FINAL

Coal Combustion Waste Impoundment

Dam Assessment Report

Site 19
Wood River Power Station
Dynegy Midwest Generation, Inc.
Alton, Illinois

Project # 0-381

Assessment of Dam Safety
Coal Combustion Surface Impoundments
for the REAC Program

Prepared for:

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for
United States Environmental Protection Agency

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INTRODUCTION

The release of over 5 million cubic yards of coal ash from the Tennessee Valley Authority's Kingston, Tennessee, facility in December 2008 serves as an important reminder of the need for our continued diligence on disposal units where coal combustion wastes are managed. The coal ash from the facility flooded more than 300 acres of land, damaging homes and property. It is critical that we all work to the best of our abilities to prevent a similar catastrophic failure and resultant environmental damage. One of the first steps in this effort is to assess the stability of the impoundments and similar units that contain coal combustion residuals and by-products to determine if and where corrective measures may be needed and then to carry out those measures as expeditiously as possible.

This report for the Wood River Power Plant facility assesses the stability of the following management units. This evaluation is based on a site assessment conducted on May 27-28, 2009 by a team of two engineers employed by Dewberry and contracted by Lockheed Martin for USEPA.

PURPOSE AND SCOPE

The U.S. Environmental Protection Agency (EPA) is embarking on an initiative to investigate the potential for catastrophic failure of Coal Combustion Surface Impoundments (i.e., management unit) from occurring at electric utilities in an effort to protect lives and property from the consequences of a dam failure or the improper release of impounded slurry. The EPA initiative is intended to identify conditions that may adversely affect the structural stability and functionality of a management unit and its appurtenant structures (if present); to note the extent of deterioration (if present), status of maintenance and/or a need for immediate repair; to evaluate conformity with current design and construction practices; and to determine the hazard potential classification for units not currently classified by the management unit owner or by a state or federal agency. The initiative will address management units that are classified as having a Less-than-Low, Low, Significant or High Hazard Potential ranking.

In February 2009, the EPA sent letters to coal-fired electric utilities seeking information on the safety of surface impoundments and similar facilities that receive liquid-borne material that store or dispose of coal combustion residue. This letter was issued under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 104(e), to assist the Agency in assessing the structural stability of such management units, including which facilities should be visited to perform a safety assessment of the berms, dikes, and dams used in the construction of these impoundments.

EPA requested that utility companies identify all management units including surface impoundments or similar diked or bermed management units or management units designated as landfills that receive liquid-borne material used for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals. Utility companies provided information on the size, design, age and the amount of material placed in the units. The EPA used the information received from the utilities to determine preliminarily which management units had or potentially could have High Hazard Potential ranking.

The purpose of this report is to evaluate the condition and potential of waste release from the selected High Hazard Potential management units. This evaluation included a site visit. Prior to conducting the site visit, a two-person team reviewed the information submitted to EPA, reviewed any relevant publicly available information from state or federal

agencies regarding the unit hazard potential classification (if any) and accepted information provided via telephone communication with the management unit owner, prior to the site visit.

EPA sent two engineers from Dewberry, one of whom was a professional engineer (PE), for a two-day site visit. The two-person team met with the owner of the management unit to discuss the engineering characteristics of the unit as part of the site visit. During the site visit, the team collected additional information about the management unit to be used in further determination of the hazard potential classification of the management unit(s), incorporating the ratings previously determined by the IDNR.

Factors considered in this further investigation of the hazard potential classification of the management units(s) included the age and size of the impoundment, the quantity of coal combustion residuals or by-products that were stored or disposed of in these impoundments, its past operating history, and its geographic location relative to down gradient population centers and/or sensitive environmental systems.

This report presents the opinion of the assessment team as to the potential of catastrophic failure and reports on the condition of the management unit(s). The team considered criteria in evaluating dams under the National Inventory of Dams, in making these determinations.

LIMITATIONS

The assessment of dam safety reported herein is based on field observations and review of readily available information provided by the owner/operator of the subject coal combustion waste management unit(s). Qualified Dewberry engineering personnel performed the field observations and review and made the assessment in conformance with the required scope of work and in accordance with reasonable and acceptable engineering practices. No other warranty, either written or implied, is made with regard to our assessment of dam safety.

APPENDIX B - PHOTOGRAPHS

1.0 CONCLUSIONS AND RECOMMENDATIONS

1.1 CONCLUSIONS

The conclusions below were reached as a result of a visual investigation performed on Thursday and Friday, May 28 and 29, 2009, as well as a review of existing documentation acquired from various sources including information provided by Dynegy Midwest Generation, Inc, (Dynegy), the current owner and operator of the Wood River Power Station.

1.1.1 Conclusions Regarding the Structural Soundness of the Management Unit(s) – The embankments viewed in the field appeared to be well designed and constructed and well-maintained. There were no visible signs of seepage or sloughing, nor were there any large diameter trees on the embankment. Review of design data indicate the embankments were constructed on suitable foundation materials,

1.1.2 Conclusions Regarding the Hydrologic/Hydraulic Safety of the Management Unit(s) – The embankments appear to be safe from overtopping and resulting failure. The management units do not drain any appreciable areas other than the surface area of the ponds.

1.1.3 Conclusions Regarding the Adequacy of Supporting Technical Documentation – The supporting technical documents appear to be adequate. The original design calculations and drawings are included as Document 5 in Appendix A.

1.1.4 Conclusions Regarding the Description of the Management Unit(s) – The description of the management units provided by Dynegy was an accurate representation of what was observed in the field.

1.1.5 Conclusions Regarding the Field Observations – Dynegy staff provided access requested to make the field observations. There was sufficient time and weather conditions to complete all Field observations. The conclusions provided in this section reflect the engineering team's field observations. The team observed no conditions requiring immediate remedial action.

1.1.6 Conclusions Regarding the Adequacy of Maintenance and Methods of Operation – The current maintenance practices appear to be adequate. There was no evidence of repaired embankments or prior releases noted during the field observations.

1.1.7 Conclusions Regarding the Adequacy of the Surveillance and Monitoring Program –The surveillance and inspection procedures outlined in the Operations and Maintenance Plan appear to be adequate. There is currently no instrumentation monitoring plan for the embankments.

1.1.8 Conclusions Regarding Suitability for Continued Safe and Reliable Operation – The field observations and review of documents lead the Dewberry team to conclude that the condition of the Coal Combustion Waste management units appear to be adequate for continued safe and reliable operation. Furthermore, this unit can be classified as SATISFACTORY based upon the guidance issued in the Scope of Work, in which SATISFACTORY is defined as, "No existing or potential management unit safety deficiencies are recognized. Acceptable performance is expected under all applicable loading conditions (static, hydrologic, seismic) in accordance with the applicable criteria. Minor maintenance items may be required."

1.2 RECOMMENDATIONS

Based on the above conclusions as well as the sum of information found within this report, the recommendations presented below are proposed.

1.2.1 Recommendations Regarding the Structural Stability – None appear warranted at this time.

1.2.2 Recommendations Regarding the Hydrologic/Hydraulic Safety – None appear warranted at this time.

1.2.3 Recommendations Regarding the Supporting Technical Documentation – None appear warranted at this time.

1.2.4 Recommendations Regarding the Description of the Management Unit(s) – None appear warranted at this time.

1.2.5 Recommendations Regarding the Field Observations – None appear warranted at this time.

1.2.6 Recommendations Regarding the Maintenance and Methods of Operation – None appear warranted at this time.

1.2.7 Recommendations Regarding the Surveillance and Monitoring Program – None appear warranted at this time.

1.2.8 Recommendations Regarding Continued Safe and Reliable Operation – None appear warranted at this time.

1.3 PARTICIPANTS AND ACKNOWLEDGEMENT

1.3.1 List of Participants

(Full list of Site meeting attendees can be found in Appendix D)

Cleighton Smith, Dewberry
Lauren Ohotzke, Dewberry
Rick Diericx, Dynegy
Tom Davis, Dynegy
Bob Crowe, Dynegy
Don Grahlherr, URS
Joe Kimlinger , URS
Don Crone, Dynegy
Susan McVety, Dynegy
Kenneth E. Smith, IEPA
Ted Dragovich , IEPA
Chris Liebman, IEPA

1.3.2 Acknowledgement and Signature

We acknowledge that the management units referenced herein have been assessed on May 28 and May 29, 2009.

Cleighton Smith, PE (IL # 062.040606)

Lauren Ohotzke, Civil Engineer

2.0 DESCRIPTION OF THE COAL COMBUSTION WASTE MANAGEMENT UNIT(S)

2.1 LOCATION

The Wood River Power Station is located in the town of Alton, in southwestern Illinois on the left descending bank of the Mississippi River, at river mile 199.6, approximately 17 miles northeast of St. Louis (Latitude 38° 51' 44.15" and Longitude 90° 08' 0.634"). There are two CCW management units at the Wood River Power Station: the two-cell East Ash Pond System (EAPS), and the four-cell West Ash Pond System (WAPS), (See Figure 1).

As shown on Figure 1, the two-cell EAPS is located on the eastern side of Chessen Lane, just north of the Mississippi River. The Wood River Creek runs along the eastern edge of this system, just beyond an earthen dike. This system consists of a primary and a secondary cell. The primary cell is referred to in the site visit photos found in Appendix B as EAPSP, or East Ash Pond System, Primary cell. Similarly, the secondary cell in this system is referenced as EAPSS, or East Ash Pond System, Secondary cell, in Appendix B. The primary cell is closest to the actual plant. The secondary cell is essentially in the northeast corner of the primary cell.

The four-cell WAPS is located to the north west of the EAPS on the western side of Chessen Lane (see Figure 1). The four cells within this system include Cell 1, Cell 2E, Cell 2W, and Cell 3. Cell 1 is directly west of the EAPS. Cell 3 is directly above (north of) the eastern side of Cell 1. Cell 2E is to the west of Cell 3, above the western side of Cell 1. The eastern border of Cell 2W shares a berm with both Cell 2E, to the north, and Cell 1, to the south. Cell 2W then stretches out westward to the edge of the property.

2.2 SIZE AND HAZARD CLASSIFICATION

The EAPS is not listed within the National Inventory of Dams (NID)database. However, the Illinois Department of Natural Resources Office of Water Resources, IDNR OWR, has classified the EAPS as a Class I small dam, similar to that of the U.S. Army Corp of Engineers' high hazard potential category.

Tables 2.2a and 2.2b give the size classification and hazard classification specifications, respectively, according to the Illinois Department of Natural Resources, Office of Water Resources,

Table 2.2a IDNR OWR
Size Classification Impounding Capacity Dam Height

Category	Impoundment	
	Storage (Ac-ft)	Height (ft)
Small	< 1,000	< 40
Intermediate	≥1,000 to <50,000	≥40 to <100
Large	≥50,000	≥100

Table 2.2b IDNR OWR Hazard Classification	
Hazard Potential Classification	**Probability for Causing Loss of Life of Substantial Economic Loss in Excess of that Which Would Occur Naturally Downstream w/o Dam Failure**
Class I	High
Class II	Moderate
Class III	Low

The EAPS, as a whole, has a surface area of 39 acres. The approximate maximum height of the EAPS is 33 feet.

Cells 1 and 2W, of the WAPS have been inactive for an extended period of time. DMG currently has an Illinois EPA-approved Closure Work Plan in place for these cells which describes the measures being taken that may eventually lead to their closure. However, DMG has stated that they do not anticipate requesting formal "closure" of these cells, 1 and 2W, from the Illinois EPA in the near future. As such, these two cells have not been assigned an official hazard classification by the IDNR. The Closure Work Plan is included as Appendix A, Document 11.

Cells 2E and 3 of the WAPS have a combined surface area of 19 acres. Cell 2E has an approximate maximum dam height of 20 feet. Cell 3 also has an approximate maximum dam height of 20 feet.

Cell 2E and Cell 3 of the WAPS have been rated as low in the NID and have been labeled as Class III small dams by the IDNR OWR. The rank of Class III is similar to that of the U.S. Army Corp of Engineers' low hazard potential category.

2.3 AMOUNT AND TYPE OF RESIDUALS CURRENTLY CONTAINED IN THE UNIT(S) AND MAXIMUM CAPACITY

The EAPS has been designed to permanently contain the following materials:

- Fly ash
- Bottom ash
- Boiler slag
- Boiler Blowdown
- Coal pyrite sluice water
- Ash hopper overflow
- Demineralizer regenerant wastes
- Water treatment clarifier sludge
- Water treatment filter backwash
- Units 1-5 turbine rooms and boiler rooms drains
- Coal pile runoff
- Coal conveyor drain line
- Non-chemical metal cleaning wastes

Area runoff
Dredge spoils
Demineralizer brine

Similarly, Cells 2E and 3 of the WAPS have been designed to permanently contain the following materials:

Fly ash
Bottom ash
Boiler slag
Coal pyrites sluice water
Ash hopper overflow
Boiler blowdown
Demineralizer regenerant wastes
Water treatment clarifier sludge
Water treatment filter backwash
Units 1-5 turbine rooms and boiler room drains
Coal pile runoff
Coal conveyor drain line
Non-chemical metal cleaning wastes
Area runoff
Dredge spoils
Demineralizer brine.

The EAPS currently contains the materials listed above to permanently exist within the EAPS. The estimated design storage volume/capacity is 435 ac-ft; Dynegy reports the system to be currently operating at a capacity of 58 ac-ft.

Cell 2E of the WAPS currently contains the above materials specified to permanently exist within the WAPS. Cell 2E has a maximum design volume/capacity of 120 ac-ft; Dynegy reports the volume of ash currently deposited in Cell 2E to be 119 ac-ft.

Cells 1 and 2W of the WAPS are no longer in use, but have not been officially closed. Both cells are primarily dry and void of water, overgrown with vegetation.

Cell 3 of the WAPS currently contains the above materials listed to permanently exist within the WAPS. Cell 3 is active has a maximum design volume/capacity of 90 ac-ft; Dynegy reports the system to be currently operating at a capacity of 9 ac-ft.

Table 2.3 displays the amount of residuals and maximum capacity of the EAPS as well as Cells 2E and 3 of the WAPS.

Table 2.3 Amount of Residuals and Maximum Capacity of Unit			
	EAPS	**Cell 2E of WAPS**	**Cells 3 of WAPS**
Surface Area (acre)	39	19	19
Current Storage Capacity (acre-feet)	58	119	9
Total Storage Capacity (acre-feet)	435	120	90

2.4 PRINCIPAL PROJECT STRUCTURES

2.4.1 Earth Embankment Dam - Based on Dynegy design files, the East Ash Pond System is comprised of earth embankments with downstream exterior side slopes of 3:1 (horizontal:vertical) and upstream interior side slopes of 3.5:1. There is a 1 foot clay blanket under a geo-membrane liner on the upstream side. The West Ash Pond System is comprised of earth embankments with downstream side slopes of 3:1 and upstream side slopes of 3:1. There is 3 foot of clay on the upstream side. Cells 2E and 3 within the West Ash Pond System have leachate collection systems. Additionally, Cell 2E has a 12-inch clay/HDPE composite liner. Cell 3 has 12-inch and 24-inch clay later, as well as an HDPE liner above the lower 24-inch clay layer.

Table 2.4.1 displays a summary of the dimensions and size specifications of the EAPS and Cells 2E and 3 of the WAPS.

Table 2.4.1 Summary of Dam Dimensions and Size			
	EAPS	**Cell 2E of WAPS**	**Cell 3 of WAPS**
Dam Height	33	20	20
Side Slopes (upstream)	3:5:1	3:1	3:1
Side Slopes (downstream)	3:1	3:1	3:1
Hazard Classification	Class I-High	N/A	N/A

2.4.2 Outlet Structures - The outlet structures of both the East Ash Pond System and the West Ash Pond System are similar overflow type V-notched concrete spillways that each discharge into a culvert that drains to an existing culvert that drains into Wood River Creek.

2.5 CRITICAL INFRASTRUCTURE WITHIN FIVE MILES DOWN GRADIENT

The inundation map prepared by Dynegy for their Emergency Action Plan (see Appendix A, Document 10) indicates that the failure floodwave would dissipate before five miles down gradient. Nonetheless there is a sewage treatment plant within one mile of the East Ash Pond System embankment.

3.0 SUMMARY OF RELEVANT REPORTS, PERMITS AND INCIDENTS

3.1 SUMMARY OF REPORTS ON THE SAFETY OF THE MANAGEMENT UNIT(S)

No previous reports on safety were provided.

3.2 SUMMARY OF LOCAL, STATE AND FEDERAL ENVIRONMENTAL PERMITS

The State of Illinois' Department of Natural Resources Dam Safety Office has regulatory oversight over the embankments comprising the East Ash Pond System (permit number is DS2005052), as well as Cells 2E and 3 of the West Ash Pond System (permit number is DS2003215).

3.3 SUMMARY OF SPILL/RELEASE INCIDENTS (IF ANY)

As stated by Dynegy, to the best of their knowledge, neither the East Ash Pond System nor the West Ash Pond System has had any spills or unpermitted releases of coal combustion residues or byproducts to surface water or land.

4.0 SUMMARY OF HISTORY OF CONSTRUCTION AND OPERATION

4.1 SUMMARY OF CONSTRUCTION HISTORY

4.1.1 Original Construction

Both the Primary and Secondary cells of the EAPS, as well as Cells 2E and 3 of the WAPS were designed and constructed under the supervision of a registered Professional Engineer. This individual was employed by Dynegy or the previous owner of the Wood River Power Station. Construction was performed in stages, from approximately 1996 through 2006.

4.1.2 Significant Changes/Modifications in Design since Original Construction

There have been no significant changes/modification in design since the original construction of the CCW units at the Wood River Power Station.

4.1.3 Significant Repairs/Rehabilitation since Original Construction

There have been no significant repairs/rehabilitation since the original construction of the CCW units at the Wood River Power Station.

4.2 SUMMARY OF OPERATIONAL HISTORY

4.2.1 Original Operational Procedures

The EAPS was commissioned (began receiving ash) in 2006, and has since not been expanded.

Cells 2E and 3 of the WAPS were commissioned (began receiving ash) in 1997.

There are no records regarding the time of commission for Cells 1 and 2W of the WAPS, however, DMG has stated that these two cells were "probably" placed into service within the mid 1970s.

4.2.2 Significant Changes in Operational Procedures since Original Startup

There have not been any significant changes in operational procedures of the East or West Ash Pond Systems since the original startup of the CCW units at the Wood River Power Station. Current operating procedures have been reviewed and approved by the IDNR, Office of Water Resources, Dam Safety Section

4.2.3 Current Operational Procedures

The current operational procedures are as follows:

- Fly ash is either sold to the local market or discharged to the EAPS Primary Cell; bottom ash is discharged to EAPS Primary Cell. Decant is discharged into the Secondary cell, where it is discharged via the outfall structure into Wood River Creek (NPDES Permit No. IL0000701, Outfall 005).
- Coal Pile Runoff is pumped to WAPS Cell 2E, the decant is discharged into Cell 3, where it is discharged via the outfall structure into Wood River Creek (NPDES Permit No. IL0000701, Outfall 002).
- Coal combustion waste previously stored in Cells 1 and 2W are occasionally mined and sold to local buyers.
- As previously stated, DMG has an Illinois EPA-approved Closure Work Plan for Cells 1 and 2W of the West Ash Pond System (see Appendix A, Document 11).

4.2.4 Other Notable Events since Original Startup

There have been no other notable events reported by Dynegy since original startup.

5.0 FIELD OBSERVATIONS

5.1 PROJECT OVERVIEW AND SIGNIFICANT FINDINGS

The EAPS at the Wood River Power Station was visually observed on Thursday, May 28, 2009. The WAPS was similarly observed on Friday, May 29, 2009. A series of photographs taken during this investigation can be found in Appendix B of this report. In addition, a field checklist is included as Appendix C.

Based upon the field observations, the following findings are reported:

- The embankments at the East Ash Pond System and the West Ash Pond System have been designed by a professional engineer and appear to be well constructed and structurally sound. There is regulatory oversight under the State of Illinois Dam Safety Program.

5.2 EARTH EMBANKMENT DAMS

5.2.1 Crests– appear to be structurally sound.

5.2.2 Upstream Slopes– appear to be structurally sound.

5.2.3 Downstream Slopes and Toes– appear to be structurally sound; a few ponding areas at the toe were noted but deemed to be from recent rains.

5.2.4 Abutments and Groin Areas– not applicable.

5.3 OUTLET STRUCTURES

5.3.1 Overflow Structure – appears to be structurally sound.

5.3.2 Outlet Conduit– not visible.

5.2.3 Emergency Spillway (If Present) - not applicable.

6.0 HYDROLOGIC/HYDRAULIC SAFETY

6.1 SUPPORTING TECHNICAL DOCUMENTATION (Provided by Dynegy, see Appendix A, Document 5)

6.1.1 Floods of Record – Not recorded by Dynegy.

6.1.2 Inflow Design Flood –Probable Maximum Flood, appropriate based on Illinois Dam Safety criteria

Table 6.1.2 displays the hazard specifications in relation to the size of the dam and total spillway design floods.

Table 6.1.2 IDNR OWR Hydrologic Evaluation Guidelines Recommended Spillway Design Floods

Hazard	Size	Total Spillway Design Flood
Class I	Small	0.5 PMF
	Intermediate	1.0 PMF
	Large	1.0 PMF
Class II	Small	100- year
	Intermediate	0.5 PMF
	Large	1.0 PMF
Class III	Small	100-year *
	Intermediate	100-year
	Large	0.5 PMF

*For proposed Class III dams where the dam height multiplied by the impounding capacity is less than or equal to 300, no specific total spillway capacity is required.

The Probable Maximum Precipitation (PMP) is defined by the American Meteorological Society as the theoretically greatest depth of precipitation for a given duration that is physically possible over a particular drainage area at a certain time of year. The National Weather Service further states the PMP values are identified as estimates. Additionally, the National Weather Service has published application procedures that can be used with PMP estimate to develop spatial and temporal characteristics of a Probable Maximum Storm (PMS). Thus, used with precipitation-runoff simulation models, a PMS can be developed to calculate probable maximum flood (PMF) hydrographs.

6.1.3 Spillway Rating – (Provided by Dynegy, see Appendix A, Document 5)

6.1.4 Downstream Flood Analysis – Dynegy has prepared an inundation map (see Appendix A, Document 5).

6.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION – Appears to be adequate.

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6.3 ASSESSMENT OF HYDROLOGIC/HYDRAULIC SAFETY – Appears to be adequate.

7.0 STRUCTURAL STABILITY

7.1 SUPPORTING TECHNICAL DOCUMENTATION

7.1.1 Stability Analyses and Load Cases Analyzed – Provided by Dynegy (Appendix A, Document 5), appears to be appropriate.

7.1.2 Design Properties and Parameters of Materials – Provided by Dynegy (Appendix A, Document 5), appears to be appropriate.

Table 7.1.2a displays a summary of the soil properties for the East Ash Pond System. Similarly, Table 7.1.2b displays a summary of the soil properties for Cells 2E and 3 of the West Ash Pond System (the two cells for which soil property information was applicable/available).

Table 7.1.2a EAPS Soil Properties Summary

Soil	Unit Weight pci	Cohesion (C) psi	Friction Angle (F) deg.
Fly Ash, Type C (Hardened)	105	3000	20
Fly Ash, Compacted	85	100	30
Clay Liner	95	230	19
Fly Ash, in-situ	75	100	30
Drainage Blanket	85	25	30
Natural Clay	115	Varies with Depth	0

Table 7.1.2b WAPS Soil Properties Summary

Soil Type	Undrained Case (total stresses)				Drained Case (effective stresses)			
	Total Unit Weight pcf	Friction Angle (F) deg.	Cohesion (C) psf	Total Sat. Weight pcf	Total Unit Weight pcf	Friction Angle (F') deg.	Cohesion (C') psf	Total Sat. Weight pcf
Clay liner	120	0	2000	131	120	25	0	131
Drainage rock	125	37	0	140	125	37	0	140
Embankment	115	0	1200	125	115	30	0	125
Old dikes	117	0	1200	125	117	25	230	125
Subgrade, clay	119	0	500	122	119	23.2	5	122
Subgrade, sand	125	30	0	130	125	30	0	130
ash	85	20	0	90	85	30	0	90

7.1.3 Uplift and/or Phreatic Surface Assumptions – not considered in design of embankment, due to upstream liner.

7.1.4 Factors of Safety and Base Stresses – Provided by Dynegy (Appendix A, Document 5), factors of safety greater than 1.8 for all cases analyzed.

Table 7.1.4a displays the static slope stability analysis summary for the EAPS. Similarly, Table 7.1.4b displays the seismic loading analysis summary for the EAPS.

Table 7.1.4a EAPS Static Slope Stability Analysis Summary

Scenario	Slope	FS
10 ft of fly ash in pond	inside	2.3 to 15.7
10 ft of fly ash in pond	Outside	2.0 to 2.0
5 ft of fly ash in pond	Inside	2.0 to 4.6
5 ft of fly ash in pond	Outside	2.0 to 2.2
After construction	Inside	1.8 to 3.0
After construction	Outside	2.0 to 3.3
Full reservoir	outside	2.0

Table 7.1.4b EAPS Seismic Loading Analysis Summary

Scenario	Direction of Sliding	D/S Slope Angle	Elev. of Water in Pond	Elev. of Fly Ash in Pond	Seismic Coefficient	FS
Full Liquefaction	D/S	3.5H:1V	452	N/A	-	0.99
Full Liquefaction	D/S	3.5:1V	452	452	-	1.04

Table 7.1.4c displays the static slope stability analysis summary for Cells 2E and 3 of the WAPS. Similarly, Table 7 .1.4d displays the seismic loading analysis summary for Cells 2E and 3 of the WAPS.

Table 7.1.4c WAPS Static Slope Stability Analysis Summary		
Loading Condition	**Location**	**F.S.**
End of Construction	upstream	3.27
Case I	Downstream	2.18
Rapid Drawdown	Upstream	3.31
Case II	Downstream	2.13
Steady Seepage, No Ash	Upstream	2.97
Case III	Downstream	1.79
Steady Seepage, with ash/water	Upstream	3.08
Case IV	Downstream	1.79
Fully Submerged	upstream	6.98
Case V	downstream	1.79

Table 7.1.4d WAPS Seismic Loading Analysis Summary		
Loading Condition	**Location**	**F.S.**
End of Construction	upstream	N/A
Case I	Downstream	N/A
Rapid Drawdown	Upstream	N/A
Case II	Downstream	N/A
Steady Seepage, No Ash	Upstream	2.01
Case III	Downstream	1.36
Steady Seepage, with ash/water	Upstream	2.07
Case IV	Downstream	1.36
Fully Submerged	upstream	3.50
Case V	downstream	1.36

The Illinois Department of Natural Resources, Department of Water Resources requirements for minimum safety factors for the static and seismic conditions are presented below in Table 7.1.4e.

Table 7.1.4e IDNR OWR Requirements for Minimum Safety Factors		
Loading Condition	**Static**	**Seismic**
End of Construction	1.3	N/A
Rapid Drawdown	1.2	N/A
Steady Seepage	1.5	1.0

7.1.5 Liquefaction Potential – Provided by Dynegy (Appendix A, Document 5); reviewed and determined to be consistent with industry practice.

7.1.6 Critical Geological Conditions – Provided by Dynegy (Appendix A, Document 5); reviewed and determined to be consistent with industry practice (seismic factor of safety greater than 1.0).

7.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION – Appears to be adequate.

7.3 ASSESSMENT OF STRUCTURAL STABILITY

The embankments at the East Ash Pond System are structurally stable, based on:

- review of design calculations, including factors of safety for embankment stability for a variety of load cases, as well as a review of other design calculations, all of which are consistent with industry practice and sealed by a licensed professional engineer, and
- visual observation on May 27, 2009, where no warning signs of concern were noted.

8.0 MAINTENANCE AND METHODS OF OPERATION

8.1 OPERATIONAL PROCEDURES – Provided by Dynegy (Appendix A, Document 9)

8.2 MAINTENANCE OF THE DAM AND PROJECT FACILITIES – Provided by Dynegy (Appendix A, Document 9)

8.3 ASSESSMENT OF MAINTENANCE AND METHODS OF OPERATION

8.3.1 Adequacy of Operational Procedures– Appears to be adequate

8.3.2 Adequacy of Maintenance– Appears to be adequate

9.0 SURVEILLANCE AND MONITORING PROGRAM

9.1 SURVEILLANCE PROCEDURES

Daily, weekly, semi-annual and annual inspections, or surveillance operations, are performed at the Wood River Power Station. The daily, weekly and semi-annual surveillance operations are conducted by Dynegy Station operations personnel, whereas the annual inspections are performed by a civil engineer, specifically a registered PE with experience in similar operations.

For more information, see the Operations and Maintenance Plan provided by Dynegy, located in Appendix A, Document 9).

9.2 INSTRUMENTATION MONITORING

9.2.1 Instrumentation Plan - None

9.2.2 Instrumentation Monitoring Results - None

9.2.3 Evaluation – A plan of instrumentation and monitoring does not appear to be warranted for these lined embankments at this time.

9.3 ASSESSMENT OF SURVEILLANCE AND MONITORING PROGRAM

9.3.1 Adequacy of Inspection Program – Appears to be adequate.

9.3.2 Adequacy Instrumentation Monitoring Program – There is no instrumentation monitoring program and none appears warranted at this time for the lined embankments. In view of the observed sound condition of the embankments, the daily, weekly, semi-annual, and annual inspections of the impoundment structures together with the emergency action plan that is in place, there appear to be sufficient safeguards at this time.

10.0 RESPONSE TO SPECIFIC EPA QUESTIONS

The following questions and answers are provided in conformance with EPA's Technical Directive (TDF) 5 regarding the reassessment of Coal containment Waste Impoundment Assessment Reports as a result of the TVA failure mode analysis report for the Kingston embankment failure. One of the key findings was that the Kingston unit may have failed because the embankment was built upon coal ash slimes.

1. Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

   The Wood River Ash Pond System – the East Ash Pond System (EAPS) and the West Ash Pond System (WAPS) impoundment embankments were not built over wet ash, slag or unsuitable material. Review of design data indicate the embankments were constructed on suitable foundation materials.

2. Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

   Yes; the Engineer-of-Record, Don Grahlherr, was present during the site visit and the meetings prior to the site visit. Questions about the foundation preparation were asked and satisfactorily answered.

3. From the site visit or from photographic documentation, was there evidence of prior releases, failures, or patchwork on the dikes?

   There was no evidence of prior releases or failures or repaired embankments that were noted during the site visit. Photographs were taken of nearly all portions of all embankments (see Appendix B of the Report).

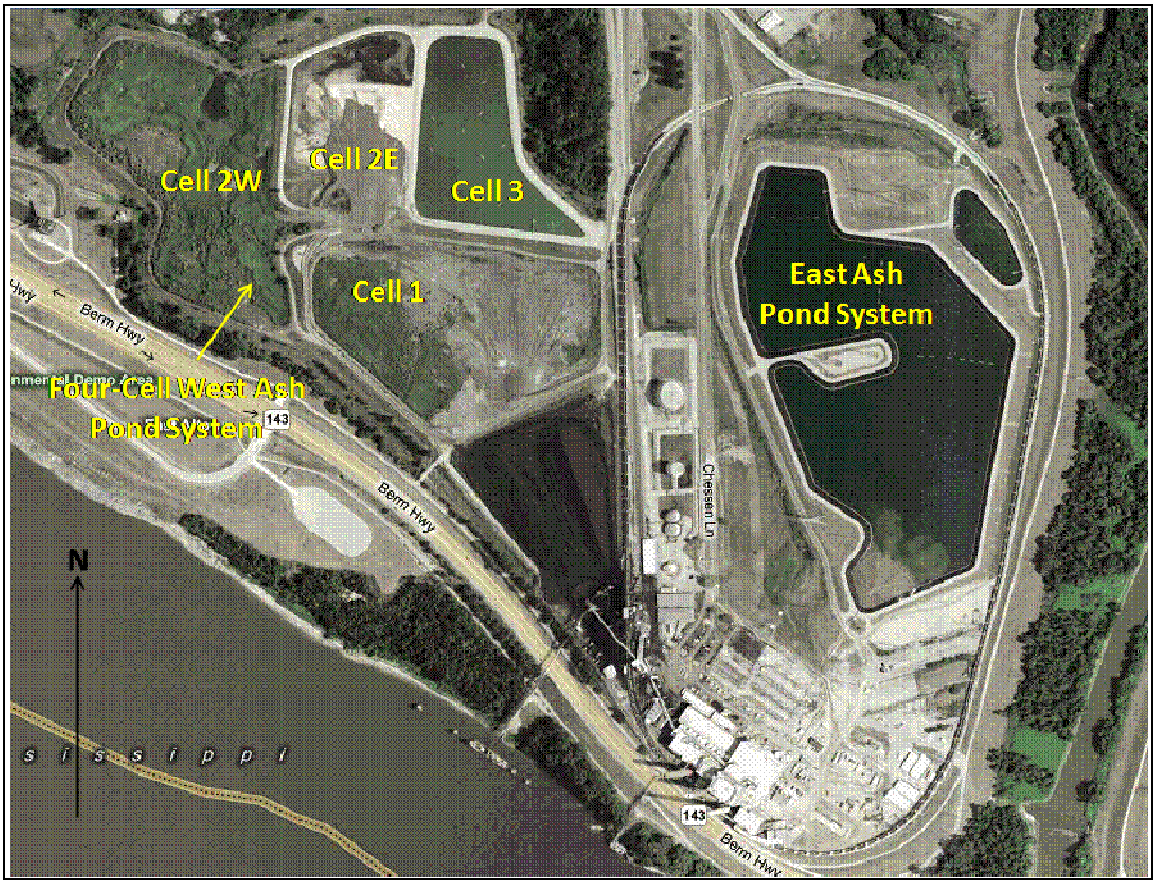

Figure 1: Wood River Power Station Aerial Map

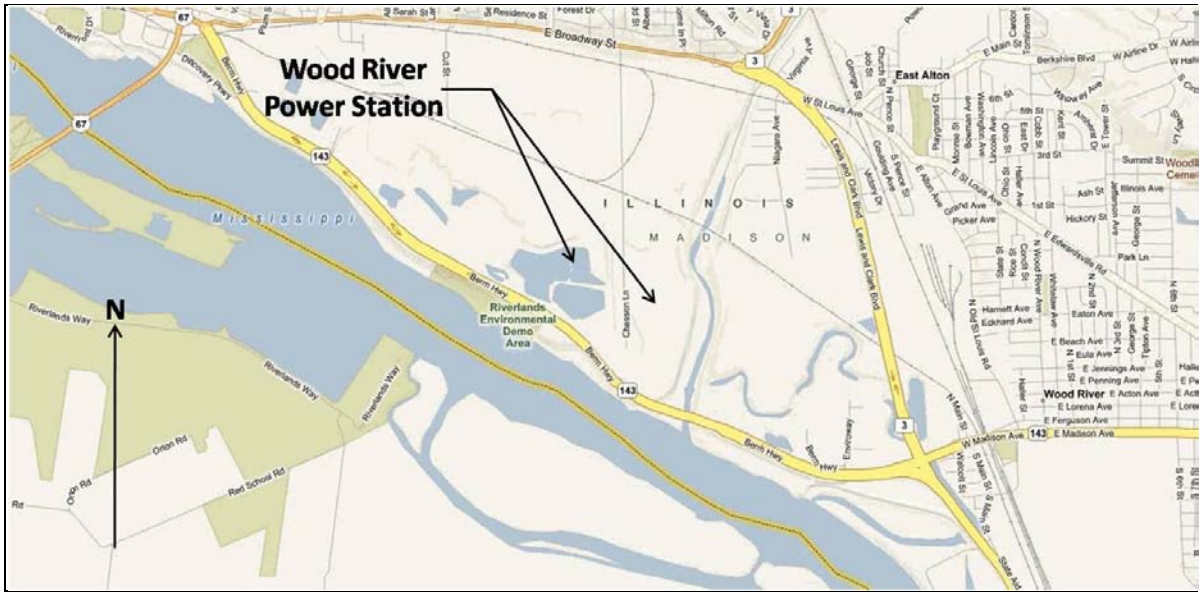

Figure 2: Wood River Power Station Vicinity Map