incompatibilities or hazardous decomposition products.

**VIII. SPILL OR LEAK PROCEDURE**

Wetting with water will reduce airborne dust. Material may be disposed of as an inert solid in an appropriate solid waste landfill. See applicable Federal, State, and Local Regulations.

**IX. SPECIAL PROTECTION INFORMATION**

If airborne dust exposure approached the TLV or PEL, use NIOSH-approved respirators. (See Section III). Provide adequate ventilation. Do not allow these ashes or the dusts from these ashes to get into the eyes, to remain on the skin if irritation occurs, to be inhaled, to get into the mouth or to be swallowed. Contact lenses should not be worn when working with these ashes. Wear appropriate personal protective equipment such as goggles.

**X. SPECIAL PRECAUTIONS**

Do not create unnecessary airborne dust when handling. Industrial hygiene surveys of worker exposure in specific ash handling operations are needed to determine the need for engineering controls of airborne dust levels, respiratory protection equipment, and other measures. Under certain conditions, such as handling in confined areas, without adequate ventilation trace metal oxides (including arsenic, iron, and vanadium) may exceed the OSHA permissible exposure levels and require personal protective equipment.

**XI. LABELING**


Contains Coal Ash (Fly Ash, Bottom Ash, or Boiler Slag)

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**WARNING:** Persistent exposure to airborne dust may harm lungs and decrease pulmonary functions. Exposure may result in irritation to eyes, skin or the respiratory tract. Contains material which may cause cancer based on laboratory animal data. Consult material safety data sheet for special protections and precautionary information.

For further information contact:

American Electric Power Service Corporation  
1 Riverside Plaza  
Columbus, Ohio 43215  
(614) 583-7459

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American Electric Power Service Corporation  
 1 Riverside Plaza  
 Columbus, Ohio 43215

**AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 MATERIAL SAFETY DATA SHEET FOR  
 FLUE GAS DESULFURIZATION GYPSUM**

Revised  
 3/11/2008

**WARNING : DO NOT ALLOW THIS PRODUCT OR THE DUSTS FROM THIS PRODUCT.**

1. TO GET INTO THE EYES. 2. TO REMAIN ON THE SKIN IF IRRITATION OCCURS. 3. TO BE INHALED (BREATHED IN) AT CONCENTRATIONS EXCEEDING APPLICABLE EXPOSURE LIMITS.  
 4. TO GET INTO THE MOUTH OR TO BE SWALLOWED.

<b>I. MANUFACTURER</b>				
<b>A. Manufacturer:</b>  AEP system coal fired steam electric generating plants equipped with flue gas desulfurization systems.	<b>B. For more information Contact:</b> American Electric Power Service Corporation 1 Riverside Plaza Columbus, Ohio 43215 (614) 716-2421			
<b>II. HAZARDOUS CONSTITUENTS</b>				
	APPROXIMATE CONCENTRATION RANGE		APPROXIMATE CONCENTRATION RANGE	
Calcium Sulfate Dihydrate (Gypsum)	80 % - 99 %	Titanium compounds reported as Ti	0 01 % - 0 1 %	
Total Silica compounds reported as Si	0 1 % - 3 0 %	Aluminum compounds reported as Al	0 01 % - 0 3 %	
Calcium compounds reported as Ca	22 % - 24 %	Magnesium compounds reported as Mg	0 01 % - 0 6 %	
Sulfur compounds reported as S	16 % - 19 %	Sodium compounds reported as Na	0 01 % - 0 1 %	
		Potassium compounds reported as K	0 01 % - 0 1 %	
		Iron compounds reported as Fe	0 01 % - 0 2 %	
		Phosphorus compounds reported as P	0 01 % - 0 1 %	
<b>III. OSHA PERMISSIBLE EXPOSURE LIMITS (PEL) AND ACGIH THRESHOLD LIMIT VALUES (TLV)</b>				
	ACGIH TLV 2006 (mg/M <sup>3</sup> )	DSHA PEL (mg/M <sup>3</sup> )		ACGIH TLV 2006 (mg/M <sup>3</sup> )
Calcium Sulfate Dihydrate	10	15		OSHA PEL (mg/M <sup>3</sup> )
Silica (SiO <sub>2</sub> )			Calcium compounds reported as Ca	5
A. Amorphous	10	(Note 1)	Iron compounds reported as Fe	10
B. Crystalline	0 025	(Notes 1)	Titanium compounds reported as Ti	15
			Aluminum compounds reported as Al	15
			Magnesium compounds reported as Mg	15
			Sodium compounds reported as Na	(Note 2)
			Potassium compounds reported as K	(Note 2)
			Sulfur compounds reported as S	(Note 2)
			Phosphorus compounds reported as P	(Note 2)
Note 1. See OSHA 29 CFR 1910.1000 Table Z-1-A, Z3. Note 2. The TLV for this constituent does not currently exist.				
Note 3: The PEL for this constituent does not currently exist				
<b>IV. PHYSICAL CHARACTERISTICS AND DATA</b>				
<b>A. Flue Gas Desulfurization Gypsum</b>				
Flue Gas Desulfurization Gypsum consists of calcium sulfate and other calcium / sulfur compounds, silica, and other trace metals. The material is an off-white or tan powder.				
Values for boiling points, vapor pressure, vapor density, percent volatile, and evaporation rate are not applicable to this product.				
This material yields a pH range of 7 0 - 8 2 in a 1% slurry				
<b>V. FIRE AND EXPLOSION HAZARD INFORMATION</b>				

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Flue Gas Desulfurization Gypsum is non-flammable and non-explosive. Flash point, flammable limits, extinguishing media, special fire fighting procedures, and unusual fire and explosion hazards are not applicable to this material.

#### VI. HEALTH HAZARD INFORMATION

The primary routes of entry are through the respiratory system (inhalation), eyes and skin. Flue Gas Desulfurization Gypsum is primarily composed of inert dust which may cause irritation to the eyes or mucous membranes. Skin exposure may cause dry skin, irritation or dermatitis, while inhalation of dust may cause throat or lung irritation, choking or decrease in pulmonary function, depending on the degree of exposure. This material contains trace amounts of crystalline silica (a pneumoconiosis-producing dust identified by IARC as a carcinogen based on laboratory animal data). Flue Gas Desulfurization Gypsum contains other constituents, including some metals, in trace quantities.

Ammonia may be present in trace amounts (<0.1%). Exposure to ammonia may result in irritation to the eyes, nose, throat, or chest. Direct contact of high concentration ammonia to the skin may result in irritation, burning or blisters.

#### EMERGENCY AND FIRST AID PROCEDURES:

In case of:

1. Eye contact - Immediately flush eyes thoroughly with water.
2. Skin contact - Immediately wash skin with soap and water if irritation occurs.
3. Inhalation - Immediately remove affected person(s) to fresh air from source.
4. Oral intake - Rinse mouth out with water.

Immediately contact physician or medical personnel if unusual coughing, tightness in chest, or shortness of breath occurs after exposure or if skin or eye irritation persists.

#### VII. REACTIVITY INFORMATION

Hazardous polymerization will not occur. There are no chemical incompatibilities or hazardous decomposition products.

#### VIII. SPILL OR LEAK PROCEDURE

Wetting with water will reduce airborne dust. Material may be disposed of as an inert solid in an appropriate solid waste landfill. See applicable Federal, State, and Local Regulations.

#### IX. SPECIAL PROTECTION INFORMATION

If airborne dust exposure approaches the TLV or PEL, use NIOSH-approved respirators. (See Section III). Provide adequate ventilation. Do not allow this material or the dusts from this material to get into the eyes, to remain on the skin if irritation occurs, to be inhaled, to get into the mouth or to be swallowed. Contact lenses should not be worn when working with this material. Wear appropriate personal protective equipment, such as goggles.

#### X. SPECIAL PRECAUTIONS

Do not create unnecessary airborne dust when handling. Industrial hygiene surveys of worker exposure in specific flue gas desulfurization gypsum handling operations are needed to determine the need for engineering controls of airborne dust levels, respiratory protection equipment, and other measures.

#### XI. ADDITIONAL INFORMATION

This product does not contain Emergency Planning and Community Right-to-Know (EPCRA) section 313 toxic chemicals above de minimis concentrations, as defined in 40 CFR Part 372.

#### XII. LABELING

Contains Flue Gas Desulfurization Gypsum

**WARNING:** Persistent exposure to airborne dust above applicable exposure limits may harm lungs and decrease pulmonary functions. Exposure may result in irritation to eyes, skin or the respiratory tract. Consult material safety data sheet for special protections and precautionary information.

For further information contact:

American Electric Power Service Corporation  
1 Riverside Plaza  
Columbus, Ohio 43215  
(614) 716-2421



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American Electric Power Service Corporation  
 1 Riverside Plaza  
 Columbus, Ohio 43215-2373

**AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 SAFETY AND HEALTH FACT SHEET FOR  
 WASTE WATER TREATMENT FILTER CAKE**

Revised 4-16-07

The OSHA Hazard Communication standard (29CFR 1910 1200) does not require material safety data sheets for waste products that are not collected and distributed for use by company employees or outside entities. Waste Water Treatment Filter Cake is a waste product only that is transported by AEP personnel to AEP facilities for disposal.

<b>I. MANUFACTURER</b>  <b>A. Manufacturer:</b>  AEP Mitchell Plant FGD system.	<b>B. For more information Contact:</b> American Electric Power Service Corporation 1 Riverside Plaza Columbus, Ohio 43215 (614) 324-6824
<b>II. MATERIAL INFORMATION</b>  Waste Water Treatment Filter Cake is a waste product consisting of solids from the FGD chloride blow-down stream, which is a step in the dewatering of the FGD (synthetic) gypsum produced by the Mitchell Plant FGD system. The material consists mainly of calcium sulfate (gypsum) with other metals and metal salts existing in trace quantities.	
<b>III. PHYSICAL CHARACTERISTICS AND DATA</b>  <b>A. Waste Water Treatment Filter Cake</b>  The material consists mainly of calcium sulfate. The material is cake-like in appearance and brown in color.  Values for boiling points, vapor pressure, vapor density, percent volatile, and evaporation rate are not applicable to this product.	
<b>IV. FIRE AND EXPLOSION HAZARD INFORMATION</b>  Waste Water Treatment Filter Cake is non-flammable and non-explosive. Flash point, flammable limits, extinguishing media, special fire fighting procedures, and unusual fire and explosion hazards are not applicable to this material.	
<b>V. HEALTH HAZARD INFORMATION</b>  The primary routes of entry are through the respiratory system (inhalation), eyes and skin. Waste Water Treatment Filter Cake is primarily composed of inert dust (irritants to mucous membranes). Exposure may result in irritation to eyes, skin, or the respiratory tract. Persistent exposure to airborne dust may decrease pulmonary functions.  <b>EMERGENCY AND FIRST AID PROCEDURES</b>  In case of: 1. Eye contact - Immediately flush eyes thoroughly with water. 2. Skin contact - Immediately wash skin with soap and water if irritation occurs. 3. Inhalation - Immediately remove affected person(s) to fresh air from source. 4. Oral intake - Rinse mouth out with water. Immediately contact physician or medical personnel if unusual coughing, tightness in chest, or shortness of breath occurs after exposure or if skin or eye irritation persists.	
<b>VI. REACTIVITY INFORMATION</b>  Hazardous polymerization will not occur. There are no chemical incompatibilities or hazardous decomposition products.	
<b>VII. SPECIAL PROTECTION INFORMATION</b>  Use wet methods or other controls to avoid unnecessary dust when handling. If airborne dust exposure approaches the TLV or PEL, use NIOSH - approved respirators. Provide adequate ventilation. Do not allow this material or the dusts from this material to get into the eyes, to remain on the skin if irritation occurs, to be inhaled, to get into the mouth or to be swallowed. Contact lenses should not be worn when working with this material. Wear appropriate personal protective equipment, such as goggles.	

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American Electric Power Service Corporation  
 1 Riverside Plaza  
 Columbus, Ohio 43215-2373

**AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 MATERIAL SAFETY DATA SHEET FOR  
 STABILIZED SCRUBBER BY-PRODUCT**

Revised 6-15-99

**WARNING : DO NOT ALLOW THIS PRODUCT OR THE DUSTS FROM THIS PRODUCT.**

- 1. TO GET INTO THE EYES. 2 TO REMAIN ON THE SKIN IF IRRITATION OCCURS. 3. TO BE INHALED (BREATHED IN).  
 4. TO GET INTO THE MOUTH DR TO BE SWALLOWED.**

<b>I. MANUFACTURER</b>				
<b>A. Manufacturer</b>		<b>B. Per more information Contact:</b> American Electric Power Service Corporation		
AEP systems coal fired steam electric generating plants equipped with flue gas de-sulfurization systems		1 Riverside Plaza Columbus, Ohio 43215 (614) 324-6824		
<b>II. HAZARDDUS CONSTITUENTS ( as determined by 29 CFR 1910.1200 (f) (2) (i) (C) (1) )</b>				
	APPROXIMATE CONCENTRATION RANGE		APPROXIMATE CONCENTRATION RANGE	
Amorphous Silica compounds reported as Si	8 4 % - 10 3 %	Titanium compounds reported as Ti	0 3 % - 0 6 %	
Aluminum compounds reported as Al	4 2 % - 6 9 %	Calcium compounds reported as Ca	15 7 % - 20 %	
Iron compounds reported as Fe	4 8 % - 7 7 %	Magnesium compounds reported as Mg	0 6 % - 1 2 %	
		Sodium compounds reported as Na	0 1 % - 0 3 %	
		Potassium compounds reported as K	0 5 % - 0 8 %	
		Sulfite Sulfur compounds reported as S	5 4 8 % - 10 3 2 %	
		Sulfate Sulfur compounds reported as S	10 4 % - 12 4 %	
		Phosphorus compounds reported as P	0 0 4 %	
<b>III. OSHA PERMISSIBLE EXPOSURE LIMITS (PEL) AND ACGIH THRESHOLD LIMIT VALUES (TLV)</b>				
CONSTITUENTS	ACGIH TLV 1990-91 (mg/M <sup>3</sup> )	OSHA PEL (mg/M <sup>3</sup> )	CONSTITUENTS	ACGIH TLV 1990-91 (mg/M <sup>3</sup> )  OSHA PEL (mg/M <sup>3</sup> )
<b>Silice (SiO<sub>2</sub>)</b>				
A. Amorphous	10	6 0 (Note 2)	Aluminum compounds reported as Al	10 15
			Iron compounds reported as Fe	5 10
			Titanium compounds reported as Ti	10 10
			Calcium compounds reported as Ca	2 5
			Magnesium compounds reported as Mg	10 10
			Arsenic compounds reported as As	0 2 0 0 1
			Sodium compounds reported as Na	(Note 4) (Note 3)
			Potassium compounds reported as K	(Note 4) (Note 3)
			Sulfite Sulfur compounds reported as S	(Note 4) (Note 3)
			Sulfate Sulfur compounds reported as S	(Note 4) (Note 3)
			Phosphorus compounds reported as P	(Note 4) (Note 3)
Note 1: This is the ACGIH adopted value for 1990-91.		Note 3: The PEL for this constituent does not currently exist.		
Note 2: See OSHA 29 CFR 1910 1000 Table Z-1-A, Z3		Note 4: The TLV for this constituent does not currently exist		
<b>IV. PHYSICAL CHARACTERISTICS AND DATA</b>				

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**A. Stabilized FGD Scrubber By-Product**

Stabilized FGD Scrubber By-Product consists of calcium sulfite and calcium sulfate, fly ash, lime, and water. The material is cake-like in appearance and off-white in color with a dry solids content of approximately 52% and a compacted wet density of approximately 95 pounds per cubic foot.

The product has a specific gravity range of 2-3

Values for boiling points, vapor pressure, vapor density, percent volatile, and evaporation rate are not applicable to this product.

This material yields a pH range of 10-12 in a 1% slurry

**V. FIRE AND EXPLOSION HAZARD INFORMATION**

Stabilized Scrubber By-Product is non-flammable and non-explosive. Flash point, flammable limits, extinguishing media, special fire fighting procedures, and unusual fire and explosion hazards are not applicable to this material.

**VI. HEALTH HAZARD INFORMATION**

The primary routes of entry are through the respiratory system (inhalation), eyes and skin. Stabilized Scrubber By-Product is primarily composed of inert dust (irritants to mucous membranes). It also contains minor amounts of calcium oxide (an irritant to mucous membranes and wet skin) and trace amounts of crystalline silica (a pneumoconiosis - producing dust identified by IARC as a carcinogen based on laboratory animal data). Stabilized Scrubber By-Product contains other constituents, including some metals, in trace quantities.

Exposure may result in irritation to eyes, skin, or the respiratory tract. Persistent exposure to airborne dust may decrease pulmonary functions.

Ammonia may be present in trace amounts (<0.1%). Exposure to ammonia may result in irritation to the eyes, nose, throat, or chest. Direct contact of high concentration ammonia to the skin may result in irritation, burning or blisters.

**EMERGENCY AND FIRST AID PROCEDURES:**

In case of:

1. Eye contact - Immediately flush eyes thoroughly with water.
2. Skin contact - Immediately wash skin with soap and water if irritation occurs.
3. Inhalation - Immediately remove affected person(s) to fresh air from source.
4. Oral intake - rinse mouth out with water.

Immediately contact physician or medical personnel if unusual coughing, tightness in chest, or shortness of breath occurs after exposure or if skin or eye irritation persists.

**VII. REACTIVITY INFORMATION**

Hazardous polymerization will not occur. There are no chemical incompatibilities or hazardous decomposition products.

**VIII. SPILL OR LEAK PROCEDURE**


Wetting with water will reduce airborne dust. Material may be disposed of as an inert solid in an appropriate solid waste landfill. See applicable Federal, State, and Local Regulations.

**IX. SPECIAL PROTECTION INFORMATION**

If airborne dust exposure approaches the TLV or PEL, use NIOSH - approved respirators. (See Section III) Provide adequate ventilation. Do not allow this material or the dusts from this material to get into the eyes, to remain on the skin if irritation occurs, to be inhaled, to get into the mouth or to be swallowed. Contact lenses should not be worn when working with this material. Wear appropriate personal protective equipment, such as goggles.

**X. SPECIAL PRECAUTIONS**

Do not create unnecessary airborne dust when handling. Industrial hygiene surveys of worker exposure in specific scrubber cake handling operations are needed.

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to determine the need for engineering controls of airborne dust levels, respiratory protection equipment, and other measures.

**XI. ADDITIONAL INFORMATION**

This product does not contain Emergency Planning and Community Right-to-Know (EPCRA) section 313 toxic chemicals above de minimis concentrations, as defined in 40 CFR Part 372.

**XII. LABELING**

Contains Stabilized Scrubber By-Product

**WARNING** Persistent exposure to airborne dust may harm lungs and decrease pulmonary functions. Exposure may result in irritation to eyes, skin or the respiratory tract. Consult material safety data sheet for special protections and precautionary information.

For further information contact:

American Electric Power Service Corporation  
1 Riverside Plaza  
Columbus, Ohio 43215  
(614) 324-6824

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American Electric Power Service Corporation  
 1 Riverside Plaza  
 Columbus, OH 43215

**AMERICAN ELECTRIC POWER SERVICE CORPORATION  
 MATERIAL SAFETY DATA SHEET FOR  
 UREA SOLUTION**

Revised 9/12/08

**WARNING: DO NOT ALLOW THIS PRODUCT:**

- 1 TO GET INTO THE EYES. 2. TO CONTACT SKIN. 3. TO BE INHALED (BREATHED IN).  
 4 TO GET INTO THE MOUTH OR TO BE SWALLOWED

**I. MANUFACTURER**

**A. Manufacturer:**

AEP system coal fired steam electric generating plants equipped with selective catalytic reduction (SCR) systems.

**B For more information Contact:**

American Electric Power Service Corporation  
 1 Riverside Plaza  
 Columbus, Ohio 43215  
 (614) 716-2421

**II. HAZARDOUS CONSTITUENTS**

	APPROXIMATE CONCENTRATION RANGE
Urea	25% - 45%
Ammonia	0.5% - 2.0%
Formaldehyde	0.4% - 0.8%

**III. OSHA PERMISSIBLE EXPOSURE LIMITS (PEL) AND ACGIH THRESHOLD LIMIT VALUES (TLV)**

CONSTITUENTS	OSHA PEL (ppm)	ACGIH TLV 2008 (ppm)
Urea	See Note 1	See Note 2
Ammonia	30	25 - TWA 35 - STEL
Formaldehyde	0.75 - TWA 2 - STEL	0.3 - Ceiling

Note 1: The PEL for this constituent does not currently exist  
 Note 2: The TLV for this constituent does not currently exist

**IV. PHYSICAL CHARACTERISTICS AND DATA**

Urea Solution is made by dissolving urea pellets in recycle water returning from the hydrolyzers. Ammonia is present due to residual in the recycle water. Formaldehyde is present to due its use as a coating on the urea pellets.

Physical Form: Liquid  
 Odor: Ammonia odor  
 Boiling Point: Approximately 220°F  
 PH: 10  
 Specific Gravity: 1.1  
 Density: Approximately 9.2 lbs. / gallon

**V. FIRE AND EXPLOSION HAZARD INFORMATION**

Urea Solution is non-flammable and non-explosive. Flash point, flammable limits, extinguishing media, special fire fighting procedures, and unusual fire and explosion hazards are not applicable to this material

**VI. HEALTH HAZARD INFORMATION**

The primary routes of entry are through the respiratory system (inhalation), eyes and skin. Urea Solution is composed primarily of urea in water with

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ammonia and formaldehyde present in small amounts. The primary inhalation hazard is from ammonia vapors present in the solution. Airborne ammonia vapors may cause irritation to the eyes, nose, throat or chest. Direct contact with liquid may cause skin irritation. This material contains trace amounts of formaldehyde (identified by IARC as a carcinogen). Formaldehyde can cause eye and throat irritation, difficulty in breathing and skin rashes and / or allergic reactions

**EMERGENCY AND FIRST AID PROCEDURES:**

In case of:

1. Eye contact - Immediately flush eyes thoroughly with water.
2. Skin contact - Immediately wash skin with soap and water
3. Inhalation - Immediately remove affected person(s) to fresh air from source
4. Oral intake - If conscious, give large quantities of water to drink.

Immediately contact physician or medical personnel if unusual coughing, tightness in chest, or shortness of breath occurs after exposure, if skin or eye irritation persists, or if any allergic-type reactions occur

**VII. REACTIVITY INFORMATION**

Hazardous polymerization. Will not occur  
 Incompatibilities: Reacts with sodium hypochlorite or calcium hypochlorite to form nitrogen trichloride that may explode spontaneously in air. Incompatible with sodium nitrite, phosphorus pentachloride and nitrosyl or gallium perchlorate. Urea will form urea nitrate when mixed with nitric acid at low pH. Urea nitrate may become unstable and/or explosive under certain conditions.  
 Decomposition: Urea solution may form ammonia, cyanuric acid, biuret and/or nitrogen oxides upon decomposition.

**VIII. SPILL OR LEAK PROCEDURE**

Spilled material must be contained. Discharges to waterways would be subject to local, state, and federal notification requirements. Contact the local Environmental representative in the event of a spill or release.

**IX. SPECIAL PROTECTION INFORMATION**

If airborne vapor exposure approaches the TLV or PEL, use NIOSH - approved respirators. (See Section III). Provide adequate ventilation. Do not allow this material or vapors from this material to get into the eyes, to contact the skin, to be inhaled, to get into the mouth or to be swallowed. Wear appropriate personal protective equipment, such as goggles and chemical resistant gloves and clothing if eye or skin contact is possible.

**X. SPECIAL PRECAUTIONS**

Industrial hygiene surveys of worker exposure in specific handling operations are needed to determine the need for engineering controls of airborne vapor levels, respiratory protection equipment, and other measures.

**XI. ADDITIONAL INFORMATION**

The concentrations of ammonia and formaldehyde are above the de minimis concentrations and would be subject to the SARA 313 reporting requirements.

**XII. LABELING**

Contains Urea Solution

**WARNING.** Persistent exposure to airborne vapors may harm lungs. Exposure may result in irritation to eyes, skin or the respiratory tract or allergic reactions. Consult material safety data sheet for special protections and precautionary information. Contains chemicals listed as IARC carcinogens.

For further information contact: American Electric Power Service Corporation  
 1 Riverside Plaza  
 Columbus, Ohio 43215  
 (614) 716-2421

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**ATTACHMENT 11- AEP LIFTING AND RIGGING PROCEDURE**


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## **1.0 DEFINITIONS AND ABBREVIATIONS**


### **1.1. Definitions for terms in AEP Policy and Procedures for Lifting and Rigging**

- 1.1.1. Attachment Point** – Designed lifting point that is part of a load or rigging point that is part of the support.
- 1.1.2. Below the Hook Lifting Device** - Any fabricated assembly designed to hold and attach a load to a hoist mechanism that is used to lift and transport the load by raising, suspending, or lowering. Lifting devices shall be properly fabricated, tested, inspected, and marked for capacity and identification.
- 1.1.3. Blind Lift** – A crane operation in which the load, crane hook and load block are not visible to the crane operator; or, for mobile cranes, the tip of the crane boom is not visible to the operator.
- 1.1.4. Competent Person** – One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are dangerous to employees, and who has authorization to take prompt corrective measures to control them.
- 1.1.5. Crane** - A mobile or fixed device used for lifting and lowering a load and moving it horizontally, *(Hoists are defined separately)*.
- 1.1.6. Critical Lift** – A lift requiring a written lift plan as defined by a business unit.
- 1.1.7. Derrick** – A hoisting machine consisting usually of a vertical mast, a slanted boom, and associated tackle.
- 1.1.8. Designated Person** -. A person selected or assigned by the employer or the employer's representative as being qualified to perform specific duties.
- 1.1.9. Digger derrick** – Multipurpose vehicle-mounted machines, primarily designed to accommodate components that dig holes, set poles, and position materials and apparatus.
- 1.1.10. Frequent Inspection** - Inspections performed at daily to monthly intervals. In AEP policy this normally reflects a monthly interval.
- 1.1.11. Hoist** - A suspended machinery unit that is used for lifting or lowering a freely suspended (unguided) load.
- 1.1.12. Lifting Device** – Any machine used for raising loads, unless exempted from AEP policy.
- 1.1.13. Lift Plan** - A written document which will include details of how the lifting operation shall be undertaken, the lifting equipment and lifting accessories to be used, how the equipment and accessories shall be rigged and the control measures in place to manage the risks identified in a risk assessment.
- 1.1.14. Load** – The total external and/or superimposed weight on the load block or hook, including the weight of load-attaching equipment.



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- 1.1.15. **Load Cell** - A below the hook device that indicates the weight of the load.
- 1.1.16. **Load Cell Observer** - Person that observes the load cell during a lift and informs the crane operator or designated person that the load cell has reached the predetermined limit.
- 1.1.17. **Load Moment Indicator** – A device that monitors various crane functions and provides the operator with a continuous reading of crane capacity.
- 1.1.18. **Marine Operations** – Where a crane is mounted on a barge or pontoons.
- 1.1.19. **Material Handler** – A Transmission and Distribution aerial lift with a side-mounted lifting jib.
- 1.1.20. **Mobile Crane** – A beam or boom on a mobile platform such as a wheeled truck, crawler, tracks or rail car.
- 1.1.21. **Overhead and Gantry Cranes** – Top-running single or multiple-girder bridge with top-running trolley hoists, and single-girder bridge with under-hung trolley hoists.
- 1.1.22. **Padding** – Protects rigging, slings, and the load or structure from superficial damage due to rubbing, chaffing, indenting, fretting, etc. against other rigging and/or load.
- 1.1.23. **Pawl** – A device for holding the machinery against undesired rotation by engaging a ratchet.
- 1.1.24. **Periodic Inspection** – Inspections at 1 to 12 month intervals or at intervals specified by the manufacturer or AEP guidance.
- 1.1.25. **Person In Charge (PIC)** - The qualified person in charge of rigging or lifting activity, designated by the business unit based on training and experience specific to the task.
- 1.1.26. **Personnel Work Platform** - Work platforms that are designed and inspected for the use of lifting personnel to perform maintenance or inspections.
- 1.1.27. **Pre-use Inspection** – Inspection performed immediately prior to use or at the beginning of each shift.
- 1.1.28. **Qualified Engineer** – A skilled technical professional who, by possession of a recognized degree or certificate and experience, has the ability to design or certify lifting and rigging plans and procedures.
- 1.1.29. **Qualified Person** – One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated an ability to solve or resolve problems relating to the subject matter, the work, or the project.
- 1.1.30. **Qualified Rigger** - Individual who has knowledge, training, and experience sufficient to conduct and provide oversight for rigging activities.
- 1.1.31. **Rated Load** - Design Rated Load (DRL) is the maximum lift capacity of the crane or the nameplate capacity. DRL does not consider any seismic forces.

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- 1.1.32. **Reeving** – Passing a rope or line through or onto something. e.g. A block or drum.
  - 1.1.33. **Rigging** - The act of using cranes, slings, hoists, special rigs, and various rigging hardware to position equipment, components parts, material or personnel.
  - 1.1.34. **Rigging (without lifting)** - Activities to retain or support w/o lifting.
  - 1.1.35. **Rigging Hardware** - Rigging attachments such as rings, links, swivel bolts/hoist rings, eyebolts, jacks, bags, rollers, shackles, tumbuckles and pad eyes, etc.
  - 1.1.36. **Rigging and Lifting Equipment (R&LE)** - Rigging and Lifting Equipment includes cranes, hoists, rigging hardware, slings and other devices used to perform lifting activities.
  - 1.1.37. **Sail Area** - Shape or configuration of a load that wind or air movement can react against. This wind MAY exert additional load on the rigging and the crane.
  - 1.1.38. **Service levels** –
    - 1.1.38.1. **Normal** - Conditions during which a lifting device is performing functions within the scope of the original design.
    - 1.1.38.2. **Heavy** – Service that involves operation within the rated load limit, which exceeds normal service.
    - 1.1.38.3. **Severe** – service that involves normal or heavy service with abnormal operating conditions.
  - 1.1.39. **Sheave** – A grooved wheel or pulley used with a rope or chain to change direction and point of application of a pulling force.
  - 1.1.40. **Shock Loading** - Conditions that causes a momentary increase in the forces in a load-supporting component beyond the rated capacity of the component.
  - 1.1.41. **Signal Person** - Person at and/or receiving the lift that indicates, coordinates and controls lift by communication to the crane operator.
  - 1.1.42. **Softeners** –Softeners are devices used to increase the radius or decrease the angle of a corner so that sling capacity is not lost at the sharp bend of the corner.
- 1.2. Abbreviations**
- 1.2.1. **ES&H** – Environmental Safety and Health.
  - 1.2.2. **IUOE** – International Union of Operating Engineers.
  - 1.2.3. **NCCER** - National Center for Construction Education and Research.
  - 1.2.4. **NCCCO** – National Commission for the Certification of Crane Operators.
  - 1.2.5. **NDE** – Non-Destructive Examination.

## **2.0 RESPONSIBILITIES**

### **2.1. Supervisors shall:**

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- 2.1.1. Ensure personnel assigned rigging tasks are sufficiently trained and skilled in safe rigging practices to adequately and safely perform those tasks.
- 2.1.2. Ensure that, prior to making the lift, a pre-job briefing is conducted. JSA and JHA (if available) should be used in briefing.
- 2.1.3. Ensure that the area is properly barricaded.
- 2.2. **Person In Charge shall:**
  - 2.2.1. Be the designated person in charge of a rigging or lifting activity.
  - 2.2.2. Select the safe load path and path of travel for the crane.
  - 2.2.3. Ensure personnel or bystanders are not endangered.
  - 2.2.4. Be present when there is a critical lift, personnel lift or a blind lift.
- 2.3. **Qualified Riggers shall:**
  - 2.3.1. Conduct pre-use inspection of rigging equipment, use correct rigging practices, and tag defective equipment out of service.
  - 2.3.2. Conduct a visual check of the lift to ensure the load is safe to lift.
  - 2.3.3. Ensure safe rigging and handling of loads during the rigging task.
  - 2.3.4. Work with crane operators to prevent overloading.
- 2.4. **Crane Operators shall:**
  - 2.4.1. Ensure the crane is operated safely.
  - 2.4.2. Not engage in any activity that could divert attention while engaged in crane operation.
  - 2.4.3. Ensure standard hand signals, communication and speed are agreed upon during the pre-job brief.
  - 2.4.4. Evaluate potential conditions during a lift, and STOPPING the lift to resolve such conditions if necessary.
  - 2.4.5. Know the cranes capacities and its limitations.
  - 2.4.6. Know the safe load paths and requirements for the safe load path.
  - 2.4.7. Ensure lifting device will not be overloaded.
  - 2.4.8. (On mobile cranes with pick and carry application) Never allow the load to be adjusted while the crane is moving.
  - 2.4.9. Never leave the controls of cranes, derricks, or other lifting devices unattended while the load is suspended or unsecured.
    - 2.4.9.1. NOTE: Light rigging or some below-the-hook devices are excepted if no hazard is presented.
  - 2.4.10. Not move a crane load over workers unless the nature of the work requires it and/or workers are specifically assigned to the task.

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- 2.4.11. Before operating a crane or derrick, the operator shall sound a warning and accept only one person's signal to start raising, lowering or swinging load. However, the operator shall stop immediately upon a signal from anyone.
- 2.4.12. Report all instances of abnormal or unusual conditions or performance immediately to supervision.

**2.5. Signal Person shall:**

- 2.5.1. Coordinate and control the lift by communication to the crane operator.
- 2.5.2. Ensure that employees are not standing under a suspended load or inside the angle of the winch line, standing/working near a cable, chain, or rope under tension (Line of Fire) unless the nature of the work requires it and or specifically assigned the task.

**2.6. Safety & Health Professional shall:**


- 2.6.1. Work with management and crews to ensure compliance with this policy.
- 2.6.2. Assist in the development of lift plans.
- 2.6.3. Conduct evaluations of lifting and rigging policies and procedures.

### **3.0 COMMUNICATIONS**

- 3.1. The type of signals to be used can vary depending on the nature of the job. Therefore, prior to the lift beginning, all personnel involved in the lifting operation shall agree upon the signal system to be used and the meanings of those signals.
- 3.2. Whenever the use of electronic communication (radios, headsets, etc.) is required, care shall be exercised to ensure uninterrupted communication (no shared lines, etc.).

### **4.0 TRAINING**

- 4.1. Trainers shall be qualified in areas in which they will instruct.
- 4.2. Mobile Crane Operator - AEP employees shall have current certification by a nationally accredited crane operator certification program (e.g. NCCCO, NCCER and IUOE) as a condition for operating the following:
  - 4.2.1. Truck Mounted Crane.
  - 4.2.2. Mobile Hydraulic Crane.
  - 4.2.3. Lattice Boom Crane.
- 4.3. Training Requirements for overhead cranes shall be the AEP Overhead Crane Operator Training or equivalent. Requalification is required every 3 years.
- 4.4. Contractors or vendors shall provide documentation on request that overhead crane operator training is equivalent to that of AEP employees.


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- 4.5. Before a lifting device is used, operators must be trained according to the manufacturer's guidelines.
- 4.6. Person-In-Charge (PIC) - Completed the AEP Qualified Rigger Training and has demonstrated the ability to perform the administrative duties associated with rigging activities. PIC must be knowledgeable in the operation of lifting devices. Requalification by rigger training is required every 3 years.
- 4.7. Qualified Rigger - AEP employees are considered as qualified riggers if they have completed the AEP Qualified Rigger Course or equivalent. Requalification is required every 3 years.
- 4.8. Qualified Signal Person – AEP employees shall complete AEP Qualified Signaler Course or equivalent. Training shall be based on ASME B30.5.
- 4.9. Contractors - Contractor employees performing rigging or signaling shall be qualified. Documentation of their qualifications shall be provided upon request.
- 4.10. Retraining shall be performed following an accident or other indication that good rigging practices are not understood.

## **5.0 GENERAL REQUIREMENTS FOR ALL LIFTING OPERATIONS**

### **5.1. General**


- 5.1.1. If unusual lift configurations, excessive or unknown loads are encountered, such as weights in excess of those normally encountered by the assigned rigger, then contact a Person-in-Charge for advice, support, and/or direction prior to performing the lift.
- 5.1.2. Neither lifting devices nor rigging shall be overloaded.
  - 5.1.2.1. If the weight of the load is not known, a dynamometer, load cell, LMI, spring scale shall be used.
- 5.1.3. Where cranes are to be used in high activity or high traffic work areas, the PIC, Signal person and crane operator shall consider adequate traffic controls and measures. (e.g. flagmen, or restricting the area during the lift.)
- 5.1.4. All employees involved in lifting and rigging will participate in a pre-job briefing.
  - 5.1.4.1. The PIC should normally conduct the briefing. However, the supervisor or an individual knowledgeable in the lift may conduct the briefing.
- 5.1.5. A re-briefing shall be performed in the event of a change in crew members, the scope of work changes, or work activities are to be assigned to a different shift.
  - 5.1.5.1. The intent of this re-briefing is to ensure understanding of the rigging evolution.

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- 5.1.6. If the lift will continue through a shift change, then follow the pre-lift briefings to support the job in progress with a face to face discussion with the off going crew personnel.
- 5.1.7. A Person-in-Charge (PIC) is required to be present whenever any of the following conditions is occurring.
  - 5.1.7.1. The lift is a Critical Lift.
  - 5.1.7.2. Personnel are to be lifted in a suspended personnel platform.
  - 5.1.7.3. The lift is a Blind Lift.
- 5.1.8. Rigging and lifting equipment subjected to shock loading shall be removed from service.
- 5.1.9. The hoist chain or hoist rope shall be free from kinks or twists, and must not be wrapped around the load.
- 5.1.10. Rejected or damaged lifting and rigging equipment shall be immediately removed from service.
- 5.1.11. Lifting devices are required to be labeled with either the rated capacity or an identifying number traceable to the manufacturer.
- 5.1.12. Slings shall be long enough to provide the maximum practical angle between the sling leg and the horizontal. Sling angles less than 30° measured from the horizontal must be approved by PIC.
- 5.1.13. Lifting devices or rigging shall not be modified without approval from a qualified engineer.
- 5.1.14. Wire rope clips shall not be used to form eyes in winch lines. Wedge socket or mechanical splice or equivalent shall be used.
- 5.1.15. Multiple part lines shall not be twisted around each other.
- 5.1.16. Use of Softeners/Padding.
  - 5.1.16.1. Softeners and padding shall be of good quality, regularly inspected and appropriate to the specific lift.
  - 5.1.16.2. Padding (for light loads) can be pieces of reinforced rubber, leather, nylon, old slings, neoprene, fire hose, or similar devices to cushion edges of the load to prevent superficial damage to the rigging.
  - 5.1.16.3. Padding is generally for sling tension of 1000 lbs or less. When in doubt, use approved softeners.
  - 5.1.16.4. Softeners shall be used to prevent the load from causing damage to the rigging.
  - 5.1.16.5. Softeners can be pieces of wood cribbing, substantial metal, sections of piping, engineered softeners marked with a load rating, or similar devices.

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- 5.1.16.6. Softeners must be used for loads with sling tension greater than 1000 lbs to protect slings from damage which would occur from sharp edges, tight angles or other conditions.
- 5.1.17. The PIC determines the safe load path and lay down area prior to the lift.
- 5.1.18. The PIC should be particularly aware of work being performed in the area of the lift and the impact the lift path may have on ongoing work.
- 5.1.19. When a Worker needs to guide a load that is being lowered workers shall maintain control of a suspended load. Tag lines are a preferred method.
  - 5.1.19.1. IF the load is at a height that would place the employee(s) at risk, THEN the worker must use a tag line(s), or other means to guide the load.
  - 5.1.19.2. IF the load has the potential to strike the employee(s) if it was to fall or swing out of control, THEN employee must use a tag line (s), or other means to guide the load.
  - 5.1.19.3. Worker may stand beside and touch a suspended load that is at or below their shoulder height and guide the load with his/her hands. **ONLY WHEN** the employee is not at risk of being struck by the suspended load due to swinging, dropping, or tipping. Employees shall not endanger themselves due to potential tripping, slipping, caught in, or swing hazards around a suspended load.
  - 5.1.19.4. Tag lines shall be of the minimum length necessary to control the load.
- 5.1.20. Avoid working under a suspended load. However, if working under a suspended load becomes necessary, then the following practice shall be followed:
  - 5.1.20.1. When cribbing, keep hands/feet out from under the suspended load. Use a Mechanical Method(s) (such as a Broom, 2X4, Long Tools, etc.) to move cribbing under suspended loads.
  - 5.1.20.2. Ensure that the crane operator does not release or lower the load until the operator receives a signal to do so from the signalman. The first choice will always be to rest the suspended load on cribbing.
- 5.1.21. Care shall be taken to ensure the following when hoisting or moving loads.
  - 5.1.21.1. The rigger properly rigs the load.
  - 5.1.21.2. There is no sudden acceleration or deceleration of the load.
  - 5.1.21.3. The load is only lifted high enough to clear obstructions.
  - 5.1.21.4. Care shall be taken during the initial lift to ensure that the load does not hang up.

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5.1.21.5. The PIC controls the movement of personnel within the area affected by the lift.

## 5.2. Maintenance

5.2.1. A preventive maintenance program shall be established and based on manufacturers' requirements. Repairs affecting the safe operation of a lifting device shall be performed by or under the direction of the manufacturer or a qualified engineer.

### 5.2.2. Repairs

5.2.2.1. A qualified person must oversee repairs and any required interaction with the manufacturer. All structural repairs and modifications must be performed by or under the direction of the manufacturer or a qualified engineer.

5.2.2.2. After being repaired, the lifting device must be given an Initial Inspection before being returned to service.

5.2.2.3. Additionally, all repaired lifting devices must be operationally tested and load tested at 125% rated capacity or in compliance with manufacturer's specifications.

5.2.2.4. Dated records and details of repairs and parts replacement must be carefully maintained.

5.3. **Lifting Operation** All lifting operations shall be conducted in compliance with AEP policy and procedures, all applicable local, state or federal regulations and manufacturers' requirements.

### 5.3.1. Attaching the load.

5.3.1.1. Ensure the load is attached to the load-block hook by means of slings or other approved devices.

5.3.1.2. Ensure the sling clears all obstacles.

### 5.3.2. Moving the load.

5.3.2.1. The load shall be well secured and properly balanced in the sling or lifting device before it is lifted more than a few inches.

5.3.2.2. The hoist chain or rope shall not be kinked and multiple-part lines shall not be twisted around each other.

5.3.2.2.1. The hook shall be positioned above the center of gravity of the load in such a manner as to minimize swinging when the load is lifted.

5.3.2.2.2. If there is a slack-rope condition, it shall be determined that the rope is properly seated on the drum and in the sheaves.

5.3.2.3. During hoisting ensure that the load is lifted slowly until it clears the ground or other support to minimize swinging when the load is lifted.

5.3.2.4. Ensure there is no sudden acceleration or deceleration of the moving load.



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- 5.3.2.5. Ensure that the load does not contact any obstructions. A "dry run" shall be conducted in areas where clearance is limited.
- 5.3.2.6. Do not use cranes, derricks and hoisting equipment to make a side pull unless specifically authorized by a qualified engineer.
- 5.3.2.7. Each time a load approaches the rated capacity, test the hoist brakes by raising the load a few inches and applying the brakes. Any slippage or downward motion is unacceptable.
- 5.3.2.8. Do not lower the hook below the point recommended by the manufacturer; never less than two full wraps of rope remaining on the hoisting drum.
- 5.3.2.9. When the load or hook approaches personnel sound the warning signal.
- 5.3.2.10. Tag lines shall be used as required to guide, snub, or otherwise control the load. *Ref Section 5.1.19.*
- 5.3.2.11. Place any attached load on the ground or floor, place controls in the OFF position, and turn off the power source before leaving the crane unattended, unless required to do otherwise by an approved emergency procedure.
- 5.3.2.12. Suspended loads that must be worked on shall be secured against unwanted movement.

#### 5.4. Control Failure


- 5.4.1. If at any time during use a crane/hoist fails to respond to its controls, the operator shall:
  - 5.4.1.1. If possible, ground the load.
  - 5.4.1.2. Cease all operations immediately.
  - 5.4.1.3. Shut down the crane.
  - 5.4.1.4. Notify supervision.
- 5.4.2. If loss of control results in a suspended load that cannot be moved.
  - 5.4.2.1. The area near and below the load shall be barricaded.
  - 5.4.2.2. Site management shall designate a qualified person to troubleshoot the problem.
  - 5.4.2.3. The manufacturer shall be contacted.
  - 5.4.2.4. A recovery plan shall be developed.

### 6.0 INSPECTIONS


- 6.1. Lifting device inspections by qualified persons are required at specific intervals including but not limited to:
  - 6.1.1. Pre-use.

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- 6.1.2. Frequent.
- 6.1.3. Periodic.
- 6.1.4. After repair or modification.
- 6.2. Inspections are required, but not limited to the following
  - 6.2.1. Cranes/Hoisting devices.
  - 6.2.2. Chains.
  - 6.2.3. Slings.
  - 6.2.4. Eye bolts.
  - 6.2.5. Shackles.
  - 6.2.6. Other rigging hardware.
  - 6.2.7. Attachment points.
  - 6.2.8. Ground stability.
  - 6.2.9. As specified in AEP policy and procedures.
- 6.3. In the event that a load must be left suspended for shift change, the lift shall be completed before pre-use inspection.
- 6.4. Only qualified (trained) personnel familiar with the equipment may conduct these inspections.
- 6.5. If a lifting device is deemed unfit for use; it shall be removed from service and the Supervisor or PIC will be notified.
- 6.6. The minimum acceptable level of inspection is determined by the manufacturer's recommendation, including pre-use inspection.
- 6.7. Annual Equipment Certification:
  - 6.7.1. Cranes - Approved third party crane inspector.
  - 6.7.2. Manual Hoists - Per manufacturer certification.
  - 6.7.3. Tuggers - Per manufacturer certification.
  - 6.7.4. Chain Slings - Per manufacturer certification.
- 6.8. To facilitate complete inspections, each site shall maintain a list of all cranes and hoists that it owns or leases.
- 6.9. **Initial Inspection of Hoists and Cranes**
  - 6.9.1. Prior to their initial use, all new or extensively repaired / modified hoists or cranes shall be inspected by a qualified inspector to ensure compliance with the applicable provisions of ASME B30 standards.
  - 6.9.2. Dated and signed inspection records shall be kept on file and shall be readily available.
- 6.10. **Inspection of Fixed Cranes and Hoists**

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- 6.10.1. At the beginning of each workday or shift in which a crane will be used, an operator or other designated personnel shall operate and visually inspect the crane and hoist. This inspection, which does not require written records, shall include:
- 6.10.1.1. Inspected from the floor.
    - 6.10.1.1.1. Operation of the hoist, trolley, and bridge including all functional operating mechanisms for maladjustment interfering with proper operation. Listen for unusual sounds and look for obstructions that would interfere with the movement of the trolley or bridge.
    - 6.10.1.1.2. Hoist and trolley brakes are to be checked for coasting that exceeds manufacturer's requirements.
    - 6.10.1.1.3. Deformation of hooks and latches, including bending, twisting, increased throat opening, cracks, nicks, gouges, and wear.
    - 6.10.1.1.4. Wire rope for broken strands, crushing, core protrusions, "bird caging", excessive wear, etc.
  - 6.10.1.2. Inspected from the bridge, if the bridge is designed to be boarded and the bridge can be safely accessed.
    - 6.10.1.2.1. Integrity, missing parts, deterioration or leakage in lines, tanks, valves, drain pump and other parts of air or hydraulic systems.
    - 6.10.1.2.2. Spooling of chain or wire rope, including excessive wear, proper spooling, over wrapping on drum, imprinting on drum, etc.
- 6.10.2. On a frequent interval (or time of use if crane has been idle for more than one month), a trained and qualified person (as assigned by management) shall inspect a crane's critical items. Documentation is to be prepared which shows the items inspected, the printed name of the assigned inspector, the signature of the assigned inspector, and the date the inspection was performed. Items to be inspected for include:
- 6.10.2.1. Cracked, missing, or broken hooks. Hooks are to be checked for deformations, including throat opening, saddle wear, and twist, and safety latch (if designed).
    - 6.10.2.1.1. Annual Non-Destructive Examination (NDE).
  - 6.10.2.2. Lifting chain is to be checked for excessive stretch, corrosion, cracks, wear, gouges, twisted and deformed links.
  - 6.10.2.3. Wire rope is to be checked for frayed, twisted, or corroded wires.
  - 6.10.2.4. Limit switches.
  - 6.10.2.5. All Pre-use Inspection items.

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- 6.10.3. AEP policy requires that a complete inspection of cranes and hoists be performed at intervals that depend on the usage of the equipment. Periodic inspections are required annually. AEP has contracted with qualified non-affiliated companies to perform these Periodic inspections. The inspection contractor verbally reports the results of the Periodic inspection to a designated site representative and discusses any items needing immediate attention. In addition, a written inspection report is issued to the location. Periodic inspections include all of the items included in Frequent Inspections plus the following additional items:
- 6.10.3.1. Deformed, cracked, or corroded members.
  - 6.10.3.2. Loose or missing bolts, nuts, pins and rivets, and weld failure.
  - 6.10.3.3. Cracked or worn sheaves and drums.
  - 6.10.3.4. Worn, cracked, or distorted parts such as pins, bearings, shafts, gears, rollers, locking and clamping devices, bumpers and stops.
  - 6.10.3.5. Excessive wear on brake system parts, linings, pawls, and ratchets.
  - 6.10.3.6. Load, wind, and other indicators over their full range for any significant inaccuracies.
  - 6.10.3.7. Gasoline, diesel, electric, or other power plants for improper performance.
  - 6.10.3.8. Excessive wear of chain drive sprockets and excessive chain stretch.
  - 6.10.3.9. Electrical apparatus for signs of any deterioration of items including, but not limited to controllers, master switches, contacts, limit switches, and push button stations, etc.
  - 6.10.3.10. Rope reeving for compliance with manufacturer's design.
  - 6.10.3.11. All function, caution, and warning labels or plates for legibility.
  - 6.10.3.12. Any other crane-type or hoist requirements from ASME B30 series.
- 6.10.4. Cranes Not In Regular Use:
- 6.10.4.1. All cranes that have been idle for more than one month shall receive a Frequent Inspection before use.
  - 6.10.4.2. Further requirements for frequency and type of crane inspection are dependent upon a crane's service class. The service class of a crane is based upon severity of service and environment.
  - 6.10.4.3. Cranes in the Heavy and Severe service classes that have been idle for more than 6 months, require both a Frequent Inspection and a Periodic Inspection prior to use.
  - 6.10.4.4. Cranes in the Normal service class that have been idle more than 12 months must be properly tagged out of service and require a Periodic Inspection prior to use.

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6.10.4.5. Wire ropes that have been idle for over one month due to shutdown or storage shall be given a thorough documented inspection before use.

6.10.4.6. It is recommended that Frequent inspections be performed monthly even on cranes which are used infrequently. In that way, the crane will be available immediately if it is needed. In addition, when the crane is operated to perform the inspection, parts get lubricated.

**6.10.5. Preventive Maintenance:**

6.10.5.1. Each location shall maintain a list of all cranes and hoists and a preventive maintenance schedule for each crane and hoist.

**6.10.6. Retention of Records:**

6.10.6.1. Written documentation for a crane or hoist's monthly inspections is required. Monthly inspection reports for the current year and the previous year shall be kept on file.

6.10.6.2. Written documentation for crane and hoists annual inspection shall be provided by the contractor. The annual inspections shall be kept on file for the life of the crane.

6.10.6.3. Initial Inspection Records.

6.10.6.4. Operational and Load Tests for a crane or hoist are performed at the time a crane is initially put into service and after a modification or extensive repair. The test reports shall be placed on file where readily available to appointed personnel.

6.10.6.5. These test reports shall be considered to be part of the permanent record of the crane and shall be retained until the crane is permanently taken out of service.

**6.11. Inspection of Mobile Cranes**


**NOTE: Boom configuration changes do not mandate a periodic (annual)**

6.11.1. Before initial use all modified, Mobile Cranes shall be inspected in accordance with the periodic (annual) inspection requirements of ASME B30.5 by a certified third party inspector independent of the site. Exceptions to this rule include attaching the jib, installing counter weights, or installing an alternate block.

6.11.2. Newly erected lattice boom cranes shall be inspected.


6.11.3. Daily pre-use inspection check and a functional/safety check shall be performed by the qualified operator using a checklist. See Appendix D for mobile crane checklist.

6.11.4. The operator of the Mobile Crane shall be knowledgeable in the operation and limitations of the Mobile Crane safety systems and interlocks. The operator shall refer to the operator's manual on each Mobile Crane to

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ensure this requirement is met. Some, but not all, examples of safety systems and interlocks are:

- 6.11.4.1. Anti-two block alarm.
  - 6.11.4.2. Bubble level indicator.
  - 6.11.4.3. Rear wheels not centered indicator.
  - 6.11.5. Documented visual inspection on the running wire rope shall be performed monthly in accordance with ASME B30.5 for Mobile Cranes in regular use. The visual inspection of the wire rope may be performed while it is on the reel(s) as long as an adequate inspection is performed. Documentation shall be maintained for the life of the rope.
  - 6.11.6. Complete inspection in accordance with ASME B30.5 periodic inspection requirements shall be performed annually on all Mobile Cranes in regular use. Certified third party inspection personnel, independent of the site, shall perform inspections. Documents shall be maintained for the life of the crane.
  - 6.11.7. Mobile Cranes that have been idle for a period of one month or more, but less than six months, shall receive a monthly inspection on the running wire rope prior to use. The visual inspection of the wire rope may be performed while it is on the drum as long as an adequate inspection is performed.
  - 6.11.8. Mobile Cranes that have been idle for over six months shall receive a periodic inspection by an independent certified inspector prior to use. Documents shall be maintained for the life of the crane.
- 6.12. Hoist Limit Switch/Device**
- 6.12.1. At the beginning of each work shift, or the first time the crane is used during a shift, test the upper-limit switch/device of each hoist under no load. Exercise extreme care to avoid two-blocking; "inch" the block into the limit switch or run it in at slow speed. If the switch/device does not operate properly, immediately notify the supervisor.
- 6.13. Synthetic Web Slings**
- 6.13.1. Each synthetic web sling shall be permanently marked with the following (or otherwise removed from service):
    - 6.13.1.1. Name or trademark of manufacturer.
    - 6.13.1.2. Rated capacities of the type of hitch.
    - 6.13.1.3. Type of material.
  - 6.13.2. Synthetic web slings and slings with alloy fittings shall not be used where fumes, vapors, sprays, mists or corrosive atmospheres may degrade the material.

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6.13.3. Synthetic web slings shall be immediately tagged and removed from service if any of the following conditions are present:

- 6.13.3.1. Acid or caustic burns;
- 6.13.3.2. Melting or charring of any part of the sling;
- 6.13.3.3. Snags, punctures, tears or cuts;
- 6.13.3.4. Broken or worn stitches; or
- 6.13.3.5. Distortion of fittings.

#### 6.14. Wire Rope Slings

- 6.14.1. An eye splice made in any wire rope shall have not less than three full tucks. However, this requirement shall not preclude the use of another form of splice or connection which can be shown to be as efficient and which is not otherwise prohibited.
- 6.14.2. Each wire rope used in hoisting or lowering, or in pulling loads, shall consist of one continuous piece without knot or splice. Exception to this is for eye splices in the ends of wires and for endless rope slings.
- 6.14.3. Eyes in wire rope bridles, slings, or bull wires shall not be formed by wire rope clips or knots.

### 7.0 CRITICAL LIFTS

- 7.1. Each business unit involved in lifting and rigging activities shall develop Critical Lift Procedures.
- 7.2. Critical lifts require evaluation and documentation in accordance with the business unit's Critical Lift Procedure.
- 7.3. A lift plan shall be developed.
- 7.4. Contractors must comply with critical lift policies established by the business unit providing oversight.

### 8.0 MOBILE CRANES

#### 8.1. General

- 8.1.1. No mobile crane lift shall be performed in adverse weather conditions that will jeopardize the safety of the lift. Follow manufacture's recommendations for wind velocity limitations, ice loading and guidance for inclement weather operation in section 8.3 of this document.
- 8.1.2. All Mobile Crane lifts that are performed near energized electrical transmission and distribution equipment near energized transformers will be performed in accordance with appropriate approach distance requirements for electrically qualified and unqualified workers.

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8.1.3. A qualified person shall oversee the assembly and disassembly of Mobile Cranes. If the configuration is changed, such as a boom section added or removed, a qualified person shall be consulted to ensure the change conforms to the manufacturer specifications.

## 8.2. Operating Mobile Cranes

8.2.1. The certified Mobile Crane operator shall be familiar with the assigned Mobile Crane type, understand the applicable portions of the manufacturer's operating manual, and be able to read and understand the load charts.

8.2.2. The Mobile Crane shall be set up in accordance with the manufacturer operating manual and the following:

8.2.2.1. Use the range diagram and load chart to assist in determining the Mobile Crane configuration requirements and clearances. Load Moment Indicator (LMI) shall not be used as a substitute for applying the load chart.

8.2.2.2. Ensure the ground on which the Mobile Crane sits is reasonably level, well compacted, stable enough to support the weight of the Mobile Crane and its load, and has no underground structures that could be collapsed.

8.2.2.3. Appropriate measures shall be taken to discover and protect underground conduits and pipes from crushing. JSA and JHA can be used for information.

8.2.2.4. Ensure firm footing under all tires or individual outrigger pads.

8.2.2.5. The industry standard for outrigger cribbing:

8.2.2.5.1. Minimum cribbing area shall be 3 times the outrigger pad area.

8.2.2.5.2. Cribbing shall be of strength sufficient to support the intended load.

8.2.2.6. When using outriggers, use applicable load chart for outrigger position. Ensure the tires do not support any load.


8.2.2.7. Always use cribbing under outrigger pads.

8.2.2.8. Use the **On Rubber** load chart if the outriggers are not used or if the tires are not clear of the ground.

8.2.2.9. Level the Mobile Crane to within 1 degree, utilizing leveling bubbles or a carpenter's level.

8.2.2.10. Do not load the crane beyond the specifications of the load-rating chart except for test purposes.



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8.2.2.11. Determine the weight of the load to be lifted such that it does not exceed the crane capacity ratings at the maximum radius over the travel of the lift.

8.2.3. Business unit barricade policies shall apply to all lifting operations.

8.2.3.1. Accessible areas within the swing radius of the rear of the rotating superstructure of the crane, either permanently or temporarily mounted, shall be barricaded in such a manner as to prevent an employee from being struck or crushed by the crane.

8.2.4. The deck and operator area shall be kept clean and free of oil, grease, rags, cables, chains, and other hazards. Non-slip surfaces should be provided at access and entry points.

8.2.5. Unauthorized personnel shall not enter the cab.

8.2.6. Personnel shall not ride on any exterior part of the Mobile Crane.

8.2.7. A signal person (spotter) shall be used as necessary to identify hazards while performing lifts. The operator will receive direction from only one person acting as the signal person. The signal person may be the same individual that is performing the rigging duties as long as they are qualified to do so.

### 8.3. Severe Weather Conditions

8.3.1. In performing lifts with a Mobile Crane during inclement weather conditions, the following situations shall be considered.

8.3.1.1. Operator discretion to be instituted in winds of sufficient force to affect the Mobile Crane loading.

8.3.1.2. Operator discretion to be instituted for the buildup of ice on the Mobile Crane booms.


8.3.1.3. Warning to all operators and riggers that shock loading or impact at temperatures below freezing may result in the brittle fractures of the steel.

8.3.2. Operators SHALL monitor weather conditions and suspend operations when:

8.3.2.1. Wind load exceeds the manufacturer requirements for configuration and load with consideration for the sail area of the load.

8.3.2.2. Electrical storms are in the vicinity. Work is to be suspended until thirty minutes after last visible lightning. A lightning strike monitoring device or service may be utilized if it is as effective as the 30 minutes work suspension.

8.3.3. Booms shall be lowered and/or anchored in accordance with the manufacturer's requirements during severe weather warning or when the equipment is left unattended for more than one shift.

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#### **8.4. Maintenance of Mobile Cranes**


- 8.4.1. A qualified person shall perform maintenance on Mobile Cranes.
- 8.4.2. All maintenance work shall be in accordance with manufacturer requirements.
- 8.4.3. A qualified person shall establish a preventive maintenance program based on the manufacturer's requirements.
- 8.4.4. After adjustments or repairs have been completed, the Mobile Crane shall not be returned to service until all safety equipment has been reinstalled, trapped air has been removed from the hydraulic system, safety devices have been verified operational, and maintenance equipment has been removed.
- 8.4.5. Replacement parts shall be obtained from the manufacturer or in accordance with the manufacturer's specifications.
- 8.4.6. All Identified deficiencies noted during maintenance of the Mobile Crane that would affect the safe operation, shall be corrected prior to additional operation and documented in accordance with the maintenance program.
- 8.4.7. Maintenance records shall be maintained for the operational life of Mobile Crane.

8.5. *Inspections: Please refer to Section 6 of these AEP procedures.*


### **9.0 OVERHEAD & GANTRY CRANES**

#### **9.1. General**

- 9.1.1. Overhead and gantry cranes shall be operated, marked, and maintained in compliance with all applicable regulations and with the manufacturer's requirements.
- 9.1.2. Except for test purposes, overhead or gantry cranes shall not be loaded beyond rated capacity without the manufacturer's approval.
- 9.1.3. Operators of overhead cranes shall be trained and qualified as required in the training Section 4 of these procedures.
- 9.1.4. The rated capacity shall be marked on each side of the bridge. If the crane has more than one hoisting unit, each hoist shall have its rated capacity marked on it or on its load block. Markings on the bridge, trolley, and load block shall be legible from the ground or floor.
- 9.1.5. On cab-operated cranes, there shall be at least two means of egress from the crane, remote from each other, and arranged to permit departure under emergency conditions.
- 9.1.6. Each independent hoisting unit shall be equipped with at least one holding brake applied directly to the motor shaft or some part of the gear train.

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- 9.1.6.1. Each independent hoisting unit (except worm-gear hoists, the angle of whose worm prevents the load from accelerating as it is being lowered) shall be equipped with a controlled-braking means in addition to the holding brake to control speed of lowering.
- 9.1.6.2. Holding brakes on hoists shall be applied automatically when power is removed.
- 9.1.7. **Holst-Limit Switch**
  - 9.1.7.1. The hoisting motion of all cranes shall have an over travel-limit switch/device in the hoisting direction to stop the hoisting motion.
  - 9.1.7.2. Lower limit switches/devices shall be provided for all hoists where the load block enters pits or hatchways in the floor.
- 9.1.8. The crane shall not be loaded beyond its rated capacity except for test purposes without the manufacturer's approval.
- 9.1.9. Facilities shall establish a designated staging area for all overhead cranes.
  - 9.1.9.1. When not in use, cranes shall be returned to a designated staging area.
- 9.1.10. The maintenance history of the crane shall be retained throughout its life.
- 9.1.11. Inspections: *Please refer to Section 6 of these AEP procedures.*
- 9.2. **Conduct of Operator.**
  - 9.2.1. Sound a warning signal (if furnished) intermittently during travel, particularly when approaching personnel.
  - 9.2.2. If you find the crane's main or emergency switch open when starting on duty, do not close it until it has been determined that no one is on or close to the crane. Do not remove warning tags or close the switch without following the proper procedures.
  - 9.2.3. Before closing the main switch, ensure that all controllers are in the OFF position.
  - 9.2.4. If a power failure occurs during operation, immediately switch all controllers to the OFF position. *Ref Section 5.4.*
  - 9.2.5. Appropriately secure outdoor cranes before leaving them.
  - 9.2.6. When the wind-indicating alarm is given, anchor the bridge on outside cranes.
  - 9.2.7. Operate all controls before beginning a new shift. If any controls do not operate properly, have a qualified person adjust or repair them before operations begin.
  - 9.2.8. Separate loads shall not be lifted on separate trolleys on the same bridge at the same time without management approval.

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### 9.3. Hoist-Limit Switch/Device

- 9.3.1. Do not use the hoist-limit switch device that controls the upper limit of travel of the load block as an operating control.

## 10.0 BELOW THE HOOK DEVICES

These lifting devices, sometimes called below-the hook lifters, attach hoists to their loads. In addition they may attach, hold, protect, control and orient the load in the process. They are independent of the crane, hoist, trolley and carrier hook.

Policy or procedure statements are not proposed as a substitute for the manufacturer's operation manual.

### 10.1. General

- 10.1.1. All below-the-hook lifting devices shall be inspected, installed, maintained, and used according to the manufacturer's specifications and instructions.
- 10.1.2. Alterations of below the hook devices shall not be performed without the full understanding and approval of the manufacturer or a qualified engineer.
- 10.1.3. Do not operate without having read operating instructions.
- 10.1.4. Do not operate unit until it is inspected before each shift.
- 10.1.5. Do not lift more than rated load capacity.
- 10.1.6. Do not operate a malfunctioning unit or one tagged out of service.
- 10.1.7. Do not use below the hook device for other than designated purposes.
- 10.1.8. Do not use a below the hook device when capacity, weight or safety markings are missing.

### 10.2. Job-built/Shop-built Devices

- 10.2.1. Any fabricated below-the-hook lifting devices shall be approved by a qualified engineer.
- 10.2.1.1. Tested up to 125% of rated capacity.
- 10.2.1.2. Designed for five times the intended load.
- 10.2.2. Marking requirements of Section 10.3 shall be met.
- 10.2.3. Documentation of the engineering approval (in conformance with the AEP Safety Manual Section G 4.09) shall be available on request.

### 10.3. Markings

- 10.3.1. The nameplate attached to the below the hook device shall include:
- 10.3.1.1. Manufacturer's name and address if applicable.
- 10.3.1.2. Serial number if applicable.
- 10.3.1.3. Rated load capacity.

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10.3.2. The rated load capacity shall be easily visible on each side of the below the hook device frame. If the lifting device is made up of several below the hook devices, each detachable from the whole, each shall be marked with its individual rated load capacity.

10.3.3. All warning labels and decals must be maintained so that they remain legible. Do not remove or obscure warning label. Replace as necessary.

#### 10.4. Installation

10.4.1. When a below the hook device requires an auxiliary power supply for operation, a designated person must ensure that the power source matches the requirements of the below the hook device. The power supply must be connected to the line side of the crane disconnect switch or to an independent circuit as specified in the manufacturer's operating instructions. Power must be disconnected at the source before making electrical connections.

#### 10.5. Inspection

10.5.1. Lifting devices require initial inspection before operation and regularly scheduled frequent and periodic inspection procedures thereafter.

10.5.2. Please reference Section 6 of these procedures.

#### 10.6. Operation

10.6.1. A designated person in accordance with the manufacturer's requirements must instruct the operator of a lifting device in its use. The operator must also be fully familiar with the following minimal guidelines.

10.6.2. The operator or a designated person must determine that all loads are secure and that nothing will fall during the lifting cycle.

10.6.3. The operator or a designated person must closely monitor the below the hook device's performance during the lifting procedure. Use of the below the hook device must be stopped immediately if any improper performance is observed.

10.6.4. The combined weight of the below the hook device and load must not exceed the rated load capacity of the crane or the hoist.

10.6.5. Do not use the below the hook device for loads for which it is not designed.

10.6.6. Only a qualified person may remove an out-of-service tag from a below the hook device after repair.

10.6.7. After use, store below the hook device properly in a stable position.

### 11.0 MANUAL, ELECTRIC AND PNEUMATIC HOISTS

This section provides safety standards for inspecting, testing, and operating hoists not permanently mounted on overhead cranes and references the requirements of ASME

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B30.11 ("Monorail Systems and Under Hung Cranes"), B30.16 ["Overhead Hoists (Under Hung)"], and B30.21 ("Manually Lever Operated Hoists").

### 11.1. General

11.1.1. This section applies to the following types of equipment:

11.1.1.1. Overhead hoists (underhung).

11.1.1.2. Hoist-way lifts.

11.1.1.3. Hatch way hoists.

11.1.1.4. Jib cranes/hoists (floor and wall mounted).

11.1.1.5. Monorail systems.

11.1.1.6. Manual-lever-operated hoists (wire rope, chain, and web-strap types).

11.1.1.7. Tuggers and blocks.

11.1.2. Hoists shall be operated, inspected, marked, and maintained according to the manufacturer's requirements.

11.1.3. The rated capacity shall not be exceeded except for properly authorized tests.

11.1.4. Portable wire rope ratchet and pawl lever-operated hoists (cable come-along) shall not be used for lifting service.

11.1.5. Systems used for transporting personnel and specially insulated hoists used for handling electrically energized power lines require special considerations and are not addressed in this chapter.

11.1.6. Load chain must be original equipment manufacturer or equivalent.

11.1.7. Over travel protection provided by the manufacturer shall be kept in working condition.

11.1.8. Support structures, including trolleys and monorails, shall have a marked rated capacity at least equal to that of the hoist(s).

11.1.9. The hoist shall be installed only in locations that will permit the operator to remain clear of the load at all times unless overhead protection is provided.

### 11.2. Operator Training/Qualification

11.2.1. Operators shall demonstrate ability to safely operate hoists.

### 11.3. Marking

11.3.1. The rated capacity shall be permanently marked.

11.3.2. Hoists shall be marked with the name of manufacturer and serial or model number.

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11.3.3. Electric-powered hoists shall be marked with voltage of AC or DC power supply and phase/frequency of AC power supply as well as circuit ampacity.

#### **11.4. Wire Rope**

11.4.1. Wire rope shall be of a construction specified by the hoist manufacturer or by a qualified person.

11.4.2. Wedge sockets shall be installed in the manner specified by the manufacturer of the assembly or the rope.

11.4.3. Swaged or compressed fittings shall be applied as recommended by the rope, hoist, or fitting manufacturer or a qualified person.

11.4.4. The rope ends shall be attached to the hoist in a manner to prevent disengagement throughout rated hook travel. No less than two wraps of rope shall remain on the anchorage of the hoist load sprocket (drum) when the hook is in its fully extended position, unless a lower-limit device is provided, in which case one wrap shall remain on each anchorage of the drum hoist.

11.4.5. Eyes in hoisting rope shall not be formed with wire rope clips.

#### **11.5. Inspections**

##### **11.5.1. General.**

11.5.1.1. Please refer to inspection guidelines in Section 6 of these AEP procedures.

11.5.1.2. Manufacturers' requirements for inspection shall be followed.

11.5.1.3. Pre-use and periodic inspections are required.

11.5.2. Welded-Link Chain - A qualified inspector shall do the following during periodic inspections:

11.5.2.1. Operate the hoist under load in raising and lowering directions and observe the operation of the chain and sprockets. The chain shall feed smoothly into and away from the sprockets.

11.5.2.2. Make sure that, if the chain binds, jumps, or is noisy, first clean and properly lubricate it. If the trouble persists, inspect the chain and mating parts for wear, distortion, or other damage.

11.5.2.2.1. Manufacturer's inspection requirements shall be followed.

#### **11.6. Maintenance**

11.6.1. The owner of the equipment shall establish a preventive maintenance program based on manufacturers' requirements.

11.6.2. Replacement parts shall be at least equal to manufacturer's specifications.

#### **11.7. Operation**

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#### 11.7.1. Attaching the Load.

- 11.7.1.1. Do not wrap the hoist rope or chain around the load.
- 11.7.1.2. Attach the load to the hook using slings or other approved devices.
- 11.7.1.3. Operate hand-chain-operated hoists with hand power only and with no more than one operator per hand chain.
- 11.7.1.4. Do not use a lever extension ("cheater") on manual-lever-operated hoists.

### **12.0 DIGGER DERRICKS**

#### 12.1. All AEP operators of Digger Derrick trucks shall complete AEP training.

- 12.1.1. Contractor operators shall complete AEP training or equivalent.
- 12.1.2. This training shall consist of classroom and hands-on training. At the completion of the training all operators shall take and pass a test consisting of both hands on and written components.
- 12.1.3. Note: The written components of the test shall confirm operators are able to read and understand the vehicles load chart. Requalification is required at 3 year intervals.
- 12.1.4. Contractors and outside companies may be exempted from this training requirement for emergency storm repair operations.

#### 12.2. General

- 12.2.1. Do not remove or bypass any interlock or safety device on the machine.
- 12.2.2. Do not operate in an electrical storm. Operations shall stop for 30 minutes after last visible lighting. A lightning strike monitoring device or service may be utilized if it is as effective as the 30 minutes work suspension.
- 12.2.3. Never come in contact with both ground and equipment when working near energized lines. Unless operating via remote controls always operate controls while standing on the vehicle.
- 12.2.4. Ground and barricade the vehicle according to the business units' policy.
- 12.2.5. Outriggers shall be extended prior to making any lifts. Ensure firm footing under all outriggers. Cribbing shall be 3 times the outrigger pad area.
- 12.2.6. Pre-use inspections shall be performed on all units prior to beginning each shift. These inspections shall include a check of operators' controls and the winch line.
- 12.2.7. The boom may not pass minimum approach distance to energized lines without appropriate covering or guarding.



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- 12.2.8. Ensure all ground personnel are clear of the load while it is being lifted.
- 12.2.9. Remain at the controls at all times while the load is suspended.
- 12.2.10. Do not exceed the capacities listed on the load charts.
- 12.2.11. Always allow extra clearance room for boom deflection.
- 12.2.12. Do not use machine to lift unknown loads.
- 12.2.13. Do not use machine to pull poles from ground without using a load measuring device such as a dynamometer.
- 12.2.14. Pole Plummer guides shall not be clamped tightly and shall not be used to lift any of the pole weight.

#### 12.3. Load Lines

- 12.3.1. The load line is designed for straight line pulls. The load line must be placed over the load so the winch is making a straight line pull.
- 12.3.2. Do not lift load that exceed the capacities of the load chart or the safety working load of the load line.
- 12.3.3. Four wraps must remain on winch drum during lifting operations.
- 12.3.4. Do not allow personnel to ride load line.
- 12.3.5. Maintain proper approach distances between load line and energized conductors. Do not rely on the synthetic load line to be an insulator.
- 12.3.6. All load line hooks shall be equipped with a safety latch.
- 12.3.7. Always keep load line level and tight on the drum.
- 12.3.8. Do not jerk (shock load) the load line while lifting.
- 12.3.9. Do not wrap end fittings around load and connect back to the load line.

#### 12.4. Attachments

- 12.4.1. When using jib attachments on Digger Derrick use appropriate load charts for the jib. Do not use the standard load chart and do not handle poles with jib.
- 12.4.2. Ensure all attachments are installed properly and inspected prior to use.

### 13.0 MATERIAL HANDLERS

A Transmission and Distribution aerial lift with a side-mounted lifting jib.

- 13.1. Only trained and qualified persons shall be permitted to operate.
  - 13.1.1. Initial training shall be refreshed every five years.
- 13.2. The lifting of personnel suspended on the hoist is prohibited.
- 13.3. Use only manufacturer approved synthetic rope for the winch line.
- 13.4. Keep winch line as clean as possible.

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- 13.5. Do not wrap hoist line around load.
- 13.6. Do not allow rope to contact energized power lines. Do not rely on rope being non-conductive.
- 13.7. Inspect the winch rope daily. Do not operate with a damaged or frayed rope.
- 13.8. Do not use the winch line as a sling.
- 13.9. Use only hooks with a safety latch.
- 13.10. Use load chart to prevent overloading. Never lift an unknown weight. Always calculate weight or use a load cell.
- 13.11. The jib is designed for vertical loads only. Never side load a jib boom.
- 13.12. Do not use jib or winch to pull or string line.
- 13.13. Do not pull poles or objects embedded in the ground.
- 13.14. Lifting a load will cause deflection in the aerial device. Allow adequate clearance when applying and removing the load.
- 13.15. Use only approved hot line tools for lifting energized conductors. Clean and inspect all fiberglass on the conductor lifter pre-use.

## **14.0 ATTACHMENT POINTS**

### **14.1. Manufacturer-Supplied Attachment Points**

- 14.1.1. Prior to lifting any load the weight of load shall be determined.
- 14.1.2. If attachment points are provided by the manufacturer, a qualified person must verify that they are adequate for handling the load imposed by the rigging method and the associated lifting angle on the attachment. The manufacturer's lifting instructions shall be followed when available.
- 14.1.3. Prior to rigging to any attachment point, the qualified person shall inspect the attachment point for signs of wear, damage, improper installation, or other risk factors.

### **14.2. Fabricated Attachment Points**

- 14.2.1. See Appendix B.
- 14.2.2. Attachment points must be certified by a qualified engineer.
- 14.2.3. Attachment points shall be designed with a safety factor of 5 times the rated capacity.

### **14.3. Eye Bolt Attachment Points**

- 14.3.1. When using eyebolts as attachment points the ASME B30.26 and/or an approved Rigging Handbook shall be followed.
- 14.3.2. A qualified person shall determine the proper size and use of selected eyebolts.

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- 14.3.3. Non-shouldered eyebolts shall not be used for angular lifting.
- 14.3.4. When using shouldered eyebolts, the plane of the eye shall be aligned with the direction of loading.
- 14.3.5. Shortening of eyebolts must follow manufacturer's requirements or a qualified engineer approved procedure.
- 14.3.6. Do not use carbon steel eyebolts below 30°F or above 275°F unless the manufacturer's procedure for the prevention of shock loading is followed.
  - 14.3.6.1. See Appendix A for the Crosby procedure.

#### 14.4. Lift/hoist ring attachment points

- 14.4.1. The preferred attachment for angular loading.
- 14.4.2. Personnel shall be made aware of potential pinch points.


### 15.0 APPROVAL OF NEWLY STOCKED EQUIPMENT

- 15.1. Prior to purchase/lease of any lifting equipment the business unit must evaluate the suitability for the equipment.
- 15.2. All necessary individuals shall be consulted to ensure the equipment is suitable for the task for which it is purchased/leased.
- 15.3. The business unit shall appoint a person to review the equipment and ensure the equipment meets the applicable safety standards.
- 15.4. No equipment shall be used on AEP property without the documentation stating capacity and safe operating instructions.
- 15.5. Equipment hazards will be evaluated during the JSA briefing using the equipment documentation.
- 15.6. Employees shall have access to manufacturer's specifications for newly acquired equipment.

### 16.0 SUSPENDED PERSONNEL PLATFORMS (Man baskets)

#### 16.1. General

- 16.1.1. The use of a crane or derrick to hoist employees on a personnel platform is prohibited except when the erection, use, and dismantling of a conventional means of reaching the work site, such as personnel hoist, ladder, stairway, aerial lift, elevating work platform, or scaffold would be more hazardous or not possible because of structural design or work site conditions.
- 16.1.2. The use of any personnel hoists (man baskets) requires the use of Personnel Hoist Checklist (attached). This shall be completed by the PIC prior to the use of the basket.

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- 16.1.3. Hoisting of the personnel platform shall be performed in a slow, controlled, and cautious manner with no sudden movements of the crane or the platform.
- 16.1.4. Load lines shall be capable of supporting without failure at least seven times the maximum intended load.
- 16.1.5. Where rotation resistant rope is used the lines shall be capable of supporting without failure at least ten times the maximum intended load.
- 16.1.6. Load and boom hoist drum brakes, swing brakes, and locking devices such as pawls shall be engaged when the occupied personnel platform is in the stationary working position.
- 16.1.7. The crane shall be uniformly level within one percent of level grade and located on firm footing. Cranes equipped with outriggers shall have them fully deployed following manufacturer's specifications, insofar as applicable, when hoisting employees.
- 16.1.8. The total weight of the loaded personnel platform and related rigging shall not exceed 50 percent of the rated capacity for the radius and configuration of the crane or derrick.
- 16.1.9. The use of machines having live booms (booms in which the lowering is controlled by a brake without aid from other devices which slow the lowering speeds) is prohibited.

#### **16.2. Platform Specifications**

- 16.2.1. Each personnel platform shall be equipped with a complete guardrail system and shall be enclosed at least from the toe board to mid-rail with either solid construction or expanded metal having openings no greater than ½ inch.
- 16.2.2. A grab rail shall be installed inside the entire perimeter of the personnel platform.
- 16.2.3. Access gates, if installed, shall not swing outward during hoisting operations.
- 16.2.4. Access gates, including sliding or folding gates, shall be equipped with a restraining device to prevent accidental opening.
- 16.2.5. Headroom shall be provided which allows employees to stand upright on the platform.
- 16.2.6. In addition to the use of hard hats, employees shall be protected by overhead protection on the personnel platform when employees are exposed to falling objects.
- 16.2.7. All rough edges exposed to contact by employees shall be surfaced or smoothed in order to prevent injury to employees from punctures or lacerations.

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- 16.2.8. A qualified welder shall perform all welding of the personnel platform and its components.
- 16.2.9. The personnel platform shall be conspicuously posted with a plate or other permanent marking which indicates the weight of the platform and its rated load capacity or maximum intended load.

### 16.3. Personnel Platform Loading


- 16.3.1. The personnel platform shall not be loaded in excess of its rated capacity.
- 16.3.2. The number of employees occupying the personnel platform shall not exceed the number required for the work being performed.
- 16.3.3. Personnel platforms shall be used only for employees, their tools, and the material necessary to do their work and shall not be used to hoist materials or tools when not hoisting personnel.
- 16.3.4. Materials and tools for use during a personnel lift shall be secured to prevent displacement.
- 16.3.5. Materials and tools for use during a personnel lift shall be evenly distributed within the confines of the platform while the platform is suspended.

### 16.4. Rigging

- 16.4.1. When a wire rope bridle is used to connect the personnel platform to the load line, each bridle leg shall be connected to a master link or shackle in such a manner to ensure that the load is evenly divided among the bridle legs.
- 16.4.2. Hooks on the headache ball assemblies, lower load blocks, or other attachment assemblies shall be of a type that can be closed and locked eliminating the hook throat opening. Alternatively, an alloy anchor type shackle with a bolt, nut, and retaining pin may be used.
- 16.4.3. Wire ropes, shackles, rings, master links, and other rigging hardware must be capable of supporting, without failure, at least five times the maximum intended load applied, or transmitted to that component. Where rotating resistant rope is used the slings shall be capable of supporting without failure at least ten times the maximum intended load.
- 16.4.4. All eyes in wire rope slings shall be fabricated with thimbles.
- 16.4.5. Bridles and associated rigging for attaching the personnel to the hoist lines shall be used only for the platform and the necessary employees, their tools, and the materials necessary to do their work, and shall not be used for any other purpose when not hoisting personnel.

### 16.5. Trial, Lift, Inspections and Proof Testing

- 16.5.1. Prior to hoisting employees on the personnel platform and after any repair or modification, the platform and rigging shall be proof tested to 125 percent of the platform's rated capacity by holding it in a suspended

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position for five minutes with the test load evenly distributed on the platform (this may be done concurrently with the trial lift).

- 16.5.2. This trial lift shall be performed immediately prior to placing personnel on the platform.
- 16.5.3. The operator shall determine that all systems, controls, and safety devices are activated and functioning properly; that no interference exists; and that all configurations necessary to reach those work locations will allow the operator to remain under the 50 percent limit of the hoist's rated capacity.
- 16.5.4. Materials and tools to be used during the actual lift should be loaded in the platform. A single trial lift may be performed at one time for all locations that are reached from a single set up position.
- 16.5.5. The trial lift shall be repeated prior to hoisting employees when:
  - 16.5.5.1. The crane is moved and set up in a new location or returned to a previously used location.
  - 16.5.5.2. The lift route is changed.
    - Unless the PIC determines that the route change is not significant (i.e., the route change would not affect the safety of hoisted employees).
- 16.5.6. A visual inspection of the crane, rigging, personnel platform, and the crane base support or ground shall be conducted by the PIC immediately after the trial lift to determine whether the testing has exposed any defect or produced any adverse effect upon any component structure.
- 16.5.7. After the trial lift and just prior to hoisting personnel, the platform shall be hoisted a few inches and inspected to ensure that it is secure and properly balanced. Employees shall not be hoisted unless the following conditions are determined to exist:
  - 16.5.7.1. Hoist ropes shall be free of kinks;
  - 16.5.7.2. Multiple part lines shall not be twisted around each other;
  - 16.5.7.3. The primary attachment shall be centered over the platform;
  - 16.5.7.4. The hoisting system shall be inspected if the load rope is slack to ensure all ropes are properly seated on drums and sheaves.
- 16.5.8. Any defects found during inspections that create a safety hazard shall be corrected before hoisting personnel.
- 16.5.9. There shall be annual inspection performed and documented by a qualified person on the personnel platform i.e. structural, and weld integrity. This information shall be provided to owner at owner's request.

## 16.6. Communications

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- 16.6.1. Some operations, such as diving operations, require a site-specific communications plan.
- 16.6.2. Continuous electrical two-way voice contact between the crane operator and the employees in the platform.
- 16.6.3. Continuous sight contact between the crane operator and the employees in the basket or another person not in the basket designated as the signal person.
- 16.6.4. The signal person shall not be assigned other duties while an occupied personnel basket is suspended and must remain in visual contact with the operator and the employees in the platform.
- 16.6.5. Employees being hoisted shall remain in continuous sight of and direct communication with the operator or signal person. In those situations where direct visual contact with the operator is not possible and the use of a signal person would create a greater hazard for that person, direct communication alone (such as by radio) may be used.

#### **16.7. Pre-Lift Meeting**

- 16.7.1. A meeting attended by the crane operator, signal person, (if necessary for the lift), employee(s), and the PIC shall be held to review the appropriate requirements of this section and the procedures to be followed.
- 16.7.2. This meeting shall be held prior to the trial lift at each new work location and shall be repeated for any employees newly assigned to the operation.

#### **16.8. Work Practices**


- 16.8.1. Cranes shall not travel while the platform is occupied.
- 16.8.2. Employees shall keep all parts of the body inside the platform during raising, lowering, and positioning. This provision does not apply to an occupant of the platform performing the duties of a signal person.
- 16.8.3. Before employees exit or enter a hoisted personnel platform that is not landed, the platform shall be secured to the structure where the work is to be performed, unless securing to the structure creates an unsafe condition.
- 16.8.4. Tag lines shall be used unless their use creates an unsafe situation.
- 16.8.5. The crane operator shall remain at the controls at all times when the crane engine is running and the platform is occupied.
- 16.8.6. Hoisting of employees shall promptly discontinue upon indication of any dangerous weather conditions or other impending danger.
- 16.8.7. Employees occupying the personnel platform shall use a body harness system with lanyard appropriately attached to the platform.
- 16.8.8. Over water, harnesses shall be disconnected and flotation devices used.

#### **16.9. 14.9 Inspections**

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16.9.1. The PIC shall designate a competent person (normally the operator) who shall inspect all machinery and equipment prior to each use and during use to make sure it is in safe operating condition. Any deficiencies shall be repaired or defective parts replaced before continued use. These inspections shall be documented as noted for the specific type of inspection.



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### Personnel Hoist Checklist

Project:	Date:
Project Superintendent/Foreman	
Operator	

**Inspection Attributes**

1. Crane and wire rope inspection	Acceptable	<input type="checkbox"/>
Date:	Inspected by:	
Inspection checklist attached	<input type="checkbox"/>	
2. Crane is equipped with power down on the load line	Acceptable	<input type="checkbox"/>
3. With load at the lowest point, crane has moiré than 2 full wraps of rope on the drum,.	Acceptable	<input type="checkbox"/>
4. Crane operator understands mandatory requirements, operations, and conditions	Acceptable	<input type="checkbox"/>
5. Operator is fully aware that two-way voice communication is required	Acceptable	<input type="checkbox"/>
6. Electric two-way communication provided between crane and basket	Acceptable	<input type="checkbox"/>
7. Basket has been tested at _____ lbs.	Acceptable	<input type="checkbox"/>
8. Adequate steel guardrails and toeboards are provided	Acceptable	<input type="checkbox"/>
9. Bottom of work platform is secure	Acceptable	<input type="checkbox"/>
10. Four point suspension provided to keep platform level	Acceptable	<input type="checkbox"/>
11. Safety hook or screw pin shackle for attachment to load line	Acceptable	<input type="checkbox"/>
12. Wire rope safety line and screw pin shackle attached above headache ball	Acceptable	<input type="checkbox"/>
13. Permanently affixed plate specifying maximum number of passengers and load limit of basket	Acceptable	<input type="checkbox"/>
15. If required, basket is equipped with overhead protection	Acceptable	<input type="checkbox"/>
16. Safety harness and lanyards provided for each passenger	Acceptable	<input type="checkbox"/>
17. Emergency method to remove employees from the suspended basket is available	Acceptable	<input type="checkbox"/>

**Certification that the above items, training of all participants and safety program requirements have been satisfied**

Project Superintendent/Foreman	
Operator	Date:
Foreman	

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**17.0 REFERENCES**

**Compliance (Numbered entries are from 29 CFR)**

1910 Subpart N		1926 Subpart N	
1910.269	Materials Handling Electric Power Generation	1926.753	Cranes & Derricks Hoisting & Rigging
AEP Safety & Health Manual		1926.950	Power T&D General Requirements
AEP Circular Letter CI-M-CL-003		1910.179	Overhead & Gantry Cranes

**Consensus**

ASME B30 Series	ANSI A10.42-2000
ASME B56 Series	D.C. Cook Rigging & Lifting Policies
National Commission for the Certification of Crane Operators <a href="http://www.nccco.com">www.nccco.com</a>	J. Klinker Rigging Handbook (most current edition)

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**18.0 APPENDICES**

**Appendix A**

The Crosby Group, Inc.	Technical Data Sheet	07/24/2008
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**Cold Temperature Service**

**Temperature to -40°F (-40°C):**

The working load limits of Crosby Fittings are valid for general service condition down to a temperature of -40°F (-40°C). The Crosby Group, Inc. does however recommend the following practical guidelines for cold temperature operations below 0°F (-18°C).

1. All lifting should be performed at a slow, steady rate. Shock loading should be avoided.
2. All lifting equipment and fittings should be given a thorough visual inspection before each lift.
3. If the equipment contains bearings, lubrication may be retarded, therefore an increased maintenance schedule may be necessary.
4. All lifting equipment should undergo a periodic surface inspection using visual and/or NDT Techniques. This schedule and technique should be designed by qualified personnel employed by the user of the equipment taking into consideration the severity level of the service condition.
5. Fittings with surface defects such as nicks, gouges, or cracks should not be used until these are removed by grinding (follow the contour of the part) within the allowable reduction of cross section. (5%)
6. Fittings that have been welded or modified after leaving the factory should not be used for cold temperature application.

**Temperature below -40°F (-40°C):**

The Crosby Group, Inc. does not recommend the use of our standard catalog fittings below -40° F/C without these special precautions.

1. These products should be ordered with certified impact properties of 25 ft lb at the operating temperature.
2. Before the initial exposure to these temperatures, all Crosby fittings shall undergo a NDT surface inspection using either the dye penetrant or the magnetic particle process.
3. All surface defects (nicks, gouges and cracks) found visually or with NDT shall be removed by grinding (following the contour of the part) within the allowable reduction of the cross section. (5%)
4. Do not use any Crosby fittings that have been modified or welded after leaving the factory.
5. After the initial NDT Examination, all Crosby fittings shall undergo dye penetrant or magnetic particle surface inspection on a periodic basis. This schedule should be designed by qualified personnel, employed by the user of the fittings taking into consideration the severity level of the service condition.
6. All lifting shall be performed at a slow, steady rate. Shock loading shall be avoided.
7. All lifting equipment shall be given a thorough visual inspection before each lift.

Crosby "COLD TUFF®" Shackles and Masterlinks may be used at temperatures down to -50° F (-45° C) under the conditions stated above. These products are identified as:

PRODUCT	SIZE	PRODUCT	SIZE	PRODUCT	SIZE
G-2130 CT	4-3/4t - 25t	G-2140 CT	30t - 80t	G-2160	75t - 1000t
A-342 CT	1-1/4" - 2"	A-345 CT	1-1/4" - 2"		

Additional information is available from The Crosby Catalog, Product Warning Sheets, OSHA and ASME B 30.

REV 4: hot section - insert into 3 and remove into 7.

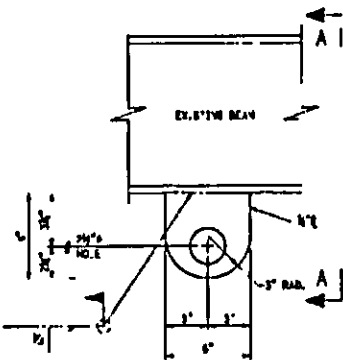
Classification	Catalog No.	Document No.	Revision No.	File Name
GENERAL	N/A	LTS	4	tdsite.doc

**8.1.2**

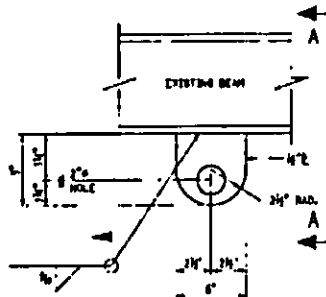
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Appendix B

AEP Pad Eye



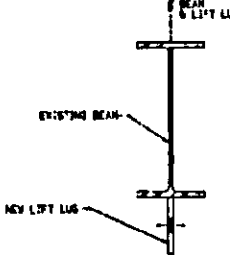
**3 TON LIFT LUG DETAIL**  
6\" data-bbox="315 475 475 495"/>



**1 TON LIFT LUG DETAIL**  
6\" data-bbox="550 445 705 465"/>

**NOTES:**


1. THE LIFT LUGS SHOWN ON THIS STRUCTURAL ENGINEERING STANDARD ARE TO BE USED WHERE THE ATTACHMENT OF THE LUGS TO THE EXISTING BEAM WILL BE DONE BY THE HOOK METHOD. THE HOOKS THAT ARE USED MUST HAVE SHOOTS AND ROUNDED SQUARE ENDS.
2. THE CAPACITY OF THE LIFT LUGS AS SHOWN HEREIN IS TO THE HORIZONTAL VERTICAL LOAD ONLY. THE CAPACITY OF THE LUGS TO THE HORIZONTAL VERTICAL LOAD MUST BE ANALYZED FOR THE EXISTING BEAM AND THE LUGS IN CONJUNCTION WITH THE LIFTED LOAD. THE LUGS ARE TO BE ANALYZED FOR THE LIFTED LOAD.
3. LUGS ARE DESIGNED FOR VERTICAL LIFT ONLY. AVOID ANY TYPE OF SIDE PULL ON THE LUG.
4. LUGS ARE TO BE INSTALLED ON THE BEAM CENTERLINE AS SHOWN IN SECTION A-A.
5. LUGS ARE TO BE INSTALLED PARALLEL TO THE MED OF THE BEAM AS SHOWN IN SECTION A-A.
6. WELDING TO BE PERFORMED IN ACCORDANCE WITH AWS D1.1.
7. WELDING ELECTRODES TO BE E7018, LOW HYDROGEN.
8. LUGS TO BE FABRICATED FROM A572-50 STEEL OR APPROVED TOLUAL.
9. FOR ADDITIONAL NOTES OTHER THAN SHOWN, CONTACT AEP STRUCTURAL ENGINEERING SECTION FOR ASSISTANCE.
10. WHEN THE SPAN OF THE BEAM IS LONGER THAN SHOWN IN THE TABLE, THE BEAM MUST BE ANALYZED FOR THE EXISTING LOADS ACTING IN COMBINATION WITH THE LIFTED LOAD.
11. WELDS IN THE LIFT LUGS ARE TO BE WELDED. ANY CUTTING MAY BE REQUIRED IF REQUIRED. WELDS THAT SHOULD BE WELDED TO THE BEAM.




**SECTION A-A**

MINIMUM BEAM SIZE	W8X15	W10X22	W12X26	W14X30	W16X40	W18X50	W21X62
1 TON	6'	12'	18'	22'	22'	22'	22'
3 TON	8'	12'	18'	22'	22'	22'	22'

REVISION 1 - ADDED NOTES 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 FOR 1 TON AND 3 TON CAPACITY. SEE NOTES 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11.

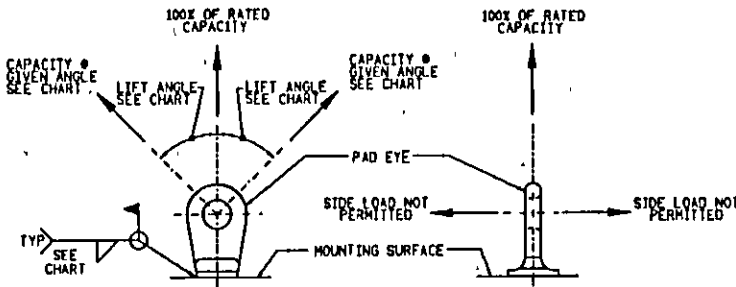
<b>CIVIL ENGINEERING DIVISION          STRUCTURAL ENGINEERING STANDARD</b>	REVISED BY: <i>[Signature]</i> APPROVED BY: <i>[Signature]</i> DATE: 4/1/08	<b>LIFT LUG DETAILS (VERTICAL LIFT)          FOR USE WITH HOOK ATTACHMENT          1 TON AND 3 TON CAPACITY</b> SHEET # 2
APPROVED BY: A. L. SMYDER    CIVIL    ENR	CIVIL    01    04/12/08/04	1 SPYRIDGE PLAZA COLUMBUS, OH, 43218
		SES - 0015-1

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Crosby Pad Eye DWG

### FORGED STEEL PAD EYE SPECIFICATIONS & DETAILS

SOURCE: CROSBY GROUP, INC. CATALOG ITEM S-264





THIS DIAGRAM ASSUMES SHOWN RELATIONSHIP OF PAD EYE TO MOUNTING SURFACE REGARDLESS OF MOUNTING SURFACE ANGLE OR WHETHER ATTACHED TO TOP OR UNDERSIDE OF EQUIPMENT OR MEMBER

**NOTES:**

- THE PAD EYES SHOWN ON THIS STRUCTURAL ENGINEERING STANDARD ARE TO BE USED WHERE THE ATTACHMENT OF THE RIGGING TO THE PAD EYE WILL BE DONE WITH A HOOK MECHANISM. THE HOOKS THAT ARE USED SHALL HAVE SMOOTH AND ROUNDED EDGES.
- THE CAPACITY OF THE PAD EYES AS SHOWN REFERS TO THE MAXIMUM LOAD APPLIED DIRECTLY TO THE PAD EYE PERPENDICULAR & IN PLANE WITH THE MOUNTING SURFACE. THE FIELD MUST CONSIDER THE RIGGING SCHEME THAT IS BEING APPLIED TO THE PAD EYE. CAPACITY OF THE PAD EYE IS REDUCED AS SHOWN WHEN LOAD IS APPLIED WITH AN ANGLE IN THE PLANE OF THE PAD EYE. LIFTING WITH AN ANGLE OUT OF PLANE TO THE PLANE OF THE PAD EYE IS NOT PERMITTED.
- PAD EYES ARE TO BE INSTALLED ON THE PLANE OF THE CENTERLINE OF STRUCTURE OR EQUIPMENT BEING LIFTED.
- WHEN ATTACHED TO STRUCTURAL MEMBERS, THE PAD EYES ARE TO BE INSTALLED PARALLEL TO BEAM WEBS ON THE CENTERLINE OF BEAM. THE BEAM MUST BE ANALYZED FOR THE LIFTED LOAD ACTING IN COMBINATION WITH THE BEAM LOAD.
- WELDING TO BE PERFORMED IN ACCORDANCE WITH AWS D1.1 OR AWS D1.3 FOR PAD SIZE 0.
- WELDING ELECTRODES TO BE E6010-B3L OR E7018.
- FOR APPLICATIONS OTHER THAN SHOWN, CONTACT AEP STRUCTURAL ENGINEERING SECTION FOR ASSISTANCE.
- THIS STANDARD APPLIES TO CROSBY GROUP, INC. CATALOG ITEM S-264 ONLY.

PAD EYE SIZE	WELD SIZE	CAPACITY/LBS. @ GIVEN LIFT ANGLE					
		0°	5°	10°	20°	30°	45°
8	3/8	520	466	461	440	405	315
1	1/4	960	861	851	812	748	611
1 1/2	1/4	960	861	851	812	748	607
2	3/8	2080	1865	1844	1759	1367	888
4	3/8	4160	3730	3687	2479	1795	1161
5	3/8	5760	5164	4625	3106	2260	1467

<b>CIVIL ENGINEERING DIVISION          STRUCTURAL ENGINEERING STANDARD</b>	REVISION NO. 1 DATE 7/9/08 APPROVED BY: <i>[Signature]</i> DATE: 8/12/08	<b>WELDABLE PAD EYE          SPECIFICATIONS &amp; DETAILS</b>
APPROVED BY: <i>[Signature]</i> 	DR: D. G. SLUPEK CR: YG/JAR DATE: 2/22/06	1 RIVERBEND PLAZA COLUMBUS, OH 43216 <b>SES - 0056</b>

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**APPENDIX C**

**Monthly Inspection Example**

**MONTHLY CRANE INSPECTION**

**THE FOLLOWING SHALL BE CHECKED MONTHLY FOR CRANES IN USE**

INSPECTION PERFORMED BY:		
CRANE ID		CAPACITY
PLANT	MONTH	CRANE LOCATION
DATE		Comments
<b>TASK</b>		
A visual inspection for integrity, missing parts, leaks, etc.		
A general check of the operation of all functional mechanisms		
A check of all limit switches without a load on the hook		
Hoist and trolley brakes are to be checked for excessive coasting		
A visual inspection of the chain and/or wire rope including a check of the drum spooling as the hook is raised		
A visual inspection of the hook(s) including hook latches, if equipped		
A check for obstructions that would impede crane or load movement		
A check of the audible or lighted warning device (if applicable)		
Hooks measured for deformation and checked for cracks and broken or missing parts (including hook latches if equipped)		
Lifting chain measured for excessive stretch		
Lifting chain checked for twisted or deformed links		
Wire rope measured for excessive stretch		
Wire rope checked for frayed, twisted or corroded wires		

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8.1.3 APPENDIX D: Daily Inspection Recommendation



**MOBILE CRANE OPERATORS DAILY CHECKLIST**



Date: \_\_\_ / \_\_\_ / \_\_\_ Operator's Name: \_\_\_\_\_  
 Shift: 1 2 3 Supervisor's Name: \_\_\_\_\_  
 (print) (print)

Instructions: Check all items and indicate condition as:  
 S: Satisfactory U: Unsatisfactory N/A: Not Applicable

Keep this checklist in the crane cab during use and return it at the end of the shift to the Safety & Health Supervisor for recordkeeping purposes. Report any unsafe or hazardous conditions to your supervisor immediately.

Crane No. \_\_\_\_\_ Capacity (tons): \_\_\_\_\_ Type: \_\_\_\_\_

MACHINERY / WALK-AROUND INSPECTION		OPERATOR CAB INSPECTION	
	Wire Rope		Housekeeping
	Hooks: Cracks, wear, deformation, throat opening, latch operation.		Cab door(s)
	Fluid (levels and leaks)		Fire extinguisher
	Batteries		Controls identification
	Exposed electrical hazards		Visibility / windows
	Foundations / Outriggers (stability)		Safety devices
	Access		Warning / indicator light(s)
	Hydraulics		Alarms
	Housekeeping		Brake
	Tires		Verify communications with signal man.


Description of Work:		Remarks:
Job Start Time:	Job End Time:	Length of Set / Operation Time:

Operator's Signature: \_\_\_\_\_


Note: See the back of this form for additional operating guidelines.

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**ATTACHMENT 12- SAFETY AND HEALTH AUDIT (SAMPLE)**

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## AMERICAN ELECTRIC POWER CONTRACTOR SAFETY EVALUATION


An effective safety program must be reevaluated continually because the working environment is constantly changing. New employees, work process, materials, and new or revised labor regulations and official standards are but a few of the reasons safety programs must be kept flexible and ready for revision or up grading. The Evaluation Program is designed to assist in the evaluation of a contractor's level of safety and health performance. The purpose is to help identify the strengths and weaknesses in the contractor's existing safety program and to act as a catalyst for improvement.

By evaluating and controlling all health and safety aspects, a contractor can minimize its accident losses. Completion of this evaluation, accompanied by follow-up in the area identified as being deficient, will assist in achieving that goal. Evaluations will be conducted with the contractor's superintendent, safety representative, plant or AEP representative.

The contractor has the potential to achieve a safety performance rating of Red, Yellow, or Green with the combined scores from the incident rate, evaluation checklist, and site tour report. A total score of 100 is possible with 74 and below Red, 89 to 75 Yellow and 90 to 100 Green. A Red rating is unacceptable and will require immediate action; a Yellow rating is considered marginal and requires improvement; a Green rating is acceptable and may require only minor action by the contractor. A contractor must maintain a Yellow or Green rating to continue to work an AEP jobsite. The total points achievable in each category are

Incident rate – 25 points; Evaluation checklist – 15 points; Site tour report – 60 points

- 1. Incident Rate** – The total number of the contractor's recordable accidents that occurred for the duration of the project or the previous twelve months, will be used to compare to the national average for construction.. **25 points**  
Incident Rate – 0 = 25 points  
50% below national construction average = 20 points  
25% Below national construction average = 15 points  
10% Below national construction average = 10 points  
Less than 10% below the nation average = 0 points
- 2. Evaluation Checklist** – Contractors written Safety and Health Program must contain minimum requirements to provide a safe work environment for their employees. Five randomly selected employees will be selected to determine effectiveness of training. The evaluation checklist will be discussed in detail with the on-site safety representative and each item on the checklist evaluated. **15 points**
- 3. Site Tours** – A site tour will be conducted following the completion of the checklist. The tour shall visit all contractors' work areas to assure the contractors are implementing their safety programs and all site-specific policies required at the plant site. This tour shall be conducted by the Evaluation Team. This tour is the most important part of the contractor's performance evaluation and should be handled accordingly. All observations and recommendations shall be listed and attached to the Contractor's Evaluation Checklist. Observations from the site tours performed by the AEP onsite representative will be reviewed. Any area deemed unacceptable for housekeeping where a supervisor is in the area, the score will be doubled in value. Also where an employee is observed performing an at risk behavior, the score will be doubled in value and tripled in value if a supervisor is present. **60 points**

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**AMERICAN ELECTRIC POWER  
 CONTRACTOR SAFETY EVALUATION**

**DATE:** \_\_\_\_\_


**CONTRACTOR:** \_\_\_\_\_ **CONTRACTOR NUMBER:** \_\_\_\_\_

**SUPERINTENDENT:** \_\_\_\_\_ **#OF EMPLOYEES ON SITE TODAY** \_\_\_\_\_

**SAFETY REPRESENTATIVE:** \_\_\_\_\_ **FULL TME: YES NO**

		YES	NO	NA
1	Contractor conducts and documents "New Hire Orientation"? (All required training should be properly documented)	YES	NO	NA
2	Contractor conducts and documents "Supervisor Safety Meetings"?	YES	NO	NA
3	Are all employees briefed on hazardous situations prior to beginning the assigned task? ( Job Safety Analysis)	YES	NO	NA
4	Contractor has weekly documented "Tool Box" Safety Meetings and signatures of attendees are maintained on site.	YES	NO	NA
5	Contractor has written record of site safety inspections and who performs them?	YES	NO	NA
6	Contractor has a written Fall Protection Program?	YES	NO	NA
7	Confined Space program in place and written program properly administered?*	YES	NO	NA
8	Respiratory Protection program in place and written program properly administered?*	YES	NO	NA
9	Asbestos (Awareness Training) program in place and written program administered? *	YES	NO	NA
10	Hearing Conservation Program in place and written program administered? *	YES	NO	NA
11	Mobile Equipment and Employee Work Platform (i.e., Mobile Crane, Lift truck, Scissor Lift, JLG, etc) programs in place and properly administered?	YES	NO	NA
12	Lead, Hexavalent Chromium and Arsenic programs in place and written programs properly administered? *	YES	NO	NA
13	Substance abuse program in place and written program properly administered? *	YES	NO	NA
14	Clearance Permit System in place and proper training documented?	YES	NO	NA
15	Safety information briefs are covered in contractor weekly safety meetings and properly documented? **	YES	NO	NA

**Additional Comments:**

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\* Five employees will be randomly selected and training record verification will be performed.

\*\* Five employees will be randomly selected to verify safety brief coverage in contractor's safety meetings. (Written sign-in sheets will be cross-referenced as necessary).

A "no" answer in any of the above that cannot be documented will result in a zero score for that item.

### CONTRACTOR SAFETY EVALUATION SCORING

1. Incident Rate points award 0-25

Score this evaluation \_\_\_\_\_

2. Safety Evaluation Checklist – 15 points possible. Contractor's corporate safety program will be reviewed with superintendent and safety representative for written programs and effective documentation. Only "no" answers will be deducted from the score, "n/a" will be counted as a "yes". Any questions answered "yes" and then found during the site tour to actually be "no" or contractor is not implementing will be changed to a "no".

Score this evaluation \_\_\_\_\_

3. Site Tour – 60 points possible. A site tour will be conducted of all contractor's work areas. Observations will be made on OSHA violations, violations of contractor safety programs or site-specific rules. A percent of observations to total number of employees will be determined and the percentage subtracted from the 60 points possible.

#### Equation

Number of observations divided by the number of employees times 60. This number is then subtracted from 60 for the final score.

#### Example

Contractor has 10 employees on site.  
Site tour results in 8 unacceptable observations.

#### Calculation

$$8 \div 10 \times 60 = 48$$
$$60 - 48 = 12.$$

Score this evaluation \_\_\_\_\_

NOTE - indicate the name(s) of the Job Site Supervisor responsible for the work area or location where the observation is made.

POINTS AWARDED:

Additional Comments:



**Kentucky Power Company**

**REQUEST**

Refer to paragraph 42 of the application regarding the estimated annual operation and maintenance expense for the converted Big Sandy Unit 1 after the unit is placed in service. Provide a detailed schedule of how the \$4,684,000 annual operation and maintenance expense was determined.

**RESPONSE**

The breakdown of the annual O&M is provided below. It should be noted that the number provided in paragraph 42 was incorrect and should have been \$4,692,000.

For modeling purposes the following description of O&M categories was used:

BCO - Base Cost of Operation*	\$2,627,000
A&G - Administrative and General	525,000
NOMI - Normal Operating Maintenance and Inspection	130,000
SO - Scheduled Outage	<u>1,410,000</u>
Total	<u>\$4,692,000</u>

\*Includes plant labor, contract labor, materials, and supplies.

**WITNESS: Ranie K Wohnhas**



## Kentucky Power Company

### REQUEST

Refer to page 9 of the Direct Testimony of Robert L. Walton where it states, "To meet these needs (natural gas volumes) Kentucky Power plans to rely predominantly on daily spot market natural gas purchases as other AEP affiliates have historically done for operation of their peaking gas-fired generating plants."

- a. Identify the plans, other than to use the spot market, that Kentucky Power has for securing its natural gas supply.
- b. Given the recent increase in natural gas costs, what consideration has Kentucky Power given to hedging its natural gas supply?

### RESPONSE

- a. The fluctuating natural gas supply requirements associated with the anticipated variable operation of the converted Big Sandy Unit 1 ("BS1") require flexibility in natural gas supply and transportation arrangements. Natural gas volumes that will be needed by Kentucky Power to match customer load demand will require instantaneous, hourly and daily flexibility in the delivery flow. The daily spot market provides this flexibility, while minimizing fuel costs. If a term contract were executed, where a natural gas supplier commits to supply a specific volume of gas on a firm basis at a price pursuant to a predetermined pricing mechanism, Kentucky Power would be committed to pay for this volume of natural gas whether it is used or not. The anticipated periodic operation of BS1 does not lend itself to a term contract with fixed volume commitments.
- b. Kentucky Power may enter into natural gas supply hedges, when appropriate, to protect customers from natural gas price volatility. If pursued, the primary means of hedging to reduce natural gas price volatility would be a portfolio of supply agreements of various lengths, which is highly dependent on the unit's capacity factors. Kentucky Power has no current plans of entering into financial fuel hedge transactions; such transactions, while they may decrease fuel price volatility, also produce gains, losses, and associated costs. However, Kentucky Power will continually evaluate future financial hedging opportunities.

WITNESS: Robert L Walton





**Kentucky Power Company**

**REQUEST**

Refer to page 1 of Exhibit RLW-2 regarding the options for the S burners. In each option it states, "Due to the composition of the gas not being that of pipeline quality natural gas. . ." Explain what is meant by this statement.

**RESPONSE**

Pipeline quality gas has been treated to remove heavier gas constituents, including liquids and other impurities. Production quality gas has not been treated. For purposes of the Big Sandy Unit 1 Refuel study, it was assumed production quality gas would be used. However, the gas source and corresponding quality will be identified as a part of the pipeline RFP process currently underway.

**WITNESS:** Robert L Walton



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**Kentucky Power Company**

**REQUEST**

Provide Kentucky Power's plans for financing the conversion of Big Sandy Unit 1 to natural gas.

**RESPONSE**

Kentucky Power plans to finance the conversion of Big Sandy Unit 1 to natural gas in the same manner the Company finances all of its operations (construction program and working capital needs) from one of two sources of available capital, internally generated funds and externally generated funds. When internally generated funds are not sufficient to cover operations or investments, the Company must employ other sources of capital such as debt and equity in order to finance its construction program and working capital needs.

**WITNESS:** Ranie K Wohnhas



## **Kentucky Power Company**

### **REQUEST**

- a. State whether there are any substations currently on the Big Sandy plant footprint or in the vicinity of the plant.
- b. If the answer to part a. is yes, provide a description and purpose of each substation.
- c. If the answer to part a. is yes, provide any future plans of operation for each substation once Big Sandy Unit 1 is converted to natural gas and is operational.
- d. If the answer to part a. is yes, explain whether there will be any subsequent capital investment or retirement and any change in operation and maintenance costs once Big Sandy Unit 1 is converted to natural gas and is operational.

### **RESPONSE**

- a. Yes, the Big Sandy 138 kV Substation is within the Big Sandy Plant footprint, and the Baker 765/345/138 kV Substation is approximately one mile from the Big Sandy Plant.
- b. The Big Sandy 138 kV Substation serves as the transmission interconnection for Big Sandy Unit 1, as well as a hub for transmission lines that link other area substations, including the Baker 765/345/138 kV substation. The Baker 765/345/138 kV Substation is a critical extra-high voltage (EHV) hub for the regional transmission grid, and provides the interconnection point for the Big Sandy plant and two nearby Independent Power Producer (IPP) generating plants.

- c. The overall function of these transmission substations will remain the same, since they are critical junctions for transmission lines that serve both local and regional functions. A project to install a second 765/345 kV transformer at the Baker Substation was approved by PJM Regional Transmission Organization as part of the Regional Transmission Expansion Plan (RTEP) in 2011 to alleviate reliability issues, and is anticipated to be in service by 2016. This project provides for reliable operation of the Big Sandy plant and other plants in the area.
  
- d. The conversion of Big Sandy Unit 1 to natural gas is not expected to require any major capital investment beyond those already approved by PJM. Any required future upgrades or changes in the operation of these stations will be determined by planning studies undertaken by AEP and PJM. Operation and maintenance costs for transmission assets, including these stations, are based on the assets in service and thus are not expected to change significantly as a result of the conversion.

**WITNESS: Robert L Walton**





## Kentucky Power Company

### REQUEST

- a. State whether there are any transmission lines currently on the Big Sandy plant footprint or in the vicinity of the plant.
- b. If the answer to part a. is yes, provide a description and purpose of each transmission line.
- c. If the answer to part a. is yes, provide any future plans of operation for each transmission line once Big Sandy Unit 1 is converted to natural gas and is operational.
- d. If the answer to part a. is yes, explain whether there will be any subsequent capital investment or retirement and any change in operation and maintenance costs once Big Sandy Unit 1 is converted to natural gas and is operational.

### RESPONSE

- a. Yes. There are transmission lines currently on the plant footprint and in the vicinity of the Big Sandy Plant.
- b. A list of the various transmission lines in the vicinity of the Big Sandy plant is below. Those lines labeled as "generator leads" provide a connection from the Big Sandy generators to the Big Sandy 138 kV transmission substation and the Baker 765/345 kV transmission substation. The remaining circuits are part of the interconnected transmission grid in the Ashland and Huntington area that provide for the reliable transfer of electric energy. These lines are part of the collective transmission network that is necessary for service to customers in the region as well as the delivery of generation from various plants in the vicinity to the PJM market.
  1. 345 kV Big Sandy Unit 2 Generator Lead
  2. 138 kV Big Sandy Unit 1 Generator Lead
  3. 138 kV Baker – Big Sandy Circuit
  4. 138 kV Big Sandy – Grangston Circuit
  5. 138 kV Big Sandy – Inez Circuit
  6. 69 kV Big Sandy – South Neal Circuit
  7. 138 kV Big Sandy – Thelma Circuit
  8. 138 kV Big Sandy – Tri-State Circuit
  9. 34.5 kV Big Sandy – Lavalette Circuit

The transmission circuits connected to Baker Substation are as follows:

1. 138 kV Baker – Big Sandy Circuit
  2. 765 kV Baker – Broadford Circuit
  3. 765 kV Baker – Culloden Circuit
  4. 345 kV Baker – Foothills IPP Circuit
  5. 765 kV Baker – Hanging Rock Circuit
  6. 345 kV Baker – Riverside IPP Circuit
  7. 345 kV Baker – Tri-State Circuit
- c. While the specific amount of power flowing on the lines may change somewhat as a result of changes in operation of the Big Sandy generators, the overall function of the network transmission will remain the same. If Big Sandy Unit 1 is converted to natural gas and operational, the facilities listed will continue to operate in the same manner as they do today. Any required upgrades or changes in the future operation of these transmission circuits will be determined by planning studies undertaken by AEP and the PJM Regional Transmission Organization.
- d. No major capital investments are anticipated to be required as a result of the decision to convert Big Sandy Unit 1 to natural gas operation. Operation and maintenance costs for transmission assets are based on the assets in service and thus are not expected to change significantly as a result of the conversion.

WITNESS: Robert L Walton



**Kentucky Power Company**

**REQUEST**

Refer to Exhibit RLW-3 of the Direct Testimony of Robert L. Walton of the Application.  
Provide pages 1-3 of Exhibit RLW-3.

**RESPONSE**

Please see KPSC 1-8 Attachment 1 on the enclosed CD.

**WITNESS: Robert L Walton**



## Kentucky Power Company

### REQUEST

At the bottom of page 8 and continuing on page 9 of Scott Weaver's direct testimony, he discusses the gas needs of Unit 1 when it is operating primarily as a peaking unit.

- a. Before the conversion to gas, was Big Sandy Unit 1 used primarily as a peaker?
- b. What are the Kentucky Power projections concerning the capacity factor of Big Sandy Unit 1 after conversion and its availability to clear in the PJM market?
- c. How does this peaking statement merge with the statements on page 6 of Weaver's testimony where he proposes that Big Sandy Unit 1 will be able to provide generation ancillary services such as synchronized reserves, day-ahead reserves and voltage support to transmission providers?

### RESPONSE

Note: Each of the references in the question to Mr. Weaver's direct testimony should have been to Mr. Walton's testimony.

- a. Before the conversion to natural gas, the duty cycle of Big Sandy Unit 1 was largely that of an intermediate or "load-following" unit --rather than a peaker, or a baseload unit based on its actual performance. For example, over the last two years (2012 and 2013), the units' average capacity factor was 35.39%; a result higher than a peaker, but lower than a typical baseload unit. Further, the unit's "Net Output Factor"-- which is a function of its actual generation divided by its potential generation when on-line—averaged 52.32% for the same period; a figure typically well below a traditional baseload unit duty cycle.
- b. As an approximate indicator of the ability to clear the PJM market, the going-forward projections in the Strategist modeling for Big Sandy Unit 1 capacity factor after its conversion to natural gas averaged approximately 25% per year.

- c. A generating unit operating in a peaking capacity generally operates with a low capacity factor, which does not preclude such a generating unit from providing the ancillary services described in the testimony of Company witness Walton. Big Sandy Unit 1 will be able to provide the ancillary services described by Company witness Walton if there is a need for those services.

**WITNESS: Robert L Walton/Scott C Weaver**





## **Kentucky Power Company**

### **REQUEST**

Refer to page 6 of the direct testimony of Robert Walton, where he states, Big Sandy Unit 1 is expected to experience a slight decrease in its output capability, from the current 278 MW net summer rating to an expected 268 MW net summer rating while burning natural gas. The average heat rate for the converted unit is expected to be slightly higher than the current heat rates at those same load points."

- a. Explain the reason for the 10 MW net summer rating drop upon converting the Big Sandy Unit 1 plant to natural gas.
- b. Provide the current heat rate at Big Sandy Unit 1.
- c. What is the expected heat rate for Big Sandy Unit 1 when it is converted?

### **RESPONSE**

- a. The boiler gas conversion feasibility study calculated full load combustion air requirements. The maximum combustion air is limited by the existing forced draft fan performance and corresponds to a 268 MW output under summer conditions.
- b. The current full load heat rate (summer) of the coal-fired unit is 9,382 Btu/Kwh.
- c. Please see KPSC 1-10 Confidential Attachment 1.

**WITNESS:** Robert L. Walton

10c. The calculated full load heat rate (summer) of the converted gas-fired unit is estimated to be [REDACTED] Btu/Kwh.