Emergency Action Plan for the
Ash Pond Complex

American Electric Power
Conesville Power Plant
42701 County Road 273
Conesville, Ohio 43811

February 2010
Revised March 2017
EMERGENCY ACTION PLAN
CFR 257.73 (a)(3)
ASH POND COMPLEX
CONESVILLE PLANT

GERS-17-006

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REGISTERED PROFESSIONAL ENGINEER

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4/11/2017

I certify to the best of my knowledge, information, and belief that the information contained in Emergency Action Plan meets the requirements of 40 CFR § 257.73 (a)(3)
CONESVILLE POWER PLANT

EMERGENCY ACTION PLAN
FOR THE ASH POND COMPLEX

PREPARED FOR
AEP GENERATION RESOURCES
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EMERGENCY CONDITIONS A, B AND C
A: NONFAILURE EMERGENCY
B: POTENTIAL FAILURE EMERGENCY
C: IMMINENT FAILURE OR FAILURE HAS OCCURRED EMERGENCY

Section 4.0 of this Emergency Action Plan (EAP) provides further descriptions of these conditions.
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1.0 NOTIFICATION FLOWCHART

1.1 General

Exhibits 1 and 2 are the Notification Flowcharts for potential emergency conditions at the Conesville plant’s ash pond complex for the American Electric Power (AEP) located in Coshocton County, Ohio. The Notification Flowchart provides the hierarchy for notification in the event of an emergency for the following conditions:

- Condition A: Nonfailure Emergency Condition.
- Condition B: Potential Failure Condition.
- Condition C: Imminent Failure or Failure Has Occurred Condition.

Section 4.0 of this Emergency Action Plan (EAP) provides further descriptions of these conditions.

All internal plant notifications for potential or actual emergencies at the dam shall be made to the Conesville Plant’s internal “1911” notification. All notifications to external agencies shall be at the direction of the Team Leader.

1.2 Sample Messages

In the event of an emergency condition at the dam, the following notifications shall be made. Sample messages are provided below to expedite transfer of accurate and timely information in the event of such a situation. Underlined items are provided to indicate where information specific to the caller or call must be given.

1.2.1 Emergency Condition A – Nonfailure Emergency Condition

A. Standby Alert Notification from AEP to Ohio Department of Natural Resources (ODNR). “This is (your name) from AEP. I am calling to advise you that we are starting constant surveillance of our Conesville ash pond complex according to our EAP due to a nonfailure emergency condition at the dam. At this time, we do not anticipate that the dam will fail, but are notifying you so you are aware of the situation. We will call you again if the condition worsens, if a decision to evacuate is
made, or when cancellation of this standby alert has been made.” *(Note, be prepared to provide additional information to ODNR regarding the nature of the emergency condition.)*

1.2.2 Emergency Condition B – Potential Failure Condition

A. Notification from AEP to Coshocton County Sheriff – “911”. “This is *(your name)* from AEP. I am calling to notify you that we have a potential failure condition of our Conesville ash pond complex. Please note that this is NOT presently an evacuation situation and we will call again if the condition worsens and it becomes necessary to evacuate potential flood prone areas.”

B. Notification from AEP to ODNR. “This is *(your name)* at AEP. I am calling to notify you that a potential failure condition exists at the Conesville ash pond complex. We have initiated notifications according to our EAP. We will call you again to inform you if the condition worsens, if a decision to evacuate is made, or when cancellation of this standby alert has been made.” *(Note, be prepared to provide additional information to ODNR regarding the nature of the emergency condition.)*

C. National Weather Service Forecast Center. If the emergency is related to a precipitation event, contact the National Weather Service (NWS) to determine NWS’s forecast of total rainfall. The telephone number for the NWS Forecast Office in Pittsburgh, PA is (412) 262-1882 and it is answered 24 hours per day, 7 days per week.

If conditions at the dam worsen and the emergency changes to Condition C, NWS should be contacted again because they can rapidly issue warnings for downstream evacuation over public broadcast stations.

D. Potential Assistance Notification from AEP to Contractors. “This is *(your name)* at AEP’s Conesville Plant. I am calling to notify you that a potential failure condition exists at our ash pond complex, which may require your assistance. I am calling to notify you so that you are aware of the potential failure condition of the dam so preparation measures can be taken. Please note this is NOT presently a failure situation and we will call again if the situation worsens.” As needed, please add “Your services are needed at this time.” *(Note, be prepared to provide additional information to
the contractors regarding the nature of the emergency condition and the types of equipment and materials that may be needed.)

E. Notification from “911” to Conesville Police/Fire Department. “This is (your name) of “Coshocton County Sheriff office. I am calling to notify you that there is a potential failure condition at the AEP’s Conesville plant’s ash pond complex. We have been directed to notify you that a potential failure condition exists at the dam so that you can be prepared if an evacuation notice is issued. Please note this is NOT presently an evacuation situation and we will call again if it becomes necessary to evacuate potential flood prone areas. Please check your agency’s copy of the dam’s Emergency Action Plan, specifically Appendix A, for maps of potential flooded areas in case an evacuation order is given. These maps indicate areas which may be flooded and would require evacuation should it become necessary. Again, this is NOT an evacuation condition at this time.”

1.2.3 Emergency Condition C – Failure is Imminent or Failure Has Occurred Condition

A. Notification from AEP to Coshocton County Sheriff - “911.” “This is (your name) at AEP’s Conesville Plant in Coshocton County. I am calling to notify you that failure of our ash pond complex is imminent/has occurred. Please notify all available emergency personnel according to the Emergency Action Plan for the dam. Specific details can be found in the Notification Flowchart, Exhibit 2 in the EAP. Evacuation of flood prone areas downstream of the dam as shown in the EAP should be started immediately.”

B. Notification from Team Lead to Yard Team Leader “This is (your name) at the plant. I am calling to notify you that failure of the ash pond dam is imminent/has occurred. Please evacuate your staff out of the potentially flooded areas and come to (give location) to assist us.” (Be prepared to indicate the personnel and equipment that may be needed.)

C. Notification from AEP to ODNR. “This is (your name) at AEP’s Conesville plant. I am calling to notify you that failure of our ash pond dam is imminent/has occurred. We have already notified “911” according to the EAP for the dam. We have told them that evacuation of flood prone areas (as shown in the EAP) should be started
immediately.” (Note, be prepared to provide additional information to ODNR regarding the nature of the emergency condition.)

D. National Weather Service Forecast Center. Contact the NWS to notify them of the emergency condition at the dam. Request that the NWS issue warnings over public broadcast stations (i.e., television, radio, weather radio) alerting the public to the failure condition and to immediately evacuate the valley in the area downstream of the plant and to beware of rapidly rising water levels in the Muskingum River.

E. Notification from AEP to Local Contractors. “This is (your name) at AEP’s Conesville plant. I am calling to notify you that an evacuation order for the Conesville plant’s ash pond complex downstream flooding area was given by AEP at (__ time__). Your services are needed at this time. Please respond as quickly as possible.” (Note, be prepared to provide additional information to the contractors regarding the nature of the emergency condition and the types of equipment and materials that may be needed.)

F. Notification from “911” to the Conesville Police/Fire Department. “This is (your name) of the Coshocton County Sheriff Office. I am calling to notify you that an evacuation order for the AEP’s ash pond complex downstream flooding area was given by AEP at (__time__). Please mobilize the emergency response services according to the EAP. Maps of potentially flooded areas are in Appendix A of the dam’s EAP. You can use the maps to determine areas from which people should be evacuated. Again, we are asking you to begin the evacuations immediately.”

G. Evacuation Notification by Police and Fire Department to Residents. “An evacuation order for the Conesville Plant ash pond complex flood prone area has been given. Please evacuate this area to higher ground immediately. This is an emergency. Please leave now!”
2.0 STATEMENT OF PURPOSE

The purpose of this document is to establish the notification procedures for the rapid implementation of emergency action to be taken prior to and/or following a failure of the dam associated with the ash pond complex at the Conesville Generating Plant. This document also provides for monitoring of the dam under various conditions so that an emergency situation at the complex will be observed promptly and reported to the appropriate personnel and agencies.

The objective of this EAP is to safeguard lives and to reduce damage to the property of the citizens of Coshocton County who live or are traveling in close proximity to the ash pond complex in the Conesville, Ohio vicinity in the event of:

- failure of AEP’s Conesville Plant’s ash pond complex; or
- flooding caused by large flow releases from the dam.

The EAP was prepared to meet the requirements of the ODNR for an EAP as provided in Ohio Administrative Code (OAC) 1501:21-15-07 and 1501:21-21-04 and as further detailed in ODNR’s EAP Guidelines.

This document supersedes any and all EAPs previously utilized by the plant.
3.0 PROJECT DESCRIPTION

The location of the Conesville ash pond complex is shown on the local area map is shown in Figure 1. The Ohio Department of Natural Resources (ODNR) – Dam Safety Program, with jurisdiction to regulate such a unit has classified this impoundment as a Class II dam. The failure of such a dam has the potential to cause damage to infrastructure, such as, public water supply, roads, railroads and utilities. The unit is listed in the National Inventory of Dams (NID) with the following identification numbers:

<table>
<thead>
<tr>
<th>Impoundment</th>
<th>NID ID</th>
<th>Ohio ID (ODNR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ash Pond Complex</td>
<td>OH01453</td>
<td>0116-002</td>
</tr>
</tbody>
</table>

The unit, since its inception in the 1950s and several modifications through the ensuing years, has operated safely without any incidents. Recognizing that proper operation, maintenance, and inspection are key to continued safety, guidelines are documented in this manual for early detection, evaluation and remediation of any potential problems at this facility.

The Conesville Plant, owned by the AEP Generation Resources, a subsidiary of American Electric Power (AEP), is located in Conesville, Coshocton County, Ohio. Adjacent to the power plant generation units is the approximately 100-acre Ash Pond Complex enclosing several individual cells separated by internal berms with a perimeter embankment around all of them. There are three main dikes that form the perimeter of the Ash Pond Complex. The Northern Haul Road Dike runs along the northern end of the complex parallel to County Road 273; the Coal Haul Road Dike runs along the southeastern side of the complex; and an unnamed dike runs the southwestern edge. The northeast corner is formed by a natural slope. The northwestern side is bordered by a closed landfill. The overall complex, defined by the outer perimeter, is considered as a single unit up ground reservoir located approximately 2,000 feet east of the Muskingum River that flows adjacent to the plant.
4.0 EMERGENCY CONDITIONS AND CLASSIFICATION

If any of the following conditions are developing, appear imminent, or have occurred, implement the appropriate notification plan immediately.

4.1 Condition A: Non-Failure Emergency Condition
Condition A applies when the emergency condition has no immediate threat to the integrity of the dam. Failure could develop within weeks if corrective measures are not initiated to prevent or mitigate failure. Such problems or undesirable features are:

a. Sloughing of the embankment slopes
b. Cracks parallel or transverse to the dam
c. Areas of new seepage or soft, wet zones on the downstream face of the dam. Flow is stable and clear.
d. Development of depressions or other settlement on the crest or slopes of the dam

4.2 Condition B: Potential Failure Condition
Condition B applies when a dam has specific problems that could lead to an evacuation condition. Failure could develop within hours to a couple of days if corrective measures are not initiated to prevent or mitigate failure. Such problems or undesirable features are summarized below:

1. Springs on abutments or downstream face with muddy water but stable flow rate
2. Piping, cavities or holes which could be attributed to internal erosion even without evidence of seepage
3. Severely clogged drains
4. Slides with no seepage and that do not reach the dam crest
5. Noticeable increase in the amount of foundation or abutment seepage or piezometric level in the monitoring wells
6. Increasing water reservoir levels.

4.3 Condition C: Failure is Imminent or Failure has Occurred Condition
Condition C applies when dam failure is imminent, there is no time for any corrective actions, or the dam has failed.

Highly undesirable features that would be major indications of an imminent failure are listed below:

1. Overtopping of the dam
2. Breach or slide below the waterline which reaches the dam crest and/or seeps water
3. Springs on the abutment or downstream slope with muddy water and progressively increasing flow rates
4. Unusual conditions of the water surface such as a whirlpool or bubbling.

**Evacuation should be implemented if any of the above Condition C criteria exist.**
5.0 GENERAL RESPONSIBILITIES

5.1 Dam Owner Responsibilities

The personnel at the power plant are responsible for the periodic inspection of the ash pond complex. The complex is not a manned facility but it is visited routinely during the week for maintenance and operations of the ash slurry piping and other plant operations. During these visits, personnel are instructed to report unusual conditions to their supervisors so that the appropriate engineers are notified and an inspection can be performed.

During implementation of the EAP, the power company and its personnel will be made available to the local emergency management agency for support and coordination efforts. Based on the concept of the ash pond complex, and the physical facilities, the only operational role of the power plant will be to reduce the slurry being pumped into the ponds.

The power company has staff located at the Columbus, Ohio headquarters that are experienced in the design and safety of dams. These individuals will evaluate the data or descriptions supplied by the plant personnel to assess the appropriate emergency condition that should be declared.

The notification flowcharts, located on pages 1 and 2, illustrate the chain of command to initiate in the event of a potential or imminent failure of any of the dams or dikes associated with the ash pond complex. Each individual who is designated to make phone calls shall specifically comment that the EAP for the ash pond complex has been initiated and that there is a condition developing that may result in failure of a dam.
5.2 On-Site Emergency Personnel Responsibilities

5.2.1 Conesville – Team Leader – Emergency Response Leader

A Team Leader is present at the facility at all times and has responsibility for plant operations. The Team Leader will have overall response authority in the event that an emergency condition occurs at any of the dams. The Team Leader can delegate responsibility to other personnel as appropriate.

The Team Leader shall be notified that an emergency condition exists at the ash pond complex. This notification may be based on a passer-by observing the dam condition or AEP personnel who have been inspecting or evaluating specific malfunctions.

The Team Leader’s duties (directly or through delegation) shall include:

A. Assume responsibility for the emergency actions, determine initial emergency condition classification (Classification A, B, or C), and continue to evaluate condition.

B. Provide for constant surveillance of the dam.

C. Initiate and maintain contact with state and local emergency responders according to the Notification Flowcharts (Exhibits 1 and 2) on pages 1 and 2, as appropriate. See Section 1.2 of this EAP for sample notification messages.

D. Determine the need for evacuation and initiate the evacuation plan of personnel working in potentially flooded areas.

E. Arrange for road closures within the plant downstream from the potentially failing embankment.

F. Initiate and direct corrective actions at the dam in consultation with AEP engineering staff and/or consulting Professional Engineers, and ODNR.

G. Supervise AEP personnel and contractors during response activities.
H. Coordinate with Yard Team Leader or outside contractor as specified in Exhibits 1 and/or 2.

I. Terminate emergency status at the dam.

5.3 Responsibility for Notification and Sample Messages

The Team Leader, Energy Production Manager and Plant Manager shall be authorized to initiate contact with local individuals and outside agencies to begin emergency action to evacuate the downstream areas. The Energy Production Manager and/or Plant Manager may delegate the listed responsibilities of the Team Leader to other company personnel during the situation if deemed necessary. In addition, the AEP Civil Engineering staff member who is evaluating the dam’s condition shall have the authority to instruct the Team Leader to initiate notification based on his assessment of the conditions.

Once the notification procedures commence, the individuals listed on the Notification Flowcharts shall make the necessary contacts as noted. If appropriate, the Plant Manager, Energy Production Manager and/or Director of Civil Engineering may delegate additional personnel to make the necessary contacts.

The statements in Section 1.2 shall be read to each agency on the notification flowchart. The responsible person notifying the agencies should note the date and time of such notification.
5.4 Public Information/News Media

The Plant Manager shall identify a representative from corporate communications who shall be responsible for disseminating information to the public and media. Appendix C contains telephone numbers for local television and radio stations.

5.5 Responsibility for Evacuation

5.5.1 Coshocton County EMA Directors – Primary Responsibility

The Coshocton County EMA shall be responsible for the evacuation and notification of the general public, including personnel at the power plant. The power company personnel shall be made available to assist the Emergency Management personnel if requested.

5.5.2 Coshocton County Sheriff – Primary Responsibility

The Coshocton County Sheriff shall coordinate with the Coshocton County EMA to notify all residents of evacuation by loud-speaker-equipped squad cars while safety personnel are being deployed.

In addition, the Coshocton County Sheriff shall provide personnel for road closures (if needed) and maintain communication with other emergency personnel.

5.5.3 Coshocton Police Department – Secondary Responsibility

Assist Sheriff with evacuation of residents as needed.
5.6 Responsibility for Duration, Security, Termination and Follow-Up

5.6.1 Duration

The Team Leader, unless delegated to another individual, shall be assigned as the AEP contact for keeping local authorities advised of continuing conditions at the dam. The Team Leader shall also function as the on-site responsible individual for contact with ODNR Dam Safety and the Director of Civil Engineering.

The AEP Civil Engineer shall have the responsibility of the on-site technical personnel for assessing the conditions of the dam and its appurtenances. The AEP Civil Engineer and the Team Leader shall be in constant communication to ensure that appropriate and consistent status updates are disseminated to the respective agencies.

5.6.2 Security

During the constant surveillance period of a Potential Failure condition, AEP shall have a minimum of two personnel assigned to on-site duties that would include monitoring of the conditions. Inspections and monitoring that would endanger the personnel shall not be implemented.

AEP shall coordinate with the appropriate local law enforcement agencies if traffic control or roadblocks are necessary to secure the area.

5.6.3 Termination

The following individuals shall have the authority to terminate the emergency condition at the dam should no failure occur or the hazard passes.

- Team Leader
- AEP Civil Engineer
- ODNR Dam Safety.

If all three of the individuals listed above are on-site, there shall be a consensus that termination of the emergency is appropriate.
The Team Leader shall have the responsibility to inform the Coshocton County EMA and other emergency response agencies that the emergency at the dam has been terminated.

5.6.4 Follow-Up Evaluation

The EAP Coordinator shall conduct a follow-up meeting with the individuals and agencies contacted during the notification conditions as soon as practical to assess the effectiveness of the EAP. If some participants cannot attend a meeting, they should be requested to provide written comments on the notification and coordination that their agency received during the emergency condition.

5.7 Responsibility of the EAP Coordinator

The Plant Environmental Staff shall be the EAP Coordinator, with assistance from AEP-Civil Engineering staff. The EAP Coordinator shall be responsible for:

A. Distributing copies of the Plan to all recipients.

B. Conducting orientation seminars so that all participants are aware of the Plan and know their responsibilities.

C. Preparing an annual emergency preparedness exercise as described in Appendix B.

D. Reviewing and revising the EAP as necessary. At a minimum, the EAP Coordinator shall review the Notification Flowcharts annually so that the contacts and phone numbers are current. If significant organizational changes occur, the entire Plan should be reviewed and revised as necessary to identify the roles and responsibilities of the appropriate personnel.

E. Serving as the EAP contact person.

F. Assist the Team Leader to implement the EAP, as required, during an event.
5.8 Duties and Responsibilities

The following table lists potential duties that each organization may be called upon to perform should an emergency condition arise at the dam. The hierarchy of notification can be found in the Notification Flowcharts (Exhibits 1 and 2).

5.8.1 Duties and Responsibilities for Condition A: Nonfailure Emergency

<table>
<thead>
<tr>
<th>Organization</th>
<th>Condition A Duties</th>
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<tbody>
<tr>
<td>Conesville Authorized Personnel</td>
<td>• Notify ODNR at beginning of emergency condition</td>
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<td></td>
<td>• Coordinate response activities at the dam</td>
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<td></td>
<td>• Mobilize local contractors if needed</td>
</tr>
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<td></td>
<td>• Notify ODNR when emergency condition ends.</td>
</tr>
<tr>
<td>AEP Geotechnical Staff</td>
<td>• Provide technical Analysis and design support.</td>
</tr>
<tr>
<td>ODNR</td>
<td>• Monitor events at the dam</td>
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<tr>
<td></td>
<td>• Offer technical advice to AEP staff.</td>
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<tr>
<td>Coal Yard Personnel</td>
<td>• Provide construction equipment, materials, and personnel to assist AEP staff in</td>
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<tr>
<td>Local Contractors:</td>
<td>responding to the emergency condition.</td>
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5.8.2 Duties and Responsibilities for Condition B: Potential Failure

<table>
<thead>
<tr>
<th>Organization</th>
<th>Condition B Duties</th>
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<tbody>
<tr>
<td>Conesville Authorized Personnel</td>
<td>• Notify “911” emergency center and ODNR at beginning of emergency condition</td>
</tr>
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<td></td>
<td>• Coordinate response activities at the dam</td>
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<td></td>
<td>• Mobilize local contractors if needed</td>
</tr>
<tr>
<td></td>
<td>• Notify ODNR, EMA, and other agencies when emergency condition ends.</td>
</tr>
<tr>
<td>AEP Geotechnical Staff</td>
<td>• Provide technical Analysis and design support.</td>
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<td>responding to the emergency condition.</td>
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<tr>
<td>Coshocton County EMA</td>
<td>• Notify the Coshocton County Sheriff</td>
</tr>
<tr>
<td>“911” Emergency Center</td>
<td>• Notify the Coshocton Police</td>
</tr>
<tr>
<td></td>
<td>• Notify the Conesville Fire Department</td>
</tr>
<tr>
<td></td>
<td>• Notify the Conesville County Emergency Management Director</td>
</tr>
</tbody>
</table>
### 5.0 GENERAL RESPONSIBILITIES

#### Condition B Duties

<table>
<thead>
<tr>
<th>Organization</th>
<th>Condition B Duties</th>
</tr>
</thead>
</table>
| 1. Coshocton County Sheriff       | • Review the flood inundation maps contained in Appendix A of the dam’s EAP to be familiar with areas that may require evacuation if an evacuation order is given.  
| 2. Conesville Fire Department     | • At this level, NO EVACUATION IS REQUIRED.                                        |

#### Condition C Duties

**5.8.3 Duties and Responsibilities for Condition C: Imminent Failure or Failure of the Dam**

<table>
<thead>
<tr>
<th>Organization</th>
<th>Condition C Duties</th>
</tr>
</thead>
</table>
| Conesville Authorized Personnel          | • Notify “911” emergency center and ODNR at beginning of emergency condition  
|                                           | • Coordinate response activities at the dam                                        
|                                           | • Mobilize coal yard personnel and local contractors if needed                   
|                                           | • Notify ODNR, EMA, and other agencies when emergency condition ends             
|                                           | • Complete follow-up reporting to ODNR.                                           |
| AEP Geotechnical Staff                   | • Provide technical Analysis and design support.                                 |
| ODNR                                      | • Monitor events at the dam                                                       
|                                           | • Offer technical advice to AEP staff.                                            |
| Coal Yard Personnel                      | • Provide construction equipment, materials, and personnel to assist AEP staff in responding to the emergency condition. |
| Local Contractors                         |                                                                                                |
| Coshocton County EMA                     | • Notify the Coshocton County Sheriff                                             
| “911” Emergency Center                   | • Notify the Coshocton Police                                                     
|                                           | • Notify the Conesville Fire Department                                           
|                                           | • Notify the Coshocton County Emergency Management Director                      |
| 1. Coshocton County Sheriff              | • IMMEDIATELY BEGIN EVACUATION of flood prone areas downstream of the dam as shown on the flood inundation maps contained in Appendix A of the dam’s EAP  
| 2. Conesville Fire Department           | • Evacuation activities may include physical evacuation, calling, knocking on doors, announcements with bullhorns, etc.  
|                                           | • Assist in rescue of stranded residents, placing sandbags, and other duties as required. |
6.0 PREPAREDNESS

6.1 Access to the Site

Public vehicle access to the ash pond complex is typically by an access road off County Road 273. Plant vehicles would access the ash pond complex using plant roads that would not be inundated or impacted by a failure. During an emergency situation, extreme caution must be used so that personnel do not drive into the path of a flood wave.

6.2 Surveillance

The ash pond complex is not a manned-facility but is visited routinely during the week for maintenance and operations of the ash slurry piping and other plant operations. During these visits, personnel are instructed to report unusual conditions to their supervisors so that the appropriate engineers are notified and an inspection can be performed. All of the dams’ instrumentation are manually read and recorded every 30-days.

The outlet structures from the ponds are ungated, overflow structures. There are no operations associated with the ponds except for the inflow of the ash sluice water. Runoff from storm events is passed through the ponds without any control. Typically, the runoff events are not a concern because the ash pond is operated to maintain a freeboard height greater than 5 feet and the drainage area into the ponds is very small.
6.3 Emergency Corrective Measures

All work related to the following conditions shall be coordinated with AEP Civil Engineering.

6.3.1 High Pool Levels/Overtopping Condition

A. If acceptable to AEP Civil Engineering, remove stop logs from the outlet structures to lower the pool level. Pumps and/or siphons may be necessary to provide additional capacity to drawdown the pool level. It may be necessary to excavate a hole in accumulated fly ash or bottom ash to enhance removal of water from the pond.

The drawdown rate of the pool should be limited to avoid potential slope stability concerns. Contact AEP Civil Engineering for an acceptable drawdown rate if pool level drawdown is required.

B. Contact a Professional Engineer for permanent repair recommendations.

6.3.2 Leakage Condition

A. If acceptable to AEP Civil Engineering, remove stop logs from the outlet structures to lower the pool level. Pumps and/or siphons may be necessary if additional capacity is required for a faster drawdown or if the pool must be drawn down lower than the outlet structures allow. It may be necessary to excavate a hole in accumulated fly ash or bottom ash to enhance removal of water from the pond.

B. Place straw bales, earth or rock fill over the leakage area. These materials may be located on site or available from the coal yard operation, or other contractor as listed in Appendix C.

C. Contact AEP-Civil Engineering staff and/or a Professional Engineer for mitigation techniques and permanent repair recommendations.

6.3.3 Slumping/Sliding of Embankment Condition
A. Fill affected area with earth or rockfill. These materials are available on site or from other contractor(s) as listed in Appendix C. If sliding occurs, the toe of the slide should be stabilized by weighting it with earth, rock, or other granular material.

B. If the slump reduced the dam crest elevation, place soil from the on-site borrow areas at the slump to restore dam to its original elevation.

C. Contact AEP-Civil Engineering staff and/or a Professional Engineer for permanent repair recommendations.

6.3.4 Sinkhole Condition

A. Fill sinkhole with earth or rockfill from on-site borrow areas. These materials may be available on site or from other contractor(s) as listed in Appendix C.

B. Contact AEP-Civil Engineering staff and/or a Professional Engineer for permanent repair recommendations.

6.3.5 Severe Downstream Erosion or Minor Structural Damage

A. Monitor and log condition of structures or downstream erosion.

B. Contact AEP-Civil Engineering staff and/or a Professional Engineer for permanent repair recommendations.

6.4 Response During Periods of Darkness

There are no area lights at the ash pond complex. The plant has portable on-site emergency lighting that can be mobilized in the event of an emergency. The emergency lighting is located at the plant’s coal yard offices and managed by the Yard Team Leader. If necessary, additional portable lighting will be rented to illuminate areas of concern.

Normal operations of the power plant do not include site visits to these areas during hours of darkness.
6.5 Response During Weekends and Holidays

The power plant is manned 24-hours, 365 days a year. Personnel would be available to respond to an emergency situation at any time.

6.6 Response During Periods of Adverse Weather

The plant has four-wheel drive vehicles to be used for transportation to the ash pond complex. The power plant also has track-mounted bulldozers that are used in the day-to-day operations of the coal yard that could be utilized to access the ponds during extreme weather conditions.

6.7 Alternative Systems of Communication

The primary means of external communications is the telephone system. A microwave telephone system for the AEP system and its affiliates is also available for internal communications.

The secondary communication system is the use of two-way radios. Most plant vehicles are equipped with radios. The frequency can be changed to be in contact with the local emergency response agency.

6.8 Emergency Supplies and Resources

Materials necessary to repair earthen embankments are not normally stockpiled at the dams or the plant site. However, plant personnel have access to heavy equipment, such as bulldozers and backhoes, which could be utilized for temporary repairs. Equipment operators and laborers are available at the plant at all hours.

Since the ash pond complex is used as major sedimentation facilities, fill material is readily available.

The plant also stockpiles a limited number of stop logs that are used in the outlet structures.
The table below lists emergency contacts and services/materials.

<table>
<thead>
<tr>
<th>Name</th>
<th>Emergency Items</th>
<th>Address</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Contact</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tony McClain Yard Team Leader</td>
<td>Bulldozers, Front-end Loaders, Backhoes</td>
<td>At the AEP Conesville Plant</td>
<td>(740) 829-4004, Work</td>
</tr>
</tbody>
</table>

6.9 Training and Updating of the EAP

The EAP shall be reviewed and updated by the EAP Coordinator and all affected parties at least once a year or as necessary. When updating the EAP, check all contact names and phone numbers for verification. If there are significant changes to the plan, such as dam ownership or major modifications to the dam, the EAP shall be updated as soon as possible.
7.0 FLOOD INUNDATION MAPS

Appendix A contains a Failure Inundation Mapping Report, which provides a brief description of the method and assumptions that were used to identify the potentially inundated areas from two potential dam failure scenarios for the ash pond complex – specifically, the One-half Probable Maximum Flood (PMF) with failure of the dam(s), and normal pool (“sunny day”) failure of the dam(s). Appendix A includes flood inundation maps which are intended to delineate areas subject to flood waters in the event of a failure of the dam at the Conesville Power plant.

Shown on the maps is the limit of flooding; the elevation and depth of flooding; and the arrival and peak time of the flood wave.

It should be noted that, because of the method and procedures used to develop the flooded area, the limits of flooding shown are approximate and should be used solely as a guideline for establishing evacuation zones. Actual evacuation zones may be greater than the area covered by the flooded areas shown and should be established by local officials based on their judgment and knowledge of local conditions.

The study considers events of an extremely remote nature. The results are not in any way intended to reflect on the integrity of any of the dams.
APPENDIX A
FLOOD INUNDATION MAPPING REPORT
FLOOD INUNDATION MAPS
APPENDIX A
FAILURE INUNDATION MAPPING REPORT
CONESVILLE COAL ASH SLURRY DAM

PREPARED FOR
AMERICAN ELECTRIC POWER COMPANY
COLUMBUS, OHIO

APRIL 2009

BURGESS & NIPLE, INC.
Engineers and Architects
5085 Reed Road
Columbus, Ohio 43220
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Attachments
Tables
Flood Inundation Maps

January 2009
1.0 INTRODUCTION

This report presents pertinent background information regarding the results of a failure inundation mapping study for the American Electric Power Company, Conesville Plant coal ash slurry dam. This study responds to requests by the Ohio Department of Natural Resources (ODNR) concerning the dam and provides the base data for preparing of an Emergency Action Plan (EAP).

This study considers events of an extremely remote nature. The results are not in any way intended to reflect on the integrity of the Conesville coal ash slurry dam.
2.0 AUTHORITY FOR STUDY

Burgess & Niple, Inc. (B&N) was authorized by American Electric Power Company on February 11, 2009, to prepare the EAP for the Conesville Plant’s coal ash slurry dam, including the flood inundation mapping. The work was completed under Contract No. 075708, Letter of Authorization 00001.
3.0 SCOPE OF STUDY

Two embankments, identified as the north and the south embankments, were constructed to create the coal ash slurry pond. The study analyzed flooding results for two events for each embankment – 50 Percent Probable Maximum Flood (PMF) with failure of the dam, and the normal pool failure event. The breach configuration was determined based on guidelines given by the U.S. Army Corps of Engineers (USACE) Hydrologic Engineering Center and Washington State guidelines for dam breach size estimation. The USACE’s Hydrologic Engineering Center River Analysis System (HEC-RAS) unsteady state model was used to model the flood events downstream from the dam to where the discharge enters the Muskingum River.
4.0 BASE INFORMATION

4.1 Project Description

The Conesville coal ash slurry dam is owned by the American Electric Power Company (AEP) and is located in Coshocton County, Ohio; AEP’s corporate headquarters are located in Columbus, Ohio. Exhibit 1 shows the location of the dam. The dam is located at the AEP Conesville power generation station approximately five miles south of Coshocton, Ohio and approximately 60 miles east of Columbus, Ohio. The dam is not on a major waterway, but is approximately 2,000 feet east of the Muskingum River.

The coal ash slurry pond at the Conesville plant was originally constructed in the 1950s and was subsequently expanded in the 1970s. The pond resembles an upground reservoir in that it was formed by excavating earth below natural grades and using the suitable excavated soil to construct embankments at the south and north ends of the pond. There is a very small land drainage area that contributes storm water runoff into the pond and the pond’s water surface makes up most of the contributing drainage area. The pond is internally subdivided into three main areas; the fly ash pond, the bottom ash pond, and the clear water pond. Internal berms, known as floating roads or divider dikes and constructed of fly ash and bottom ash, are used to separate the three areas, however, the berms are not constructed as “dam embankments” and are not considered to be structurally capable of serving as water storage embankments.

The fly ash pond comprises the northern portions of the overall pond system, with an area of approximately 50 acres. Fly ash-laden water is discharged via four delivery pipes into the northwest corner of the fly ash pond. The water passes through several cells within the fly ash pond where solids settle out of the water. The cells within the fly ash pond are formed by internal berms as described above. The locations of internal berms in both the fly ash and bottom ash ponds may vary from time-to-time as needed to control water flow and allow removal of accumulated solids from particular areas. At the southeast corner of the fly ash pond system, outlet structure No. 2 controls flow from the fly ash pond into the clear water pond. There is a separate 36-inch diameter pipe adjacent to outlet structure No. 2 that also conveys water from the fly ash pond system into the clear water pond.

The bottom ash pond is in the southwest portion of the overall pond area and covers approximately 10 acres. Bottom ash-laden water is discharged via nine pipes into the northwest corner of the bottom ash pond from which it passes through an initial settling cell for heavier solids and then through a larger cell for further settling of remaining solids. Near the northeast side of the bottom ash pond...
pond, outlet structure No. 1 controls flow from the bottom ash pond into the clear water pond. In addition, four 12-inch diameter pipes are installed just south of outlet structure No. 1 to pass flow from the bottom ash pond to the clear water pond.

The clear water pond is the smallest of the three areas, is located at the southeast corner of the overall pond area, and has a surface area of approximately 2 acres. It receives water from the fly ash and bottom ash ponds and subsequently discharges water via a drop inlet structure that discharges to a drainage stream. The stream flows toward the south, through a holding pond, and ultimately enters the Muskingum River.

Water enters the pond system from four primary sources:

1. Bottom ash-laden water,
2. Flue gas desulfurization (FGD) water,
3. Fly ash-laden water
4. Precipitation

Based on topographic mapping from March 2005 aerial photography, the top of the embankment along the south and southeast portion of the pond ranges from Elevation 766.4 feet to over 768 feet and original ground just beyond the outside slope of the embankment ranges from Elevation 735 to 760. Therefore, the approximate maximum embankment height on the south portion of the embankment is about 32 feet. Similarly, the top of the embankment along the north portion of the pond had an elevation of 772.9 to 773.9 feet and a ground surface just beyond the outside slope of the embankment from Elevation 736. The approximate maximum embankment height for the north embankment is 37 feet.

According to operating records provided by AEP, the clear water pond is typically operated with a normal pool level of about Elevation 755; the bottom ash pond has a normal pool level of about Elevation 755 to 760; and the fly ash pond has a normal pool elevation in the range of 758 to 764.

4.2 Data Sources

The HEC-1 hydrologic runoff model, developed by the Hydrologic Engineering Center of the U.S. Army Corps of Engineers (USACE), was used to model the outflow from the pond under the two failure conditions. Key input information is as follows:
4.2.1 **Top of Embankment Elevation**

The top of embankment elevation is used to determine whether the embankment will overtop under a flood condition. Based on elevations from Drawing No. CV-050609 as provided by AEP, the low point on the north embankment is Elevation 772.9 feet which is along the haul road on top of the embankment and the low point on the south embankment is Elevation 766.4 which is adjacent to the clear water pond. We note that there is a low point in the south embankment where an access road passes through the embankment near the bottom ash pond – for modeling purposes, the low point was considered to be filled to not permit water to overflow at this location.

4.2.2 **Normal Pond Water Surface Elevation**

The normal pond water surface elevation is used as the starting elevation in the pond for both the normal pool ("sunny day") and the 50% PMF failure conditions.

AEP provided B&N with a plot of historic pond water surface elevations for each of the fly ash, bottom ash, and clear water ponds, with data ranging from June 2001 to September 2007. Water surface elevations in the clear water pond ranged from Elevation 751 to 756 with the typical elevation being at about 755 feet; the bottom ash pond ranged from Elevation 755 to 763, with a typical elevation of about 758; and, the fly ash pond ranged from 757 to 764 with a typical elevation of about 760.

For modeling of the breaches, the breach along the south embankment was considered to be adjacent to the clear water pond where the original ground surface is about Elevation 735, therefore the normal pool water surface elevation for south embankment failure modeling was considered to be Elevation 755 (from the clear water pond information). For the north embankment, the failure would occur at the north end of the fly ash pond, therefore the normal pool elevation for north embankment failure modeling was considered to be Elevation 760.

4.2.3 **Base Elevation of Modeled Breach in Embankment**

Based on information documented on Drawing 0116-002, Elevation 735 was selected to be the base elevation for a potential breach of the embankments that form the coal ash slurry pond. This elevation is consistent with natural ground elevations just north of the north embankment and also just east of the clear water pond, therefore, B&N used a base elevation of 735 for modeling breaches of both the north and south embankments.
4.2.4 **Pond Elevation-Storage Information**

For modeling outflow from a potential dam failure, the relationship between elevation and storage in the pond is required. Following review of available information, B&N developed elevation-storage information for the pond based on Drawing No. CV-050609 along with original design drawings that showed the embankment side slopes inside the pond. The original design drawings indicate that the pond was excavated below natural ground. For B&N’s calculations, the volume was calculated to a bottom of pond elevation of 730. A plot of the elevation-storage relationship used for this analysis is attached as Figure 1.

4.2.5 **Outflow Spillway Discharge Rating**

The spillway discharge rating is the relationship between the water level in the pond and outflow from the pond’s outlet structure, in this case it would be from the clear water pond to the drainageway that leads southward to the Muskingum River. AEP did not find drawings of the clear water pond’s outlet structure; therefore it was decided to model the 50% PMF condition as though there is no outflow from this structure. This approach gives a conservatively high maximum pool elevation because there would normally be some discharge from the outlet structure that would reduce the maximum pool elevation. Based on a sensitivity analysis (see later paragraph), the downstream water surface elevations are not significantly impacted by the choice of initial water surface elevations in the pond.

4.2.6 **Floating Roads/Divider Dikes**

Several floating roads/divider dikes exist within the overall coal ash slurry pond and they divide the pond into several smaller ponds. The fly ash pond is actually a complex of several ponds, the bottom ash pond is a separate pond, and the clear water pond receives water from both the fly ash and bottom ash ponds and subsequently discharges it to the drainageway outside the pond from which water will flow into the holding pond and eventually flow to the Muskingum River.

The model assumes that the floating roads/divider dikes do not exist. Because they are not designed as water retention embankments, it was concluded that they do not have the structural capability to retain water; therefore the floating roads/divider dikes are conservatively assumed non-existent in the model.
4.2.7 Embankment Failure Parameters

To model the outflow from the embankment failure, it is necessary to assume the geometry of the breach in the embankment and the time over which the failure occurs. For this analysis, we have used a trapezoidal breach cross-section with a bottom width (perpendicular to flow) of 145 feet, side slopes of 1H:1V, and a bottom of breach elevation of 735. It was assumed that the failure would occur over a time period of 1 hour 15 minutes. These values are generally within published ranges for breaches and provide a peak outflow from the breached embankment that has good agreement with USACE guidelines. B&N also used a Washington State guideline and calculation to aid in determining the size of the breach to use in the HEC-1 model. Copies of the USACE guidelines (Attachments 1 and 2) and Washington State calculation sheets (Attachments 3 and 4) are attached.

For the normal pool failure, the embankments were modeled with failure occurring with the water at the normal pool elevation. For the 50 percent PMF event, the embankments were modeled with failure occurring when the pond level reaches the maximum pond elevation obtained from modeling the 50 percent PMF without failure. In general, this results in a failure elevation about 2 feet higher than the starting pond elevation for the 50 percent PMF event.

4.2.8 Sensitivity Analysis

Parametric analyses were performed to evaluate the effects of water level variations over time. For the south embankment, these variations included modeling potential failure conditions with starting pond water levels of 754 and 756 to compare the differences to the normal pool elevation of 755. Similarly, for the north embankment, two additional starting pool conditions with starting elevations of 758 and 762 were modeled as a part of the parametric evaluations.

The HEC-RAS river analysis system, also developed by the U.S. Army Corps of Engineers, was used to model the flooded areas downstream of the north and south embankments to where the water would enter the Muskingum River. HEC-RAS data sources are as follows:

4.2.9 Elevation Source

AEP provided aerial mapping by Henderson Aerial Surveys, Inc. of the site that covered the entire study area for the south embankment and nearly all of the study area for the north embankment, with a small portion unmapped near the northwest portion of the modeled area for the north embankment.
For the small unmapped area, B&N used elevation data from the Ohio Geographically Referenced Information Program (OGRIP) website, which is a compilation of aerial photographs and GIS elevation data for many counties across Ohio. Coshocton County, where the Conesville plant is located, is one of the included counties. B&N reviewed the compatibility of the AEP-supplied topographic mapping with that from the OGRIP website and found them to be consistent. The elevation data for developing cross-sections for the HEC-RAS model was taken from this combined data set.

### 4.2.10 Inflow Hydrographs

The model requires a hydrograph (water flow at various times) at the upstream end of the modeled area. The hydrograph for modeling either the north or south embankment failures was the output of the HEC-1 model previously discussed.

### 4.2.11 Channel Roughness

Channel roughness affects the depth of water in the modeled cross-sections as well as the velocity of flow. Channel roughness values were estimated by B&N based on a February 20, 2009 site visit in conjunction with review of aerial photographs. In general, the flow sections downstream of the embankments are open land with either agricultural or open vegetation or have some tree cover and the Manning “n” values used ranged from 0.035 to 0.045 in the channels downstream of the embankments and from 0.05 to 0.12 in the overbank areas.

### 4.2.12 Downstream Extent of Modeling

HEC-RAS modeling was carried out from each of the north and south embankments to where the outflow would enter the Muskingum River, a distance of approximately 2,500 feet for the north embankment and 2,000 feet for the south embankment.

### 4.3 Flood Inflow Hydrograph

Per discussions with Ohio Department of Natural Resources (ODNR) on the extent of modeling to demonstrate the consequences of a failure of the dam, AEP requested B&N to model (1) the normal pool (“sunny day”) failure condition, and (2) the 50% probable maximum flood (PMF) failure condition.
The normal pool failure condition occurs when the pond is at its normal pool elevation and failure of the embankment occurs. This would generally be considered to result from a piping failure (i.e. water seeping through the embankment internally erodes soil from the embankment until it fails) or from a foundation failure. No rainfall event is associated with the normal pool failure condition.

The 50% PMF results from determining the runoff into the pond from the probable maximum precipitation, then applying a 50% reduction to that runoff to get the 50% PMF. For this site, B&N used a probable maximum precipitation of 32.90 inches of rainfall in a 24-hour period. (ref: HYDROMETEOROLOGICAL REPORT NO. 51 Probable Maximum Precipitation Estimates, United States East of the 105th Meridian June 1978, Prepared by Louis C. Schreiner and John T. Riedel Hydrometeorological Branch Office of Hydrology National Weather Service).

4.4 Model Development

B&N developed the HEC-1 model input and used it to produce the dam failure hydrograph for the dam. The failure hydrograph was routed downstream using the HEC-RAS model, beginning at the dam embankments and terminating where the water enters the Muskingum River. The geometry of the downstream reach of the hydraulic model was developed using elevation data provided by AEP as previously described. The failure hydrograph developed in HEC-1 was inserted into the HEC-RAS model and routed downstream.

4.5 Modeling Conditions

Resulting peak discharges for the 50 percent PMF and normal pool models are as follows:

<table>
<thead>
<tr>
<th>Location</th>
<th>50% PMF Peak Discharges</th>
<th>Normal Pool Discharges</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>South Embankment w/failure</td>
<td>North Embankment w/ failure</td>
</tr>
<tr>
<td>Embankment outflow</td>
<td>22,518 cfs</td>
<td>25,853 cfs</td>
</tr>
<tr>
<td>Discharge into Muskingum River</td>
<td>18,385 cfs</td>
<td>24,933 cfs</td>
</tr>
<tr>
<td></td>
<td>South Embankment w/ failure</td>
<td>North Embankment w/ failure</td>
</tr>
<tr>
<td>Embankment outflow</td>
<td>20,855 cfs</td>
<td>24,538 cfs</td>
</tr>
<tr>
<td>Discharge into Muskingum River</td>
<td>16,171 cfs</td>
<td>23,550 cfs</td>
</tr>
</tbody>
</table>

cfs = cubic feet per second.
4.6 **Downstream Road/Railroad Embankments**

The railroad bed approximately 1,500 feet downstream of the north embankment was included in the HEC-RAS model. No other road or railroad embankments are between the embankments and the Muskingum River.
5.0 STUDY RESULTS

5.1 50% Probable Maximum Flood With Failure

This analysis routes the outflow hydrograph from failure of the Conesville coal ash slurry dam occurring when the pool has reached its maximum nonfailure condition stage. The area flooded appears on the flood inundation maps for the conditions of a starting normal pool level of 755 feet for the south embankment and a starting normal pool level of 760 feet for the north embankment.

5.2 Normal Pool Event with Failure

Normal pool failure is assumed to occur when the dam is at its normal pool elevation. The outflow hydrograph from the dam reaches a sharp peak and recedes back to base flow. The peak is attenuated as it moves downstream. The peak flow of 20,855 cfs for the south embankment is reduced to 16,171 cfs at the study limit by virtue of the valley storage downstream from the embankment. Similarly, for the north embankment, the peak flow of 24,538 cfs for the north embankment is reduced to 23,550 cfs at the study limit. The extent of flooding is shown on the flood inundation maps and is essentially equivalent to the flooded area from the 50% PMF with failure event because flood elevations are generally less than ½ foot different between 50% PMF failure conditions and normal pool failure conditions.

5.3 Mapping Flood Information

Flood information is provided at selected cross sections on the inundation maps. Definitions of the arrival time, peak time, and peak elevation are listed in the legend. Elapsed time for the PMF is measured from the time of maximum reservoir elevation at the embankment. Elapsed time for the normal pool failure is measured from the beginning of dam failure.
5.4 Discussion of Sensitivity Modeling Results

Table 1, attached, summarizes the HEC-1 hydrologic analyses for determining the outflow from the dam during normal pool and 50% PMF conditions. The table provides the modeling results for starting pond elevations of 754, 755, and 756 for possible embankment failures to the south, and starting pond elevations of 758, 760, and 762 for possible embankment failures to the north.

A higher starting water surface elevation before the storm results in a higher maximum water surface elevation in the pond and also a somewhat higher maximum discharge from the breached embankment. For the 50% PMF condition, the maximum water surface elevation and maximum discharge are both higher than what was obtained from the normal pool failure with the same starting pond elevation – this is reasonable since there is additional water depth added to the pond from the precipitation in the 50% PMF condition.

Table 2 presents the HEC-RAS summary for downstream flood elevations and peak discharges. Table 2 also provides the model analysis results for starting pond elevations of 754, 755, and 756 for possible embankment failures to the south, and for starting pond elevations of 758, 760, and 762 for possible embankment failures to the north.

At locations downstream of the failed embankment either on the north or south sides, the flows at each modeling cross section and the corresponding water surface elevations are all very similar. For example, for the south embankment, normal pool failure condition, the water surface elevation for a starting elevation of 756 is 734.07 at station 0.00 while for a starting elevation of 754 it is 733.55, a difference of only 0.52 feet. Similarly, the 50% PMF water surface elevations are about 0.4 foot higher than for the normal pool failure condition for the same starting water elevation in the pond. For the accuracy of mapping that is available with existing 2-foot contours, these differences are nearly indistinguishable.
ATTACHMENTS
Figure 1
American Electric Power
Conesville Plant Coal Ash Pond
Elevation Storage Plot
### TABLE 1

**SUGGESTED BREACH PARAMETERS WEIR TYPE MODE OF FAILURE**

**FOR EARTH FILL DAM**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breach Width</td>
<td>1/2 to 3 dam heights</td>
</tr>
<tr>
<td>Side Slope of Breach</td>
<td>0:1 to 1:1</td>
</tr>
<tr>
<td>Failure Time (Hrs.)</td>
<td>0.5 to 4</td>
</tr>
</tbody>
</table>

**FOR CONCRETE GRAVITY DAM**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breach Width</td>
<td>A multiple of monolith widths</td>
</tr>
<tr>
<td>Side Slope of Breach</td>
<td>0:1</td>
</tr>
<tr>
<td>Failure Time (Hrs.)</td>
<td>0.1 to 0.5</td>
</tr>
</tbody>
</table>

**FOR CONCRETE ARCH DAMS**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breach Width</td>
<td>Entire dam width</td>
</tr>
<tr>
<td>Side Slope of Breach</td>
<td>Valley wall slope</td>
</tr>
<tr>
<td>Failure Time (Hrs.)</td>
<td>Nearly instantaneous</td>
</tr>
</tbody>
</table>
FIGURE 2
ENVELOPE OF EXPERIENCED OUTFLOW
RATES FROM BREACHED DAMS

HISTORICAL FAILURES

<table>
<thead>
<tr>
<th>NO.</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>St. Francis, California</td>
</tr>
<tr>
<td>2.</td>
<td>Swift, Montana</td>
</tr>
<tr>
<td>3.</td>
<td>Buffalo Cr, West Virginia</td>
</tr>
<tr>
<td>4.</td>
<td>Oros, Brazil</td>
</tr>
<tr>
<td>5.</td>
<td>Apishapa, Colorado</td>
</tr>
<tr>
<td>6.</td>
<td>Hell Hole, California</td>
</tr>
<tr>
<td>7.</td>
<td>Scheaffer, Colorado</td>
</tr>
<tr>
<td>8.</td>
<td>Granite Creek, Alaska</td>
</tr>
<tr>
<td>9.</td>
<td>Little Deer Creek, Utah</td>
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<tr>
<td>10.</td>
<td>Castlewood, Colorado</td>
</tr>
<tr>
<td>11.</td>
<td>Baldwin Hills, California</td>
</tr>
<tr>
<td>12.</td>
<td>Hatchtown, Utah</td>
</tr>
<tr>
<td>13.</td>
<td>Lower Two Medicine, Montana</td>
</tr>
<tr>
<td>14.</td>
<td>Teton, Idaho</td>
</tr>
</tbody>
</table>

\[ Q_B = 75(D)^{1.85} \]

\( Q_B \): Peak Outflow in c.f.s.
\( D \): Hydraulic Depth in ft.
WASHINGTON STATE GUIDELINES BREACH PARAMETERS
TECHNICAL NOTE 1, JULY 1992
VALUES FOR FAILURE AT NORMAL POOL

<table>
<thead>
<tr>
<th>Name of AEP</th>
<th>Cohesionless</th>
<th>Erosion Resistant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conesville</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ash Pond</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elevation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top of Dam</td>
<td>766.00</td>
<td></td>
</tr>
<tr>
<td>Stream Bed</td>
<td>729.60</td>
<td></td>
</tr>
<tr>
<td>Normal Pool</td>
<td>755.00</td>
<td></td>
</tr>
<tr>
<td>Breach Bottom</td>
<td>735.00</td>
<td></td>
</tr>
</tbody>
</table>

Storage in acre feet
- Top of Dam: 2811
- Normal Pool: 1691
- Surface Area: 67
- Normal Pool: 83.9

Type of Embankment Material
- Pick Only One
- Cohesionless
- Erosion Resistant

Eroded Volume of Breach
- V_m = 3.75(BFF)^2 Cohesionless
- V_m = 2.5(BFF)^2 Erosion Resistant

Time for Breach Development
- t = 0.026V_m^0.36 Cohesionless
- t = 0.042V_m^0.36 Erosion Resistant

Storage Volume Normal Pool
- V_m = 1891

Height of Water over Breach Bottom
- H = 20.00

Breach Formation Factor at Normal Pool
- BFF = V_m(H)

Width of Breach
- W_b = (27*N*A)^0.5

Surface Area
- A = 23.4*S_f

Face Area
- S_f = W/W_b + Z_b

Summary Failure at Normal Pool
- Width of Breach is 159 Feet
- Time for Breach Development is 1.09 hour
- Dam Breach Peak Discharge is 16538 cfs
WASHINGTON STATE GUIDELINES BREACH PARAMETERS
TECHNICAL NOTE 1, JULY 1992
VALUES FOR FAILURE AT NORMAL POOL

Name of AEP Conesville Ash Pond
Elevation
Top of Dam: 766.00
Stream Bed: 729.60
Normal Pool: 760.00
Breach Bottom: 735.00

Storage in acre feet
Top of Dam: 2811
Normal Pool: 2299
Surface Area in acres
Top of Dam: 87
Normal Pool: 83.9

BFF = Breach Formation Factor at Normal Pool
BFF=V_m(H)
V_m = Eroded Volume of Breach
V_m=3.75(BFF) Cohesionless
V_m=2.5(BFF) Erosion Resistant

Eroded Volume of Breach
V_m = 11554 cubic yards

Type of Embankment Material Pick Only One
Cohesionless
Erosion Resistant

= Only cells to be filled

t = Time for Breach Development

Z_{i}=Upstream Embankment Slope
Z_{t}=2.5
Z_{d}=Downstream Embankment Slope
Z_{e}=1

Breach Slope

15

W_b=142.7 feet

Q_p = Dam Breach Peak Discharge
Q_p=3.1*W*H^{1.5}(A/(A+H^{0.5}))^{3}
W=W_b+Z_b*H
A=23.4*S_{a}/W
S_{a}=r/face Area

18489 cfs
167.7

SUMMARY FAILURE AT NORMAL POOL

Width of Breach is 143 Feet
Time for Breach Development is 1.22 hour
73.1 minutes

Dam Breach Peak Discharge is 18489 cfs
TABLES
# Table 1

**American Electric Power Conesville Plant Coal Ash Slurry Pond HEC-1 Results**

<table>
<thead>
<tr>
<th>Starting Water Surface Elevation (feet)</th>
<th>Sunny Day Failure Condition</th>
<th>0.5 PMF Failure Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum Water Surface Elevation (feet)</td>
<td>Maximum Discharge (cfs)</td>
</tr>
<tr>
<td>754.0</td>
<td>754.0</td>
<td>20,003</td>
</tr>
<tr>
<td>755.0</td>
<td>755.0</td>
<td>20,855</td>
</tr>
<tr>
<td>756.0</td>
<td>756.0</td>
<td>21,666</td>
</tr>
<tr>
<td>758.0</td>
<td>758.0</td>
<td>23,174</td>
</tr>
<tr>
<td>760.0</td>
<td>760.0</td>
<td>24,538</td>
</tr>
<tr>
<td>762.0</td>
<td>762.0</td>
<td>25,848</td>
</tr>
</tbody>
</table>
### TABLE 2
AMERICAN ELECTRIC POWER
CONESVILLE PLANT COAL ASH SLURRY POND
HEC-RAS RESULTS

#### South Embankment - Sunny Day Failure
**Pool Level 754**

<table>
<thead>
<tr>
<th>Reach</th>
<th>Cross Section</th>
<th>Q Total (cfs)</th>
<th>W.S. Elev (ft)</th>
<th>Q Total (cfs)</th>
<th>W.S. Elev (ft)</th>
<th>Q Total (cfs)</th>
<th>W.S. Elev (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>South</td>
<td>0.00</td>
<td>14912</td>
<td>733.55</td>
<td>16171</td>
<td>733.86</td>
<td>17165</td>
<td>734.07</td>
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<tr>
<td>South</td>
<td>0.32</td>
<td>15265</td>
<td>735.37</td>
<td>16513</td>
<td>735.68</td>
<td>17506</td>
<td>735.90</td>
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<tr>
<td>South</td>
<td>0.59</td>
<td>19167</td>
<td>739.89</td>
<td>20051</td>
<td>740.17</td>
<td>20968</td>
<td>740.36</td>
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<tr>
<td>South</td>
<td>0.75</td>
<td>20003</td>
<td>745.27</td>
<td>20855</td>
<td>745.45</td>
<td>21666</td>
<td>745.62</td>
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#### South Embankment - 0.5 PMF Failure
**Pool Level 754**

<table>
<thead>
<tr>
<th>Reach</th>
<th>Cross Section</th>
<th>Q Total (cfs)</th>
<th>W.S. Elev (ft)</th>
<th>Q Total (cfs)</th>
<th>W.S. Elev (ft)</th>
<th>Q Total (cfs)</th>
<th>W.S. Elev (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>South</td>
<td>0.00</td>
<td>17288</td>
<td>734.09</td>
<td>18385</td>
<td>734.26</td>
<td>19411</td>
<td>734.43</td>
</tr>
<tr>
<td>South</td>
<td>0.32</td>
<td>17639</td>
<td>735.92</td>
<td>18749</td>
<td>736.11</td>
<td>19758</td>
<td>736.29</td>
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<tr>
<td>South</td>
<td>0.59</td>
<td>21053</td>
<td>740.38</td>
<td>21815</td>
<td>740.56</td>
<td>22566</td>
<td>740.74</td>
</tr>
<tr>
<td>South</td>
<td>0.75</td>
<td>21750</td>
<td>745.64</td>
<td>22518</td>
<td>745.83</td>
<td>23250</td>
<td>745.99</td>
</tr>
</tbody>
</table>

#### North Embankment - Sunny Day Failure
**Pool Level 758**

<table>
<thead>
<tr>
<th>Reach</th>
<th>Cross Section</th>
<th>Q Total (cfs)</th>
<th>W.S. Elev (ft)</th>
<th>Q Total (cfs)</th>
<th>W.S. Elev (ft)</th>
<th>Q Total (cfs)</th>
<th>W.S. Elev (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>0.00</td>
<td>19846</td>
<td>741.81</td>
<td>23550</td>
<td>742.46</td>
<td>24916</td>
<td>742.69</td>
</tr>
<tr>
<td>North</td>
<td>0.05</td>
<td>19816</td>
<td>742.68</td>
<td>23576</td>
<td>743.34</td>
<td>24912</td>
<td>743.57</td>
</tr>
<tr>
<td>North</td>
<td>0.09</td>
<td>20420</td>
<td>745.03</td>
<td>23950</td>
<td>745.29</td>
<td>25273</td>
<td>745.41</td>
</tr>
<tr>
<td>North</td>
<td>0.13</td>
<td>20453</td>
<td>745.11</td>
<td>23984</td>
<td>745.39</td>
<td>25306</td>
<td>745.51</td>
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<tr>
<td>North</td>
<td>0.26</td>
<td>20789</td>
<td>745.82</td>
<td>24329</td>
<td>746.25</td>
<td>25650</td>
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<tr>
<td>North</td>
<td>0.38</td>
<td>22065</td>
<td>747.48</td>
<td>24538</td>
<td>748.11</td>
<td>25848</td>
<td>748.34</td>
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</table>

#### North Embankment - 0.5 PMF Failure
**Pool Level 758**

<table>
<thead>
<tr>
<th>Reach</th>
<th>Cross Section</th>
<th>Q Total (cfs)</th>
<th>W.S. Elev (ft)</th>
<th>Q Total (cfs)</th>
<th>W.S. Elev (ft)</th>
<th>Q Total (cfs)</th>
<th>W.S. Elev (ft)</th>
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</thead>
<tbody>
<tr>
<td>North</td>
<td>0.00</td>
<td>23620</td>
<td>742.47</td>
<td>24933</td>
<td>742.69</td>
<td>26207</td>
<td>742.90</td>
</tr>
<tr>
<td>North</td>
<td>0.05</td>
<td>23639</td>
<td>743.35</td>
<td>24916</td>
<td>743.57</td>
<td>26247</td>
<td>743.78</td>
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<td>North</td>
<td>0.09</td>
<td>24018</td>
<td>745.30</td>
<td>25300</td>
<td>745.40</td>
<td>26552</td>
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<tr>
<td>North</td>
<td>0.13</td>
<td>24054</td>
<td>745.40</td>
<td>25320</td>
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<td>26595</td>
<td>745.63</td>
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<tr>
<td>North</td>
<td>0.26</td>
<td>24397</td>
<td>746.26</td>
<td>25668</td>
<td>746.42</td>
<td>26879</td>
<td>746.59</td>
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<tr>
<td>North</td>
<td>0.38</td>
<td>24606</td>
<td>748.12</td>
<td>25853</td>
<td>748.34</td>
<td>27058</td>
<td>748.56</td>
</tr>
</tbody>
</table>

Note: Cross Section stationing is miles from Muskingum River toward embankment.
APPENDIX B
TRAINING, EXERCISING, UPDATING,
AND POSTING THE EAP
APPENDIX B

TRAINING, EXERCISING, UPDATING AND POSTING THE EAP

A. Training

The Conesville Power Plant EAP Coordinator (Plant Environmental Coordinator) shall be thoroughly familiar with the Emergency Action Plan (EAP) and the actions that may be required under the EAP.

The EAP Coordinator shall be responsible for:

1. Conducting orientation seminars for plant personnel who are involved in the inspection and operations of the ash pond complex. The seminars will also include personnel who may respond to outside callers reporting an unusual condition at or near the ponds.

2. Conducting an initial coordination meeting with key plant personnel and appropriate local and state agencies to review the EAP and discuss the responsibilities of each agency. Once the initial EAP has been presented and distributed to the authorities, annual face-to-face meetings shall be conducted with the authorities to review/update their copies of the EAP. If there are significant changes to the initial EAP, a coordination meeting with all the participants will be conducted.

3. Training alternate AEP staff to complete the Emergency Response Leader duties in the event the Team Leader is not available during a period of emergency as described in this EAP.

4. All attendees of such training sessions shall sign the EAP Training Record Form.

B. Exercising

The EAP Coordinator shall plan and convene an emergency exercise one time each year. The exercise shall include appropriate AEP administrative, operations, and maintenance personnel. Response organizations shall be invited to participate, however, their
unavailability shall not be cause for not completing the exercise. The exercise shall be performed to test the procedures and determine appropriate actions in the event of an emergency.

At the conclusion of the exercise, the personnel shall review the exercise and prepare a written summary of lessons learned and items that can be improved upon.

C. Updating the EAP

The EAP Coordinator will be responsible for conducting an annual review of the Plan. The annual review shall include the following items:

1. AEP personnel names, positions, and/or phone numbers shall be verified and revised as necessary.

2. All telephone numbers listed for external agencies shall be called and verified that they are the correct numbers to dial in the event of an emergency.

3. Descriptions of alterations to the dam embankments and/or outlet structures.

4. Additions or deletions to the list of Emergency Supplies and Resources.

Upon completion of each annual review, the EAP Coordinator shall complete the form on the following page to document the review and update.

Revised pages shall be distributed to all EAP recipients with a summary of the changes. If there are no revisions necessary within a given year, the EAP Coordinator shall document that the Plan has been reviewed.

A Professional Engineer shall review the EAP every 5 years to assure that it remains viable in the event that an emergency should occur at the dam. At a minimum, the Professional Engineer’s activities should include:

- A site visit to inspect the dam and appurtenances and to review staffing and emergency responses by AEP personnel
- Review of the written plan
• Confirm that Emergency Supplies and Resources are current
• Complete any necessary technical updates to the EAP.

D. Posting of the Notification Flowchart

An up-to-date copy of the Notification Flowcharts shall be posted in the control room and in the office of the Team Leader.

The EAP Coordinator shall maintain a minimum of one copy of the EAP at the Conesville Plant and a copy for AEP-Civil Engineering Department.

See Appendix D for the distribution list of the EAP and the number of full copies/sets of inundation maps each agency shall receive as updates. The EAP Coordinator shall be responsible for distribution of the EAP and any updates.
Use this form to record training sessions. File the completed form in the EAP. A thorough review of all items in the EAP should be discussed during training. Appropriate employees and EAP team members should attend the training session, annually or participate in a simulated exercise.

<table>
<thead>
<tr>
<th>TRAINING LOCATION:</th>
<th>__________________________</th>
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</thead>
<tbody>
<tr>
<td>DATE:</td>
<td>TIME:</td>
</tr>
</tbody>
</table>

### CLASS SIGN-IN

<p>| | |</p>
<table>
<thead>
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</table>

Summary and Commentary:
The EAP must be reviewed and updated (if necessary) annually for accuracy of information provided, particularly to keep contact names and telephone numbers up-to-date. At the conclusion of each review and update the changes shall be indicted in the following table.

<table>
<thead>
<tr>
<th>Date Review Completed</th>
<th>Name and Title of Reviewer</th>
<th>Changes Made</th>
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</tr>
</tbody>
</table>
APPENDIX C

SITE-SPECIFIC DATA
APPENDIX C

SITE-SPECIFIC DATA

STUDIES/DESIGN REPORTS

All engineering studies and design reports related to the ash pond complex, including Appendix A - Dam Break Analysis, at the Conesville Power Plant are stored at the corporate offices of American Electric Power. These documents include design drawings and topographic mapping. Copies of most drawings are also available at the power plant. The power company will make discretionary availability of these documents. The following lists the contact and address for request of information.

American Electric Power
Manager – Geotechnical Engineering Section
1 Riverside Plaza
Columbus, OH 43215
614-716-2917

Plant Manager
Conesville Power Plant
42701 County Road 273
Conesville, Ohio 43811
APPENDIX C

Crushed Rock and Stone, Bottom Ash
National Lime and Stone 740-622-6892
William Albert Excavating 740-622-3045

Diving Services
AEP Diving Coordinator, Dustin Zirkly cell: 304-593-6137 / office: 304-675-8258

Fabricators and Machine Shop Services
Muskingum Grinding 740-622-4741
Knowlton Steel 740-872-6100

Concrete & Patching Materials
Smith Concrete 800-936-4937
Adams Brothers Concrete 740-452-7566

Contractors
Headwaters 740-622-8001
Williams Albert Excavating 740-622-3045

Crane Service
Capital City Crane 740-521-4646
William Albert Excavating 740-622-3045
Responsible Individuals (not listed on Notification Charts)

<table>
<thead>
<tr>
<th>Team Leaders</th>
<th>Office Phone # (Audinet)</th>
<th>Office Phone #</th>
<th>Cell #</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Miles Kimball</td>
<td>288-4886</td>
<td>740-829-4886</td>
<td>740-552-1179</td>
</tr>
<tr>
<td>B. Mark Grier</td>
<td>288-4042</td>
<td>740-829-4042</td>
<td>740-294-8992</td>
</tr>
<tr>
<td>C. Gene Whilett</td>
<td>288-4884</td>
<td>740-829-4884</td>
<td>740-502-4080</td>
</tr>
<tr>
<td>D. Mark Andrews</td>
<td>288-4882</td>
<td>740-829-4882</td>
<td>740-552-1019</td>
</tr>
</tbody>
</table>

Conesville Plant Personnel

<table>
<thead>
<tr>
<th>Coal yard staff</th>
<th>Office Phone #</th>
<th>Cell #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tom Hammond</td>
<td>288-4109</td>
<td>740-404-3624</td>
</tr>
<tr>
<td>Rich Rollison</td>
<td>288-3275</td>
<td>740-404-1514</td>
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</tbody>
</table>
APPENDIX C

SITE-SPECIFIC DATA

LOCAL TV AND RADIO STATIONS

<table>
<thead>
<tr>
<th>Station Name</th>
<th>Location</th>
<th>Phone Number</th>
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</thead>
<tbody>
<tr>
<td>A. WTNS Radio</td>
<td>Coshocton</td>
<td>740-622-1560</td>
</tr>
<tr>
<td>B. WHIZ TV</td>
<td>Zanesville</td>
<td>740-452-5431</td>
</tr>
<tr>
<td>C.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F.</td>
<td></td>
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</tr>
</tbody>
</table>

Other Important Numbers

| A. Conesville Volunteer Fire Department | 740-829-2385 |
| B. State Emergency Response Commission (SERC) | 740-644-2260 |
| C. State Police-Newport, Ohio            | 740-374-6616 |
| C. Local Emergency Planning Committee (LEPC) |            |
| Muskingum County                         | 740-962-3183 |
| Coshocton County                         | 740-373-5613 |
| E.                                        |              |
| F. Weather Report                        | Parkersburg, W. Va. | 304-422-4500 |
| G. Hospitals:                            |              |
| Coshocnton Regional Medical              | 740-622-6411 |
| Genisis Health Care Zanesville           | 740-454-4000 |
| H. Ambulance Service:                    |              |
| Coshocton County EMS                     | 740-622-4294 |
| Community Ambulance                      | 740-454-6800 |
APPENDIX D
PREPARATION AND APPROVAL OF THE EAP

A. Plan Preparation

This Emergency Action Plan (EAP) was prepared by AEP staff and Conesville Plant personnel.

B. AEP Approval

This revision of the EAP was prepared for the Conesville Plant’s ash pond complex under my direction as the Plant Manager for the AEP Conesville facility. By signing this Approval, I certify that I have read and understand the EAP and the actions that may be required under it and, to the best of my knowledge, the information contained herein is accurate as of the date of my signature. The adoption of this EAP makes any previous versions null and void.

______________________________  ________________________________
(Signature)                      (Date)

Conesville Plant Manager

C. ODNR Approval

This EAP shall be submitted to the ODNR for review and approval. Upon receipt of written approval from the ODNR, a copy of ODNR’s approval letter shall be attached in this EAP following this page and a copy of the approval letter shall be forwarded to each holder of a copy of the EAP.
APPENDIX E

DISTRIBUTION LIST/ACKNOWLEDGEMENT
APPENDIX E

DISTRIBUTION LIST/ACKNOWLEDGEMENT

The following are copies of Receipt Signature Pages indicating that each agency on the distribution list has received, read, and understood the Plan and agree to their responsibilities. The list below provides the name, address, and phone number and number of copies to which the Emergency Action Plan has been distributed.

<table>
<thead>
<tr>
<th>Name/Address</th>
<th>Copies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conesville Power Plant</td>
<td>6</td>
</tr>
<tr>
<td>42701 County Road 273</td>
<td></td>
</tr>
<tr>
<td>Conesville, Ohio 43811</td>
<td></td>
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<tr>
<td>AEP</td>
<td>1</td>
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<tr>
<td>Civil Engineering</td>
<td></td>
</tr>
<tr>
<td>1 Riverside Plaza</td>
<td></td>
</tr>
<tr>
<td>Columbus, Ohio 43215</td>
<td></td>
</tr>
<tr>
<td>(614) 716-2917</td>
<td></td>
</tr>
<tr>
<td>Coshocton County Emergency Planning</td>
<td>2</td>
</tr>
<tr>
<td>Committee</td>
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</tr>
<tr>
<td>Police Department</td>
<td>1</td>
</tr>
<tr>
<td>County Sheriff</td>
<td>1</td>
</tr>
<tr>
<td>Name/Address</td>
<td>Copies</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Division of Water, Dam Safety</td>
<td>1</td>
</tr>
<tr>
<td>Ohio Department of Natural Resources</td>
<td></td>
</tr>
<tr>
<td>Fountain Square, Bldg., E-3</td>
<td></td>
</tr>
<tr>
<td>Columbus, Ohio 43224</td>
<td></td>
</tr>
<tr>
<td>(614) 265-6731</td>
<td></td>
</tr>
<tr>
<td>Coshocton County Sheriff</td>
<td>1</td>
</tr>
</tbody>
</table>
This is to acknowledge receipt of the appropriate number of copies of the Emergency Action Plan for the Ash Pond Complex at the Conesville Power Plant. We have read and understood the Plan and agree to our responsibilities listed in the Plan.

NAME (Print)_________________________________________________

SIGNATURE__________________________________________________

DATE________________________________________________________

AGENCY/COMPANY __________________________________________

Please return to: Conesville Power Plant
42701 County Road 273
Conesville, Ohio 43811

Attn: EAP Coordinator