DRAFT REPORT
ROUND 10 DAM ASSESSMENT – MAY 24, AND 25, 2011
DYNEGY MIDWEST GENERATION, INC. – BALDWIN ENERGY COMPLEX
PRIMARY FLY ASH POND, SECONDARY FLY ASH POND, SECONDARY POND, INTERMEDIATE POND, FINAL POND
BALDWIN, ILLINOIS

PREPARED FOR:

U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

PREPARED BY:

GZA GeoEnvironmental, Inc.
One Edgewater Drive
Norwood, Ma 02062
GZA File No. 01.0170142.30

DRAFT

GZA
GeoEnvironmental, Inc.

Engineers and
Scientists

March 15, 2012
GZA File No. 170142.30

Mr. Stephen Hoffman
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

RE: DRAFT Assessment of Dam Safety of Coal Combustion Surface Impoundments at the Baldwin Energy Complex

Dear Mr. Hoffman,

One Edgewater Drive
Norwood,
Massachusetts 02062
Phone: 781-278-3700
Fax: 781-278-5701
http://www.gza.com

In accordance with our proposal 01.P0000177.11 dated March 28, 2011, and U.S. Environmental Protection Agency (EPA) Contract No. EP10W001313, Order No. EP-B115-00049, GZA GeoEnvironmental, Inc. (GZA) has completed our inspection of the Baldwin Energy Complex Coal Combustion Waste (CCW) Impoundments located in Baldwin, Illinois. The site visit was conducted on May 24 and 25, 2011. The purpose of our efforts was to provide the EPA with a site specific inspection of the impoundments to assist EPA in assessing the structural stability of the impoundments under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 104(e). We are submitting one hard copy and one CD-ROM copy of this Draft Report directly to the EPA.

Based on our visual inspection, and in accordance with the EPA's criteria, the Primary Fly Ash Pond, Secondary Fly Ash Pond, Secondary Pond, Intermediate Pond, and Final Pond are currently in **POOR** condition in our opinion. Further discussion of our evaluation and recommended actions are presented in the Task 3 Dam Assessment Report. The report includes: (a) a completed Coal Combustion Dam Inspection Checklist Form for each Basin; (b) a field sketch; and (c) selected photographs with captions. Our services and report are subject to the Limitations found in **Appendix A** and the Terms and Conditions of our contract agreement.

We are happy to have been able to assist you with this inspection and appreciate the opportunity to continue to provide you with dam engineering consulting services. Please contact the undersigned if you have any questions or comments regarding the content of this Task 3 Dam Assessment Report.

Sincerely,

GZA GeoEnvironmental, Inc.

Doug P. Simon, P.E.
Geologic Engineer
doug.simon@gza.com

Patrick J. Harrison, P.E.
Senior Geotechnical Consultant
patrick.harrison@gza.com

Peter H. Baril, P.E. (MA)
Consultant Reviewer
peter.baril@gza.com

PREFACE

The assessment of the general condition of the dams/impoundment structures reported herein was based upon available data and visual inspections. Detailed investigations and analyses involving topographic mapping, subsurface investigations, testing and detailed computational evaluations were beyond the scope of this report.

In reviewing this report, it should be realized that the reported condition of the dams and/or impoundment structures was based on observations of field conditions at the time of inspection, along with data available to the inspection team. In cases where an impoundment is lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions, which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is critical to note that the condition of the dam and/or impoundment structures depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the reported condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Prepared by:

GZA GeoEnvironmental, Inc.

Patrick Harrison, P.E.

License No.: 062.034946
Senior Geotechnical Consultant
GZA GeoEnvironmental, Inc.

EXECUTIVE SUMMARY

This Inspection Report presents the results of a visual inspection of the Dynegy Midwest Generation, Inc. (Dynegy) – Baldwin Energy Complex (BEC) Coal Combustion Waste (CCW) Impoundments located at 10901 Baldwin Road, Baldwin, Illinois. These inspections were performed on May 24 and 25, 2011 by representatives of GZA GeoEnvironmental, Inc (GZA), accompanied by representatives of Dynegy.

The BEC is a three-unit coal-fired power plant, with a maximum generating capacity of approximately 1800 Megawatts. Commercial operation of the facility began in the 1970's. Unlined earthen embankment CCW Impoundments (Primary Fly Ash Pond, Intermediate Pond, and Final Pond) were constructed in conjunction with the BEC facility for the purpose of storing and disposing non-recyclable CCW from the BEC facility and clarification of water prior to discharge. The Primary Fly Ash Pond (PFAP) was expanded in 1981 to the south and west and included the area that was later split into the Secondary Fly Ash Pond (SFAP). The PFAP was originally constructed with 35 foot embankments and was expanded vertically in 1989 with a 20 foot 'raise'. In response to a failure of the southern embankment of the PFAP in February 1995, an Intermediate Embankment was constructed and resulted in the separation of the SFAP from the PFAP. A berm (Secondary Dike) was constructed upstream of the Intermediate Pond in approximately 1998 and resulted in the construction of the Secondary Pond.

Water and CCW is discharged into the PFAP where the CCW is allowed to settle and water is discharged into the SFAP and the Secondary Pond. Solids are further settled in the SFAP prior to water discharge to the Secondary Pond. Water flows sequentially through the Secondary, Intermediate and Final Ponds for further clarification prior to discharge of the water near the southwest corner of the property.

For the purposes of this EPA-mandated inspection, the sizes of the impoundments were based on U. S. Army Corps of Engineers (COE) criteria. Based on the maximum crest height of 55 feet and a storage volume of approximately 10,000 acre-feet, the PFAP is classified as an **Intermediate** sized structure. Based on the maximum crest height of 55 feet and a current storage volume of 1,650 acre-feet, the SFAP Impoundment is classified as an **Intermediate** sized structure. Based on the maximum crest height of 12 feet and a storage volume of approximately 190 acre-feet, the Secondary Pond is classified as a **Small** sized structure. Based on the maximum crest height of 20 feet and a storage volume of approximately 40 acre-feet, the Intermediate Pond is classified as a **Small** sized structure. Based on the maximum crest height of 32 feet and a storage volume of approximately 72 acre-feet, the Final Pond is classified as a **Small** sized structure.

According to guidelines established by the COE, dams with a storage volume less than 1,000 acre-feet and/or a height less than 40 feet are classified as Small sized structures and dams with a storage volume between 1,000 acre-feet and 50,000 acre-feet and/or a height between 40 feet and 100 feet are classified as Intermediate sized structures.

Under the EPA classification system, as presented on page 2 of the EPA check list (**Appendix C**) and Definitions section (**Appendix B**), it is GZA's opinion that the PFAP, SFAP and the Final Pond would be considered as having a **Significant** hazard potential. The hazard potential rating is

based on no probable loss of human life due to failure and the potential environmental impacts outside of Utility owned property.

Under the EPA classification system, as presented on page 2 of the EPA check list (**Appendix C**) and Definitions section (**Appendix B**), it is GZA's opinion that the Secondary Pond and the Intermediate Pond would be considered as having a **Low** hazard potential. The hazard potential rating is based on no probable loss of human life due to failure and the potential environmental impacts would likely be limited to Utility owned property.

Assessments

In general, the overall condition of the PFAP impoundment was judged to be **POOR**. The PFAP impoundment was found to have the following deficiencies:

1. Thick vegetation and trees along the upstream and downstream slopes;
2. Minor potholes and rutting along the crest gravel access road;
3. Damaged discharge pipe from the northern decant;
4. The absence of erosion protection on the embankment near the discharge location of the northern decant has allowed erosion of the embankment;
5. No hydraulic/hydrologic analysis has been performed to confirm adequate freeboard and decant capacity at the design storm event;
6. The stability analysis completed does not account for storm event loading conditions; and,
7. No stability analysis has been performed on the Intermediate Embankment.

In general, the overall condition of the SFAP impoundment was judged to be **POOR**. The SFAP impoundment was found to have the following deficiencies:

1. Thick vegetation and trees along the upstream and downstream slopes;
2. Minor potholes and rutting along the crest gravel access road;
3. Scarp present on the downstream slope of the northern embankment;
4. The stability analysis for the SFAP is incomplete for portions of the embankments and does not indicate that the embankments meet generally accepted levels of stability for the sections analyzed; and
5. No hydraulic/hydrologic analysis has been performed to confirm adequate freeboard and decant capacity at the design storm event.

In general, the overall condition of the Secondary Pond impoundment was judged to be **POOR**. The Secondary Pond impoundment was found to have the following deficiencies:

1. No hydraulic/hydrologic analysis has been performed to confirm adequate freeboard, decant and overflow spillway capacity; and,
2. No seepage and/or stability analysis has been performed for the Secondary Dike.

In general, the overall condition of the Intermediate Pond impoundment was judged to be **POOR**. The Intermediate Pond impoundment was found to have the following deficiencies:

1. Thick vegetation and trees along the upstream and downstream slopes;
2. Potholes along the crest gravel access road;
3. Concrete covering the downstream slope prohibits monitoring of potential erosion;
4. No hydraulic/hydrologic analysis has been performed to confirm adequate freeboard and decant/overflow spillway capacity;
5. In GZA's opinion, the stability analysis for the impoundment was incomplete; and,
6. No evaluation has been conducted to verify the stability of the overflow section against piping or fines erosion.

In general, the overall condition of the Final Pond impoundment was judged to be **POOR**. The Final Pond impoundment was found to have the following deficiencies:

1. Thick vegetation and trees along the downstream slopes;
2. Minor potholes along the crest gravel access road;
3. No hydraulic/hydrologic analysis has been performed to confirm adequate freeboard and decant/overflow spillway capacity;
4. In GZA's opinion, the stability analysis for the impoundment was incomplete; and,
5. No evaluation has been conducted to verify the stability of the overflow section against piping or fines erosion.

The following recommendations and remedial measures generally describe the recommended approach to address current deficiencies at the impoundments. Prior to undertaking recommended maintenance, repairs, or remedial measures, the applicability of permits needs to be determined for activities that may occur under the jurisdiction of the appropriate regulatory agencies.

GZA recommends that BEC/Dynegy conduct the following studies and analysis:

1. Conduct an analysis of the hydraulic/hydrologic condition of the impoundments to establish the rise in water level that occurs during the 100-year, 24-hour rain event to confirm that adequate freeboard is maintained and adequate decant and spillway capacity is available. The loading conditions established during the design storm event should be used in the evaluation of the seepage and stability evaluation of the embankments.

2. Address the deficiencies noted in Section 2.6 and Section 3.1 for the stability and seepage analysis previously conducted for the impoundments and establish a complete seepage and stability analysis for each impoundment.

3. Evaluate the potential for piping and fines erosion along the overflow sections of the Ash Pond Dike and the Settling Pond Dike.

4. Moist soil conditions were observed along the downstream slope and/or toe of the southern embankment of the SFAP. This condition may indicate the presence of seepage in that area and should be evaluated. We recommend removing all trees on the downstream slope and toe area and evaluation of the moist soil conditions.

Recurrent Operation & Maintenance Recommendations

GZA recommends the following operation and maintenance level activities:

1. Increased mowing of the grasses on the embankments to facilitate inspections and reduce the risk of burrowing animals;

2. Repair the potholes present in the gravel crest access roads. Grade the road to provide better drainage and reduce future potholing; and,

3. Clear trees and other deep rooted vegetation from the slopes and crests of the embankments.

Repair Recommendations

GZA recommends the following repairs to address observed deficiencies that may affect the stability of the embankments. The recommendations may require design by a professional engineer and construction contractor experienced in impoundment construction.

1. Repair the discharge pipe and the embankment erosion near the discharge pipe from PFAP's northern decant. Protect the embankment with riprap or other erosion control features.

2. Remove the concrete located on the downstream slope of the Ash Pond Dike. Repair any erosion observed beneath the concrete and replace with fill engineered to provide a stable embankment that is not susceptible to erosion or piping.

3. Pending the results of the hydraulic/hydrologic analysis, modify the design or operation of the impoundments to provide adequate capacity.

4. Pending the results of the complete seepage and stability analysis for each impoundment, modify the design or operation of the impoundments to provide conditions that result in embankments that meet the generally accepted factors of safety.

Alternatives

There are no practical alternatives to the repairs itemized above.

TABLE OF CONTENTS

TABLE OF CONTENTS (CONT'D)

TABLE OF CONTENTS (CONT'D)

FIGURES

APPENDICES

1.0 DESCRIPTION OF PROJECT

1.1 General

1.1.1 Authority

The United States Environmental Protection Agency (EPA), has retained GZA GeoEnvironmental, Inc. (GZA) to perform a visual inspection and develop a report of conditions for the Dynegy Midwest Generation, Inc., (Dynegy, Owner) Baldwin Energy Complex (BEC, Site) Coal Combustion Waste (CCW) Impoundments in Randolph County, Illinois. This inspection was authorized by the EPA under the authority of the Comprehensive Environmental response, Compensation, and Liability Act (CERCLA) Section 104(e). This inspection and report were performed in accordance with Request for Quote (RFQ) RFQ-DC-16, dated March 16, 2011 and EPA Contract No. EP10W001313, Order No. EP-B11S-00049. The inspection generally conformed to the requirements of the Federal Guidelines for Dam Safety[1], and this report is subject to the limitations contained in **Appendix A** and the Terms and Conditions of our Contract Agreement.

1.1.2 Purpose of Work

The purpose of this investigation was to visually inspect and evaluate the present condition of the impoundments and appurtenant structures (the management unit) to attempt to identify conditions that may adversely affect their structural stability and functionality, to note the extent of any deterioration that may be observed, review the status of maintenance and needed repairs, and to evaluate the conformity with current design and construction standards of care.

The investigation was divided into five parts: 1) obtain and review available reports, investigations, and data from the Owner pertaining to the impoundment and appurtenant structures; 2) perform a review with the Owner of available design, inspection, and maintenance data and procedures for the management unit; 3) perform a visual inspection of the site; 4) prepare and submit a field assessment checklist; and 5) prepare and submit a draft and a final report presenting the evaluation of the structure, including recommendations and proposed remedial actions.

1.1.3 Definitions

To provide the reader with a better understanding of the report, definitions of commonly used terms associated with dams are provided in **Appendix B**. Many of these terms may be included in this report. The terms are presented under common categories associated with dams which include: 1) orientation; 2) dam components; 3) size classification; 4) hazard classification; 5) general; and 6) condition rating.

[1] FEMA/ICODS, April 2004: http://www.ferc.gov/industries/hydropower/safety/guidelines/fema-93.pdf

1.2 Description of Project

1.2.1 Location

The BEC is located about ¾ -miles north of Baldwin in Randolph County, Illinois and the entrance to the Site is on Baldwin Road. The BEC CCW impoundments are located about ½ mile southwest of the power plant, at approximately latitude 38° 11' 33" North and longitude 89° 52' 05" West. A Site locus of the impoundments and surrounding area is shown in **Figure 1**. An aerial photograph of the impoundments and surrounding area is provided as **Figure 2**. The impoundments can be accessed by vehicles from an earthen access road from the BEC.

1.2.2 Owner/Caretaker

The CCW impoundments are owned by Dynegy Midwest Generation, Inc. and operated by the BEC.

	Dam Owner/Caretaker
Name	Dynegy Midwest Generation, Inc, Baldwin Energy Complex
Mailing Address	10901 Baldwin Road
City, State, Zip	Baldwin, Illinois 62217
Contact	Charles Nerone
Title	Operations Manager
E-Mail	charles.nerone@dynegy.com
Daytime Phone	618-785-3244
Emergency Phone	911

1.2.3 Purpose of the Impoundments

The BEC is a three-unit coal-fired power plant, with a maximum generating capacity of approximately 1,800 Megawatts. Commercial operation of the facility began in the 1970's. Unlined earthen embankment CCW Impoundments (Primary Fly Ash Pond, Intermediate Pond, and Final Pond) were constructed in conjunction with the BEC facility for the purpose of storing and disposing non-recyclable CCW from the BEC facility and clarification of water prior to discharge. The Primary Fly Ash Pond (PFAP) was expanded in 1981 to the south and west and included the area that was later split into the Secondary Fly Ash Pond (SFAP). The PFAP was originally constructed with 35 foot embankments and was expanded vertically in 1989 with a 20 foot 'raise'. In response to a failure of the southern embankment of the PFAP in February 1995, an Intermediate Embankment was constructed and resulted in the separation of the SFAP from the PFAP. A berm (Secondary Dike) was constructed upstream of the Intermediate Pond in approximately 1998 and resulted in the construction of the Secondary Pond.

Process water and sluiced CCW are discharged into the PFAP, where the CCW is allowed to settle and water is discharged (decanted) into the SFAP and the Secondary Pond. Solids are further settled in the SFAP prior to water discharge to the adjoining Secondary Pond (refer to Figure 2). Water flows sequentially through the Secondary, Intermediate and Final

Ponds for further clarification prior to discharge via the decant structure located near the southwest corner of the property.

1.2.4 Description of the Primary Fly Ash Pond and Appurtenances

The original embankments of the PFAP, which were constructed in 1969, were designed by Sargent & Lundy. The 1981 expansion and 1989 vertical expansion were designed by Illinois Power Company. Following the failure of a portion of the southern embankment in 1995, a failure analysis was conducted by Woodward Clyde Consultants (Failure Analysis).[2] Although it was not one of the remedial options presented by Woodward Clyde, an Intermediate Embankment was designed by Illinois Power Company and was constructed within the PFAP in response to the 1995 failure. The following description of the impoundment is based on information provided in the Failure Analysis, Sargent & Lundy Design Drawings,[3] Illinois Power Company Drawings,[4] other information received from BEC, and observations made by GZA during our Site visit.

The PFAP Impoundment is located southwest of the BEC. The PFAP functions as a sedimentation basin for bottom ash, fly ash and scrubber solids which are discharged into two distinct areas of the impoundment for ease of recycling and disposal. The impoundment receives bottom ash and other scrubber solid slurry in the northern portion of the impoundment through a series of 10-inch diameter steel pipes. Water used to sluice bottom ash and other scrubber solids is discharged to the Secondary Pond through a decant structure which is located along the western embankment of the impoundment. The location of the discharge pipes and decant structure is shown in **Figure 3**.

Fly ash is sluiced into the southern portion of the PFAP for storage and disposal of the fly ash through a 12-inch diameter steel pipe. Fly ash is allowed to settle and water is discharged from the southern portion of the PFAP through five 12-inch diameter decant pipes which are located along the Intermediate Embankment. The location of the decant structures and discharge pipes is shown in **Figure 3**.

The PFAP Impoundment consists of an earthen embankment with a crest length of approximately 3.2 miles and a general height (from the lowest downstream toe elevation to the crest of the impoundment) of approximately 15 feet along the northern embankments and approximately 55 feet along the southern embankments. The following description of the PFAP embankments was provided in the Failure Analysis:

"2.1 ORIGINAL DIKE DESIGN AND CONSTRUCTION

The original dike was constructed during November 1969 using "earthfill" and "impervious fill" material as shown in the drawings. We presume both types of material were actually low plastic clay fill obtained on-site within the present pond area. The original embankment section had a 15-ft wide crest and 3H:1V side slopes between Station 46+66 and 58+77. (Dike stationing refers to stationing for the original dike construction as shown on construction drawings.

[2] "Geotechnical Investigation, Baldwin Power Station: Fly Ash Pond South Dike, Balwin, Illinois" by Woodward-Clyde Consultants, dated September 7, 1995. (Failure Analysis).
[3] Several Sargent & Lundy drawings from the original impoundment design were available. A complete list of the drawings reviewed is provided in Appendix F.
[4] The 1981 expansion, 1989 Vertical raise and the intermediate embankment were designed by Illinois Power Company Engineers.

The failure area is between Station 50+00 and 57+00.) The crest elevation was el. 435±.

Between Stations 46+66 and 58+77, a 6-inch thick gravel erosion protection layer was placed on the downstream slope surface of the dike between el. 408 ft and 400 ft. A 2-ft thick horizontal sand and gravel blanket drain was placed at the embankment toe and extended approximately 50 ft upstream beneath the embankment. A flat-bottomed drainage ditch was built about 40 ft downstream of the embankment toe. From the embankment toe, the ground surface was sloped at approximately 2 percent towards the drainage ditch. Upstream of the upstream toe at el. 415, the embankment slope transitions at a 6H:1V slope.

Between Station 58+77 and Station 81+00, the side slope changes to 2.5H:1V and the blanket drain was eliminated.

The top of the dike had a 6-inch thick layer of bottom ash surfacing along its entire length.

No construction records were provided documenting placement and compaction of 1969 embankment fill, although tests in this study show that it appears to be well compacted.

2.2 1989 DIKE RAISE DESIGN AND CONSTRUCTION

In 1989, the raise was constructed by first end-dumping bottom ash into the pond against the upstream slope of the embankment and over the fly ash deposited on the pond bottom. The bottom ash created a working platform above the water (Figure 3). The maximum total thickness of this bottom ash material is estimated to be approximately 35 ft. A haul road was built along the top of the original embankment to facilitate construction of the bottom ash working platform. It was constructed by placing a driving surface of bottom ash along the crest of the dike and stabilizing the ash with lime and fly ash. A pozzolonic reaction occurred between the bottom ash and the lime/fly ash, creating a surface resembling a weak concrete. The surface of the bottom ash working platform was placed against the upstream face to EL. 436 ft, or approximately 1 ft above the roadway crest. The design indicated that the ash was to be placed to EL. 434 ft, or approximately 1 ft below the top of the roadway (Figure 2). The fact that the bottom ash was placed to a level above the crest of the lower dike, plus the presence of the stabilized bottom ash roadway, are important factors in the failure, as noted later.

Within the water-inundated area, between approximately Stations 46+50 and Station 75+00, clay fill was placed directly on the surface of the bottom ash working platform to the crest of the present upper dike (EL. 456), a height 20± ft above the original embankment crest.

The downstream slope of the addition was placed as an uninterrupted extension of the original 3H:1V downstream embankment face. (Survey data show that the actual slope is somewhat steeper, about 2.77H:1V) This resulted in the centerline of the upper dike being set back in the upstream direction approximately 60 ft from the original dike centerline. The remainder of the embankment section consisted of a 16 ft wide crest and an upstream face with a 2.5H:1V slope to the top of the bottom ash working platform.

To the east of Station 75+00, the height of the original dike was relatively small and resulted in the toe of the dike being setback relative to the toe of the higher portion of the dike further to the west.

Between Station 65+00 and Station 74+00, a transition section was constructed where the dike centerline moved from the setback position to a position to coincide with the original dike centerline (Figure 4). The added height of the addition over the original embankment centerline results in an absence of a setback in the toe of the eastern portion of the embankment relative to the western portion. The cross-sectional template of the eastern portion of the dike matched that of the western portion. Compacted fill within the transition section and that further to the east consisted of clay and was placed directly on the existing ground surface.

Construction records indicate that the bottom ash (type "B" fill) on the upstream side of the lower dike was not compacted except for the top 12 inches, which was compacted to 90 percent of its maximum dry density according to ASTM D698.

The fill for the 1989 raise was borrowed from an area north of the ash pond north dike. It was generally silty clay, although some clayey silt was also used. It was reportedly compacted in lifts to 95 percent of its maximum dry density according to ASTM D698. Field density tests by PSI indicate that the specified level of compaction was achieved for all materials tested, although the actual test locations are difficult to verify."

A typical design cross section of the 1969 southern embankment of the PFAP is shown in **Figure 4**. The 'as built' cross section of the embankments after the 1989 raise, as recreated by Woodward Clyde and documented in the Failure Analysis, is provided as **Figure 5.**

After the failure of the western portion of the southern embankment the normal pool level in the SFAP area was lowered to an elevation of approximately 430 feet (MSL). Subsequently, the Intermediate Embankment was constructed to relieve the stresses on the failed portion of the southern embankment. The Intermediate Embankment consists of an earthfill embankment that was constructed with a crest elevation of El. 444 feet MSL in 1996. The embankment was raised to approximately El 455 feet MSL in 1999 using upstream slope design. Based on the information provided in the Illinois Power Company Drawings, the Intermediate Embankment was constructed on the existing fly ash using clay fill. Clay fill was then used to raise the dike to the final elevation. Three stabilizing berms were constructed perpendicular to the downstream slope of the Intermediate Embankment into the SFAP. The stabilizing berms extend 207 feet to 437 feet southwest of the downstream slope of the Intermediate Embankment and are approximately 4 feet to 6 feet high. The slopes of the Intermediate Embankment were constructed with 2H:1V and 2.5H:1V slopes, respectively. A plan view of the Intermediate Embankment is provided as **Figure 6**.

An overflow spillway that is approximately 2 feet deep and 200 feet wide with an invert elevation of 455 feet MLS was constructed in the Intermediate Embankment. The spillway and downstream slope was lined with 12-inch riprap. The water elevation in the southern portion of the PFAP is controlled using five (5) decant pipes that were 12-inches in diameter without trash racks or stop logs. The typical cross sections and decant pipes through the Intermediate Embankment are provided on **Figure 7.**

No drawings were available for the decant structure that transmits water from the northern portion of the PFAP to the Secondary Pond. Based on GZA's observations, the decant structure for the northern portion of the PFAP has an adjustable intake height to regulate the

water elevation. The water from the PFAP that enters the northern decant structure discharges upstream of and flows into the Secondary Pond.

1.2.5 Description of the Secondary Fly Ash Pond Impoundment and Appurtenances

The SFAP was separated from the PFAP after construction of the Intermediate Embankment in 1996. Therefore, the design history for the SFAP follows that described in Section 1.2.4 for the PFAP. The following description of the impoundment is based on information provided in the Failure Analysis,[5] Sargent & Lundy Design Drawings,[6] Illinois Power Company Drawings,[7] other information received from BEC, and observations made by GZA during our Site visit.

The SFAP is located southwest of the BEC and west of the PFAP. The impoundment was constructed in 1969 and serves as a settling pond and final disposal location for CCW generated by the BEC. The SFAP receives water and unsettled solids from the fly ash portion of the PFAP through a series of five decant pipes which extend through the Intermediate Embankment. Water is discharged from the SFAP to the Secondary Pond through a decant structure which is located near the northwest embankment of the SFAP. The location of the discharge pipes from the PFAP and the decant structure are shown in **Figure 8**.

The SFAP consists of an earthfill embankment with a crest length of approximately 1.3 miles and a general height (from the lowest toe elevation to the crest of impoundment) of approximately 30 feet along the northern embankment and approximately 55 feet along the southern portion. The design of the exterior embankments and the Intermediate Embankment that makes up the SFAP are as described in Section 1.2.4 for the PFAP. Please refer to Section 1.2.4 for details of the design.

Instrumentation at the impoundment includes one well, nine vibrating wire piezometers, and four inclinometers in the area of the 1995 failure. The instrument locations are shown on **Figure 9**.

1.2.6 Description of the Secondary Pond Impoundment and Appurtenances

The Secondary Pond is a cross-valley impoundment that was created when the Secondary Dike was constructed upstream of the Ash Pond Dike in the Intermediate Pond. The Secondary Dike was designed by Illinois Power Company. The following description of the impoundment is based on information provided in the Illinois Power Company Drawings,[8] other information received from BEC, and observations made by GZA during our Site visit.

The Secondary Pond is located southwest of the BEC and west of the PFAP and SFAP. The impoundment was separated from the Intermediate Pond by the Secondary Dike and serves as a settling pond for solids that may not have settled in the PFAP and the SFAP.

[5] "Geotechnical Investigation, Baldwin Power Station: Fly Ash Pond South Dike, Baldwin, Illinois" by Woodward-Clyde Consultants, dated September 7, 1995. (Failure Analysis).
[6] Several Sargent & Lundy drawings from the original impoundment design were available. A complete list of the drawings reviewed is provided in Appendix F.
[7] The 1981 expansion, 1989 Vertical raise and the intermediate embankment were designed by Illinois Power Company Engineers.
[8] The 1981 expansion, 1989 Vertical raise and the intermediate embankment were designed by Illinois Power Company Engineers.

The Secondary Pond receives water and unsettled solids from the PFAP through a discharge pipe which is located northeast of the Secondary Dike. Water and solids enter the Secondary Pond from the SFAP through a decant structure and discharge pipe which is located along the southern slope of the valley. Water is discharged from the Secondary Pond into the Intermediate Pond through a series of six (6) 18 inch steel decant pipes that extend through the Secondary Dike. The location of the discharge pipes from the PFAP and SFAP and the decant pipes through the Secondary Dike are shown in **Figure 10**.

The Secondary Pond is formed by a cross valley embankment (Secondary Dike) with a crest length of approximately 700 feet and a general height (from the lowest toe elevation to the crest of impoundment) of approximately 12 feet. Based on the information provided in the Illinois Power Company Drawings, the Secondary Dike was constructed by placing bottom ash on the existing ground surface in the pond area to create a working pad above the partially dewatered pond. Fill of an unknown nature was placed on the bottom ash to form the embankment. The embankments were constructed with 4H:1V upstream and 2H:1V downstream slopes and the crest was 15 feet wide. The embankments were designed with 18-inches of riprap on the upstream and downstream embankments and a 15-foot wide gravel access road on the crest. A 50-foot wide, open channel spillway was designed and constructed along the embankment with an elevation of 400 feet MSL. Typical design cross sections of the Secondary Dike and details of the decant pipes are shown on **Figure 11.**

Instrumentation at the impoundment includes a flow meter located on one of the decant pipes as shown in **Figure 11.**

1.2.7 Description of the Intermediate Pond Impoundment and Appurtenances

The Intermediate Pond is a cross-valley impoundment that was designed by Sargent & Lundy. During design and construction, the embankment that forms the Intermediate Pond was referred to as the Ash Pond Dike[9]. The following description of the impoundment is based on the Sargent & Lundy Design Drawings,[10] information received from BEC, and observations made by GZA during our Site visit.

The Intermediate Pond is located southwest of the BEC, west of the PFAP, and is adjacent to and downstream of the Secondary Pond as shown in **Figure 2**. The impoundment was constructed in 1969 and serves as a settling pond and final settling and disposal location for CCW generated by the BEC. The Intermediate Pond originally extended upward into the valley several hundred feet but was modified into the current configuration with the construction of the Secondary Dike. The Intermediate Pond receives water and unsettled solids from the Secondary Pond through the Secondary Pond decant pipes. Water is discharged from the Intermediate Pond into the Final Pond through a decant structure which is located along the Ash Pond Dike. The approximate location of the discharge pipes from the Secondary Pond and the decant structure are shown in **Figure 12**. Design details of the decant structure design are shown in **Figure 14.**

[9] The term "Ash Pond Dike" was used in the Sargent & Lundy Design Drawings and will be used herein for convenience and consistency.

[10] Several Sargent & Lundy drawings from the original impoundment design were available. A complete list of the drawings reviewed is provided in Appendix F.

The Ash Pond Dike consists of an earthfill embankment with a crest length of approximately 900 feet and a general height (from the lowest downstream toe elevation to the crest of impoundment) of approximately 20 feet at the decant structure.

Based on the information provided in the Sargent & Lundy Design Drawings, the Ash Pond Dike was designed using an "impervious fill" core and "earthfill" shell. Based on information contained in the Failure Analysis, the impervious fill likely consisted of lean clay and the earthfill likely consists of loess deposits as both materials were generally available on the Site. The embankment was designed with 3H:1V upstream slopes and 3.5H:1V downstream slopes. The upstream and downstream slopes were designed with a one (1) foot thick layer of sand and gravel over the earthfill. A one (1) foot, 1.5 feet, and 2 feet thick layer of riprap was designed over the sand and gravel on the upstream, crest and downstream slopes, respectively. Gravel was used to fill in the voids of the riprap at the crest to create an access road. The crest elevation at the decant structure was designed to be approximately elevation 398.33 feet (MSL). The design and typical sections through the Ash Pond Dike are provided on **Figures 13 and 14**.

The overflow spillway was designed for the Ash Pond Dike by 'cutting' a V-shaped spillway into the embankment northwest of the decant structure. The spillway was 14.5 feet wide at the base and 100 feet wide at the top with a designed bottom elevation of 385 feet MSL, which is eight (8) feet below the current inlet elevation (elevation 394 feet MSL) of the decant structure. Therefore, it appears that the overflow spillway has a key role in discharging water from the impoundment. The elevation of the spillway results in continuous flow of water through the overflow spillway. The spillway was filled with "rockfill" and the crest access road was constructed over the spillway. The downstream slope portion of the spillway design included a 12 feet 'thick' (measured parallel to a level surface, not perpendicular to the slope) layer of 'rockfill' that extended to the toe. The typical section for the overflow spillway is shown on **Figure 14**.

1.2.8 Description of the Final Pond Impoundment and Appurtenances

The Final Pond is a cross-valley impoundment that was designed by Sargent & Lundy. During design and construction, the embankment that forms the Intermediate Pond was referred to as the Settling Pond Dike[11]. The following description of the impoundment is based on the Sargent & Lundy Design Drawings,[12] information received from BEC, and observations made by GZA during our Site visit.

The Final Pond is located southwest of the BEC, west of the PFAP, and adjacent to and downstream of the Intermediate Pond as shown in **Figures 2 and 12**. The impoundment was constructed in 1969 and serves as a settling pond and final settling and disposal location for CCW generated by the BEC. The Final Pond receives water and unsettled solids from the Intermediate Pond through the Intermediate Pond decant structure and associated discharge pipe. Water is discharged from the Final Pond to a drainage ditch that is adjacent to the southern portion of the utility property through a decant structure which is located near the southwest edge of the Final Pond. The approximate location of the discharge pipes from the Intermediate

[11] The term "Settling Pond Dike" was used in the Sargent & Lundy Design Drawings and will be used herein for convenience and consistency

[12] Several Sargent & Lundy drawings from the original impoundment design were available. A complete list of the drawings reviewed is provided in Appendix F.

Pond and the decant structure are shown in **Figure 12**. Details of the decant structure design are shown in **Figure 14.**

The Settling Pond Dike consists of an earthfill embankment with a crest length of approximately 680 feet and a general height (from the lowest downstream toe elevation to the crest of the impoundment) of approximately 32 feet at the decant structure.

Based on the information provided in the Sargent & Lundy Design Drawings, the Settling Pond Dike was designed using an "impervious fill" core and "earthfill" shell. Based on information contained in the Failure Analysis, the impervious fill likely consisted of lean clay and the earthfill likely consists of loess deposits as both materials were generally available on the Site. The embankment was designed with 3H:1V upstream and downstream slopes. The upstream slope was armored with a one (1) foot thick layer of sand and gravel over the earthfill, followed by a one (1) foot thick layer of riprap from the toe to an elevation of 385 feet MSL. Above elevation 385 feet MSL, the upstream slope was armored with a 6-inch thick layer of gravel fill. The downstream slope was armored with a one (1) foot thick layer of sand and gravel over the earthfill. A two (2) foot thick layer of riprap was placed over the sand from the toe to an elevation of approximately 377 feet MSL. Above elevation 377 feet MSL, the downstream slope was armored with a 6-inch thick layer of gravel fill. The Settling Pond Dike included a 2-feet thick, sand and gravel drainage blanket that varied in elevation from 377 feet to 384 feet MSL. The crest elevation was designed to be at approximately elevation 400 feet. The design and typical sections through the Settling Pond Dike are provided on **Figure 13 and 14**.

The overflow spillway designed for the Settling Pond Dike was similar to that designed for the Ash Pond Dike. The difference between the overflow spillway for the Settling Pond Dike was in the details of the downstream toe construction as shown on **Figure 14**.

1.2.9 Operations and Maintenance

The impoundments are operated and maintained by BEC personnel. Operation of the PFAP Impoundment includes periodic movement of the ash discharge pipelines. Operation of the SFAP, Secondary Pond, Intermediate Pond and Final Pond includes periodic adjustment of the decant elevations.

Operation and maintenance of the BEC facility, including the impoundments, is regulated by the EPA under the National Pollutant Discharge Elimination System (NPDES) Permit No. IL0000043. The BEC personnel perform visual inspections of the impoundments on a weekly basis and the inspection results are documented in a field log book. Starting in 2009, the impoundments were inspected by professional engineers on an annual basis.

1.2.10 Size Classification

For the purposes of this EPA-mandated inspection, the sizes of the impoundments were based on U. S. Army Corps of Engineers (COE) criteria. Based on the maximum crest height of 55 feet and a storage volume of approximately 10,000 acre-feet, the PFAP is classified as an **Intermediate** sized structure. Based on the maximum crest height of 55 feet and a current storage volume of 1,650 acre-feet, the SFAP Impoundment is classified as an **Intermediate** sized structure. Based on the maximum crest height of 12 feet and a storage volume of

approximately 190 acre-feet, the Secondary Pond is classified as a **Small** sized structure. Based on the maximum crest height of 20 feet and a storage volume of approximately 40 acre-feet, the Intermediate Pond is classified as a **Small** sized structure. Based on the maximum crest height of 32 feet and a storage volume of approximately 72 acre-feet, the Final Pond is classified as a **Small** sized structure.

According to guidelines established by the COE, dams with a storage volume less than 1,000 acre-feet and/or a height less than 40 feet are classified as Small sized structures and dams with a storage volume between 1,000 acre-feet and 50,000 acre-feet and/or a height between 40 feet and 100 feet are classified as Intermediate sized structures.

1.2.11 Hazard Potential Classification

Under the EPA classification system, as presented on page 2 of the EPA check list (**Appendix C**) and Definitions section (**Appendix B**), it is GZA's opinion that the PFAP, SFAP and the Final Pond would be considered as having a **Significant** hazard potential. The hazard potential rating is based on no probable loss of human life due to failure and the potential environmental impacts outside of Utility owned property.

Under the EPA classification system, as presented on page 2 of the EPA check list (**Appendix C**) and Definitions section (**Appendix B**), it is GZA's opinion that the Secondary Pond and the Intermediate Pond would be considered as having a **Low** hazard potential. The hazard potential rating is based on no probable loss of human life due to failure and the potential environmental impacts would likely be limited to Utility owned property.

Please note that Dynegy provided additional information to GZA since submittal of the checklists. The Checklists have been updated to reflect that information and the updated checklists are provided in **Appendix C**. The items that were changed are marked in a 'blue' font.

1.3 Pertinent Engineering Data

1.3.1 Drainage Area

Based on the design documents and visual observations by GZA, the PFAP and the SFAP do not receive surface drainage from the surrounding areas. Based on our estimates of the drainage area from topographic contours on drawing E-BAL1-C130, approximately 6 acres, 9 acres, and 180 acres drain into the Final Pond, Intermediate Pond and Secondary Pond, respectively.

1.3.2 Reservoir

Based on the May 16, 2011 aerial photograph and estimates made by GZA[13], the PFAP has a surface area of 357 acres and a storage volume of approximately 10,000 acre feet at a pool

[13] Surface area estimates generated using Google Earth Professional software and available aerial photographs. Volume estimate for the Secondary pond is based on the preconstruction valley topography shown on the Sargent & Lundy design drawings.

elevation of 448 feet MSL.[14] Approximately 22 acres of pool area was observed during the May of 2011 Site visit by GZA. The SFAP has a surface area of 55 acres and a storage volume of approximately 1,650 acre feet at a pool elevation of 430 feet MSL.[15] Approximately 17 acres of pool area was observed during the May 2011 Site visit by GZA. The Secondary Pond has a surface area of 19 acres and a storage volume of approximately 190 acre feet at a pool elevation of 396 feet MSL. The Intermediate Pond has a surface area of 2 acres and a storage volume of approximately 40 acre feet at a pool elevation of 394 feet MSL. The Final Pond has a surface area of 2.2 acres and a storage volume of approximately 72 acre feet at a pool elevation of 393 feet MSL. The pool areas observed on GZA's May 2011 Site visit are consistent with the surfaces areas noted above.

1.3.3 Discharges at the Impoundment Sites

According to BEC personnel, under normal operating conditions, approximately 8 million gallons of water per day (MGD) to 13 MGD are discharged from the Final Pond to the drainage ditch. The discharges to the different portions of the Primary Fly Ash Pond are not measured.

1.3.4 General Elevations (feet – MSL)

Elevations were taken from design drawings, reports, and data provided by BEC. Elevations were based upon the USGS topographic map MSL vertical datum.

<u>Primary Fly Ash Pond Impoundment</u>	
A. Top of Embankment (Minimum)	± 455 feet
B. Upstream Water at Time of Inspection	± 447.5 feet
C. Downstream Tail Water at Time of Inspection	396.1 feet (Northwest)[16] 430 feet (Along SFAP)
D. Maximum Pond Water Elevation	Unknown
<u>Secondary Fly Ash Pond Impoundment</u>	
A. Top of Embankment (Minimum)	± 434 feet
B. Upstream Water at Time of Inspection	430 feet
C. Downstream Tail Water at Time of Inspection	396.1 feet
D. Maximum Pond Water Elevation	Unknown
<u>Secondary Pond Impoundment</u>	
A. Top of Embankment (Minimum)	402 feet
B. Upstream Water at Time of Inspection	396.1 feet
C. Downstream Tail Water at Time of Inspection	394 feet
D. Maximum Pond Water Elevation	Unknown

[14] Storage capacity of the PFAP is based on an average base elevation of ash of 420 feet as estimated by GZA from drawings provided by BEC personnel.
[15] Storage capacity of the PFAP is based on an average base elevation of ash of 400 feet as estimated by in the Failure Analysis.
[16] The downstream elevation to the northwest was taken to be the elevation in the Secondary Pond.

Intermediate Pond Impoundment

A. Top of Embankment (Minimum)	400 feet
B. Upstream Water at Time of Inspection	394 feet
C. Downstream Tail Water at Time of Inspection	392.7 feet
D. Maximum Pond Water Elevation	Unknown

Final Pond Impoundment

A. Top of Embankment (Minimum)	398 feet
B. Upstream Water at Time of Inspection	392.7 feet
C. Downstream Tail Water at Time of Inspection[17]	± 375 feet
D. Maximum Pond Water Elevation	Unknown

1.3.5 Design and Construction Records and History

Limited construction documentation was available from the BEC with regards to the ash impoundments. No information was available regarding construction of the original 1969 embankments; however Woodward Clyde concluded that the berms were compacted to approximately 95% of the standard proctor based on the results of their subsurface investigation. Based on our review of the Failure Analysis, Woodward Clyde was provided construction documentation of the 1989 raise that included results of density tests conducted on the clay fill. However, such documentation could not be located since reorganization of the BEC files.

As built drawings were available for the Intermediate Embankment but there were no construction photos or documentation of the earthwork construction methodology or testing performed. No as built drawings or other construction documentation was available for the Secondary Dike.

1.3.6 Operating Records

No operating records of the impoundments were provided to GZA.

1.3.7 Previous Inspection Reports

The impoundments were visually inspected by a consulting professional engineer from URS in 2009 and 2010. Copies of the URS inspection reports were reviewed by GZA. On February 20, 2009, URS observed erosion along the southwestern portion of the SFAP and recommended repairs to correct it. In addition, URS noted tall vegetation and trees on the impoundments and recommended removal of the trees. On March 24, 2010, URS observed two large erosion features along the southern embankment and recommended repairing with gravel and seeding. In addition, URS noted tall vegetation and trees on the impoundments and recommended removal of the trees. Copies of the URS inspection reports are provided as **Appendix D**.

[17] Downstream tail water elevation based on visual estimates made by GZA during the Site Visit.

2.0 INSPECTION

2.1 Visual Inspection

The BEC impoundments were inspected on May 24 and 25, 2011 by Patrick J. Harrison, P.E., and Douglas P. Simon, P.E. (Wisconsin), of GZA GeoEnvironmental, Inc., and accompanied by Phil Morris of Dynegy. The inspection was conducted over the course of two days. For both days, the weather was partly cloudy with occasional rain with temperatures in the 70°s to 80°s Fahrenheit. Photographs to document the current conditions of the impoundments were taken during the inspection and are included in **Appendix E**. At the time of the inspection, the water levels in the impoundments were as provided in Section 1.3.4. Underwater areas were not inspected, as this level of investigation was beyond of GZA's scope of services. Copies of the EPA Checklists are included in **Appendix C**. Please note that the checklists have been updated since they were first submitted to the EPA to reflect additional information that was provided by Dynegy.

During our visual inspection, GZA observed the area of the 1995 failure and also observed a scarp along the northern portion of downstream slope of the SFAP. The history of the 1995 failure has been discussed in Section 1.2.4 and our observations of the failed area are provided in Section 2.2 along with our observations of the scarp on the downstream slope of the SFAP.

2.1.1 PFAP Impoundment General Findings

In general, the BEC PFAP Impoundment was found to be in **POOR** condition. In GZA's professional opinion, the embankment(s) visually appear to be sound and no immediate remedial action appears to be necessary. However, based on EPA's inspection criteria, the impoundment has been given a POOR Condition Rating, because complete hydrologic/hydraulic and geotechnical computations were not provided/available for GZA's for review. Thus the hydrologic/hydraulic adequacy of the impoundment as well as the stability of the embankment(s) could not be independently verified.

An overall Site plan showing the impoundments is provided as **Figure 2**. The location and orientation of photographs provided in **Appendix E** is shown on the Photo Plan in **Figure 3**.

2.1.2 PFAP Upstream Slope (Photos 58, 64, 65, 66, and 68)

The water surface elevation at the time of inspection was at elevation 447.5 feet MSL. Therefore, the lower portion of the upstream slope was below the water level or covered by ash deltas and not visible. The upstream slope above the water generally appeared to be in good condition. However, thick vegetation was present along much of the slope not covered by ash making it difficult to inspect the slope. No unusual movement, depressions or sloughing was observed on the slope.

2.1.3 PFAP Crest of Impoundment (Photos 58, 61, 63, 64, 65, and 68)

The crest of the PFAP Impoundment generally had a gravel access road that had grass covering much of the road along the eastern and southern portions of the impoundment crest. The crest of impoundment had occasional pot holes along its entire length; with the frequency of potholes increasing along the eastern and southern embankments. The alignment of the crest

appeared generally level, with no large depressions or irregularities observed. Based on information provided by BEC personnel, the crest elevation is approximately elevation 455 feet MSL. No significant settlement was observed at the time of our inspection. There was approximately 7 feet of free board at the time of our inspection.

2.1.4 PFAP Downstream Slope (Photos 55, 56, 57, 59, 60, 62, and 67)

The downstream slope of the impoundment was generally covered in thick vegetation making it difficult to observe during our inspections as shown in Photos 55 through 57. The eastern and southern portions were generally covered with dense trees and shrubs. The western and northern portions were generally covered with grass that had not been recently mowed. No unusual movement or displacement was observed on the slope. A gravel access road was present along the toe of the downstream slope of the northern embankment of the impoundment and generally was in good condition, with minor rutting on the surface.

2.1.5 PFAP Discharge Pipes (Photos 29, 30, 50, 51, 52, 69, 71 through 74)

Water and CCW enters the northern portion of the PFAP through a series of 10 inch diameter steel pipes. The discharge pipes appeared to be in good condition based on our visual observations. Water is removed from the northern portion of the PFAP through the decant structure for the northern portion of the PFAP that appeared to be approximately 24 inches in diameter. However, the decant structure was difficult to access due to dense vegetation. Water that enters the northern decant structure discharges upstream of the Secondary Pond via an approximately 24-inch diameter CMP pipe. The CMP discharge pipe showed signs of damage and significant leaking. The leaking water had eroded the soil around a portion of the discharge pipe as shown in Photos 29 and 30. There was no riprap or other erosion control protection observed near the CMP discharge pipe.

The 12-inch diameter steel decant pipes along the Intermediate Embankment that discharge water from the southern portion of the PFAP to the SFAP were generally in good condition based on our observations. However, most of the pipes were located within ash deltas or surrounded by ponded water and could not be easily accessed.

2.1.6 SFAP Impoundment General Findings

In general, the BEC SFAP Impoundment was found to be in **POOR** condition. An overall Site plan showing the impoundments is provided as **Figure 2**. The location and orientation of photographs provided in **Appendix E** is shown on the Photo Plan in **Figure 8**.

2.1.7 SFAP Upstream Slope (Photos 36 through 39, 47, 48, and 54)

The water surface elevation in the SFAP at the time of inspection was at elevation 430 feet MSL. Therefore, the lower portion of the upstream slope was below the water level or covered by ash deltas and not visible. In the area of the 1995 failure, the impounded ash was generally stockpiled at or above the crest elevation and thus covered the upstream slope. Where visible, the upstream slope generally appeared to be in good condition with no unusual movement, erosion or displacement observed. However, thick vegetation and trees were present along portions of the slope making it difficult to access and inspect the slope.

2.1.8 SFAP Crest of Impoundment (Photos 36, 37, 39, 47 and 48)

The crest of the SFAP Impoundment was generally covered by a gravel access road. The crest of the impoundment had occasional pot holes along its entire length; particularly along the eastern and southern embankments of the impoundment. With the exception of the area of the 1995 Failure, the alignment of the crest appeared generally level, with no large depressions or irregularities observed. Based on information provided by BEC personnel, the crest elevation outside the 1995 Failure area is approximately elevation 455 feet MSL.

The crest was lowered 21 feet to an elevation of 434 feet MSL along a portion of the southern embankment in response to the 1995 Failure as shown in Photo 47. No significant settlement or evidence of continued movement was observed at the time of our inspection. There was approximately 4 feet of free board at the time of our inspection.

2.1.9 SFAP Downstream Slope (Photos 32, 33, 34, 35, 40 through 46, and 49)

The condition of the downstream slope of the SFAP impoundment was obscured along much of the southern embankment due to thick vegetation including trees up to 16 inches in diameter. Grass that had not been recently mowed was present on the remaining portions of the downstream slope.

A scarp was observed near the crest of the downstream slope of the northwestern embankment at the approximate location shown on **Figure 8**. The scarp was approximately 100 feet wide along the slope and extended approximately 30 feet to 40 feet down the slope. The vertical face at the head of the scarp was approximately 2 feet high. The scarp had reportedly developed 2 weeks prior to our inspection and repair of the scarp has been completed since our visit according to BEC personnel. Moist surface conditions that may have been an indicator of seepage were observed along the toe of the southern embankment. However, we were not able to confirm the nature or extent of moist conditions due to the thick vegetation.

2.1.10 SFAP Ash Discharge Pipes (Photos 52 through 54)

Water and CCW enter the SFAP from the southern portion of the PFAP through a series of five (5) steel decant pipes that appeared to be in good condition at the time of our inspection. Water is removed from the SFAP through the decant structure which is located along the northwestern embankment and discharges along the valley slope above the Secondary Pond. The decant structure and discharge pipe appeared to be in good operating condition with no defects or damage observed. The riprap present at the discharge location and down the slope appeared to be in good condition and no there were no visible signs of erosion.

2.1.11 Secondary Pond General Findings

In general, the BEC Secondary Pond was found to be in **POOR** condition. In GZA's professional opinion, the embankment(s) visually appear to be sound and no immediate remedial action appears to be necessary. However, based on EPA's inspection criteria, the impoundment has been given a POOR Condition Rating, because complete hydrologic/hydraulic and geotechnical computations were not provided/available for GZA's for review. Thus the hydrologic/hydraulic adequacy of the impoundment as well as the stability of the embankment(s) could not be independently verified.

An overall Site plan showing the impoundments is provided as **Figure 2**. The location and orientation of photographs provided in **Appendix E** is shown on the Photo Plan in **Figure 10**.

2.1.12 Secondary Pond Upstream Slope (Photos 22, 24 and 25)

The water surface elevation in the Secondary Pond at the time of inspection was at elevation 396.1 feet MSL. Therefore, the lower portion of the upstream slope was below the water level and not visible. The upstream valley slopes that were above the water were generally thickly vegetated with shrubs and trees up to 24 inches in diameter. The typical conditions of the valley slopes are shown on Photos 26, 27, 28, and 31.

As noted in Section 1.2.6, the Secondary Dike impounds the water that forms the Secondary Pond. The upstream slope of the Secondary Dike that was above the water was generally in good condition and no unusual movement or sloughing was observed. However, thick vegetation greater than 5 feet in height was present along the upstream slope of the Secondary Dike making it difficult to inspect.

2.1.13 Secondary Pond Crest of Impoundment (Photo 24)

The crest of the Secondary Dike generally had an access road that was generally grassy be appeared to have been graveled in the past. The alignment of the top of Secondary Dike appeared generally level outside of the area of the overflow spillway, with no large depressions or irregularities observed. The crest elevation of the Secondary Dike is approximately 402 feet MSL.

2.1.14 Secondary Pond Downstream Slope (Photo 24)

The water surface elevation in the Intermediate Pond along the downstream slope of the Secondary Pond at the time of inspection was at elevation 394 feet MSL. Therefore, the lower portion of the downstream slope was below the water level and not visible. Thick vegetation was present along portions of the downstream slope above the water level making it difficult to inspect. The visible portions of the downstream slope appeared to be in good condition with no unusual movement or sloughing was observed.

2.1.15 Secondary Pond Ash Discharge Pipes

The decant inlets and the discharge pipe outlets for the Secondary Pond were located below the water surface in the Secondary and Intermediate Ponds, respectively. Therefore, GZA was not able to observe the decant or discharge pipes.

2.1.16 Intermediate Pond General Findings

In general, the BEC Intermediate Pond was found to be in **POOR** condition. An overall Site plan showing the impoundments is provided as **Figure 2**. The location and orientation of photographs provided in **Appendix E** is shown on the Photo Plan in **Figure 12**.

2.1.17 Intermediate Pond Upstream Slope (Photos 1, 75 and 76)

As noted in Section 1.2.7, the Ash Pond Dike impounds the water that forms the Intermediate Pond. The upstream slope of the Ash Pond Dike that was above the water was generally in good condition with no unusual movement or sloughing observed. However, tall grasses along portions of the slope made it difficult to inspect and trees up to 4 inches in diameter were present.

2.1.18 Intermediate Pond Crest of Impoundment (Photos 1, 75 and 76)

The crest of the Intermediate Pond generally had a gravel access road at the location of the Ash Pond Dike. The access road was generally in fair condition but there were several potholes along the roadway. The alignment of the crest of the Ash Pond Dike appeared generally level in the areas outside of the overflow spillway, with no large depressions or irregularities observed. The crest of the Ash Pond Dike elevation is approximately elevation 400 feet MSL.

2.1.19 Intermediate Pond Downstream Slope (Photos 2 through 5)

The water surface elevation in the Final Pond along the downstream slope of the Intermediate Pond was at elevation 392.7 feet MSL at the time of inspection. Therefore, the lower portion of the downstream slope was below the water level and not visible. Thick vegetation and trees up to 4 inches in diameter were present along portions of the downstream slope above the water level making it difficult to inspect. No unusual movement or sloughing was observed on the visible portions of the slope.

A portion of the downstream slope had been covered with concrete to control erosion along the overflow spillway of Ash Pond Dike. Water was flowing from under the concrete in several locations. Due to the concrete, GZA was not able to observe whether erosion was continuing to occurring due to the seepage.

2.1.20 Intermediate Pond Ash Decant Structure (Photos 76 and 77)

The decant structure for the Intermediate Pond appeared to be in good condition at the time of our Site visit and did not appear to be cracked or otherwise damaged. However, the water level in the impoundment was such that the decant pipe appeared to be nearly at capacity as shown on Photo 77. The discharge pipes into the Final Pond are located below the water surface and could not be observed during our Site visit.

2.1.21 Final Pond General Findings

In general, the BEC Final Pond was found to be in **POOR** condition. An overall Site plan showing the impoundments is provided as **Figure 2**. The location and orientation of photographs provided in **Appendix E** is shown on the Photo Plan in **Figure 12**.

2.1.22 Final Pond Upstream Slope (Photos 7, 8 and 9)

As noted in Section 1.2.8, the Settling Pond Dike impounds the water that forms the Final Pond. The water surface elevation in the Final Pond at the time of inspection was at

elevation 392.7 feet MSL. Therefore, the lower portion of the upstream slope was below the water level and not visible. The upstream slope of the Settling Pond Dike that was above the water was generally in good condition and no unusual movement or sloughing was observed. However, tall grasses along the slope made it difficult to inspect.

2.1.23 Final Pond Crest of Impoundment (Photos 10, 18 through 20)

The crest of the Settling Pond Dike was covered by a gravel access road that was generally in fair condition, but there were several potholes along the length of the crest. The alignment of the crest of Settling Pond Dike appeared to be consistent with the design elevation, with no large depressions or irregularities observed. The crest elevation of the Ash Pond Dike is approximately elevation 398 feet MSL.

2.1.24 Final Pond Downstream Slope (Photos 10 through 15)

The water surface elevation in the drainage ditch along the downstream slope was visually estimated by GZA to be at elevation 375 feet MSL. Therefore, the lower portion of the downstream slope and toe was below the water level and not visible. Thick vegetation and trees up to 18 inches in diameter were present along portions of the downstream slope making it difficult to inspect. No unusual movement or sloughing was observed on the visible portions of the slope.

Water was actively discharging from the overflow section of the Settling Pond Dike and flowing along the armored portion of the downstream slope. Thick vegetation and trees were present along the armored portion of the slope.

2.1.25 Final Pond Ash Decant Structure (Photos 9, 16, and 17)

The decant structure for the Final Pond appeared to be in good condition at the time of our Site visit. However, it appeared that water was discharging at a rate that was near the maximum capacity of the decant structure. The discharge pipes into the downstream water way are located below the water surface and could not be observed during our Site visit.

2.2 Caretaker Interview

Maintenance of the impoundments is the responsibility of BEC personnel. GZA met with BEC personnel and discussed the operations and maintenance procedures, regulatory requirements, and the history of the impoundments since their construction.

2.3 Operation and Maintenance Procedures

As discussed in Section 1.2.9, BEC personnel are responsible for the regular operations and maintenance of the impoundments. No formal maintenance plan has been developed for the impoundments. Based on our discussions with BEC personnel, the roadways and slopes are repaired as needed.

2.4 Emergency Action Plan

An Emergency Action Plan (EAP) has not been developed for the impoundments. Note that the hazard potential classification for the dam is discussed in Section 1.2.11.

2.5 Hydrologic/Hydraulic Data

No hydrologic/hydraulic studies have been conducted for the impoundments. GZA did not perform an independent assessment of the hydraulics and hydrology for the impoundments as this was beyond our scope of services.

2.6 Structural and Seepage Stability

No engineering evaluation is available for the 1969 embankments designed by Sargent & Lundy. However, as discussed below seepage and stability analyses were conducted in 1995 and 2011 and relied upon the design drawings for information about embankments.

2.6.1 1995 Failure Analysis

The Failure Analysis evaluated the causes of the 1995 failure, the stability of the failed section, and the stability of the remaining PFAP embankments. Soil borings were drilled, laboratory testing was conducted, and instrumentation was installed to evaluate the stability of the southern embankment of the PFAP and SFAP. Based on the results of the Failure Analysis, the failed section of the embankment had a factor of safety against global failure less than the generally accepted value of 1.5.

The Failure Analysis also indicated that deep seated failure on the high plasticity clay below the embankments could occur for embankments that were greater than about 35 feet high. Based on the results of the failure analysis, the potential for deep failure was greatest between Stations -6-50 and 5+50. In addition, shallow failures due to high hydrostatic pressures in the bottom ash could occur where bottom ash was present near the downstream face of the embankment. The Failure Analysis identified the potential for shallow failure from the southwestern corner of the impoundment to Station 14+00. Relative to the current impoundment configuration, the areas of potential deep and shallow failure are along the southern embankment of what is now the SFAP.

The Failure Analysis presented three remedial options to increase the factor of safety above generally acceptable levels; a parallel wall, a translated dike, and an HDPE wall. However, Dynegy (at that time Illinois Power Company) constructed the Intermediate Embankment in lieu of applying one of the suggested remedial measures. We understand that the Intermediate Embankment was constructed to allow the water levels in the SFAP to be lowered and thus reduce the static loading on the embankments. However, Illinois Power Company did not evaluate the stability of the embankments based on their remedial design.

2.6.2 2011 URS Stability Analysis

Since our Site Visit, Dynegy has contracted URS to conduct an evaluation of the stability of the 1995 failure section, the Ash Pond Dike, and the Settling Pond Dike. The URS analysis evaluated the FOS under four loading conditions that included the static load under

drained and undrained conditions, and the seismic load based the 475 year return period event and 2475 year return period event. The 475 year return period event was the applicable standard prior to and including the period of the 1995 failure. The 2475 year return period event corresponds to the current design standard required by the Illinois Department of Natural Resources (IDNR) for Construction and Maintenance of Dams. The impoundments are not subject to the requirements of the IDNR standard; however the use of IDNR criteria is standard practice, in GZA's opinion.

In the 1995 Failure Area, the URS analysis was based on the current embankment configuration and reportedly used the soil properties provided in the 1995 Failure Analysis. The URS analysis indicates that the following factors of safety (FOS) in the 1995 Failure Area:

Condition	Computed FOS	Minimum FOS
Drained static conditions	1.21	1.5
Undrained static conditions	1.73	1.5
475 Year Seismic Load	1.10	1.0
2475 Year Seismic Load	0.57	1.0

The URS analysis indicates that the FOS under drained static conditions and the 2475 year seismic load are below the generally accepted standards of 1.5 and 1.0, respectively. No recommendations for increasing the FOS were provided in the URS analysis.

Based on our review of the URS analysis, it is GZA's opinion that the stability analysis for the SFAP is incomplete. URS stated that the soil parameters used for the analysis were based on the values reported in the Woodward Clyde Failure analysis. However, GZA observed several instances where the values used in the URS analysis did not correlate to the values reported in the Woodward Clyde Failure Analysis. Also, the URS analysis was conducted for the conditions present during normal operating levels rather than during the increased loading that would occur during the 100 year, 24 hour storm event. Also, the URS analysis did not evaluate the stability of the remaining embankments of the SFAP. Therefore, based on the results stated in the Woodward Clyde Failure Analysis, it would be assumed that the remaining portions of the embankments do not meet the generally accepted FOS values, in GZA's opinion.

The URS analysis also evaluated the stability of the Ash Pond Dike and the Settling Pond Dike. The composition and cross sections of the embankments was based on the 1969 design drawings and the soil parameters were reportedly based on the values presented in the Woodward Clyde Failure Analysis for the SFAP. However, no supplemental field or laboratory test data was collected by URS.

The URS analysis indicates the following factors of safety (FOS) for the Ash Pond Dike as noted for Section B-B':

Condition	FOS
Drained static conditions	1.55
Undrained static conditions	5.10
475 Year Seismic Load	3.28
2475 Year Seismic Load	2.00

The URS analysis indicates the following factors of safety (FOS) for the Settling Pond Dike outside of the overflow section as noted for Section A-A':

Condition	FOS
Drained static conditions	1.66
Undrained static conditions	3.34
475 Year Seismic Load	2.31
2475 Year Seismic Load	1.50

The URS analysis indicates the following factors of safety (FOS) for the Settling Pond Dike within the overflow section as noted for Section F-F':

Condition	FOS
Drained static conditions	1.56
Undrained static conditions	3.23
475 Year Seismic Load	2.21
2475 Year Seismic Load	1.40

Based on our review of the URS analysis, it is GZA's opinion that the stability analysis for the SFAP is incomplete for the following considerations:

1. URS stated that the soil parameters used for the analysis were based on the values reported in the Woodward Clyde Failure analysis. However, GZA observed several instances where the values used in the URS analysis did not correlate to the values reported in the Woodward Clyde Failure Analysis. In addition, there were soil types (eg. riprap, sand and gravel filter) that were not part of the Woodward Clyde Failure Analysis and no justification was provided in the URS analysis for the soil parameters used in the analysis.

2. Also, the URS analysis was conducted for the conditions present during normal operating levels rather than during the increased loading that would occur during the 100 year, 24 hour storm event.

3. The analysis of the Ash Pond Dike did not provide justification that the Section used represented the critical section of the embankment.

4. The analysis for Section F-F' through the overflow section of the Settling Pond Dike assumes a water surface that follows the base of the rockfill in the section and exits at the downstream slope near the toe. Based on the conditions observed during GZA's inspection, water exits the downstream slope within several feet of the crest of the impoundment. The analysis also assumed the tail-water elevation to be at the ground surface. However, there appeared to be several feet of water on the downstream toe at the time of our inspection. Therefore, the assumed water table within the embankment and along the downstream toe does not match the observed conditions. An analysis with a modeled water table that more closely matches the observed conditions may result in a lower FOS.

5. Given the use of the overflow sections of the Ash Pond Dike and the Settling Pond Dike to support continuous flow of water, the stability of the materials against erosion or piping should be considered.

3.0 ASSESSMENTS AND RECOMMENDATIONS

3.1 Assessments

In general, the overall condition of the PFAP impoundment was judged to be **POOR**. The PFAP impoundment was found to have the following deficiencies:

1. Thick vegetation and trees along the upstream and downstream slopes;
2. Minor potholes and rutting along the crest gravel access road;
3. Damaged discharge pipe from the northern decant;
4. The absence of erosion protection on the embankment near the discharge location of the northern decant has allowed erosion of the embankment;
5. No hydraulic/hydrologic analysis has been performed to confirm adequate freeboard and decant capacity at the design storm event;
6. The stability analysis completed does not account for storm event loading conditions; and,
7. No stability analysis has been performed on the Intermediate Embankment.

In general, the overall condition of the SFAP impoundment was judged to be **POOR**. The SFAP impoundment was found to have the following deficiencies:

1. Thick vegetation and trees along the upstream and downstream slopes;
2. Minor potholes and rutting along the crest gravel access road;
3. Scarp present on the downstream slope of the northern embankment;
4. The stability analysis for the SFAP is incomplete for portions of the embankments and does not indicate that the embankments meet generally accepted levels of stability for the sections analyzed; and
5. No hydraulic/hydrologic analysis has been performed to confirm adequate freeboard and decant capacity at the design storm event.

In general, the overall condition of the Secondary Pond impoundment was judged to be **POOR**. The Secondary Pond impoundment was found to have the following deficiencies:

1. No hydraulic/hydrologic analysis has been performed to confirm adequate freeboard, decant and overflow spillway capacity; and,
2. No seepage and/or stability analysis has been performed for the Secondary Dike.

In general, the overall condition of the Intermediate Pond impoundment was judged to be **POOR**. The Intermediate Pond impoundment was found to have the following deficiencies:

1. Thick vegetation and trees along the upstream and downstream slopes;
2. Potholes along the crest gravel access road;
3. Concrete covering the downstream slope prohibits monitoring of potential erosion;
4. No hydraulic/hydrologic analysis has been performed to confirm adequate freeboard and decant/overflow spillway capacity;
5. In GZA's opinion, the stability analysis for the impoundment was incomplete; and,
6. No evaluation has been conducted to verify the stability of the overflow section against piping or fines erosion.

In general, the overall condition of the Final Pond impoundment was judged to be **POOR**. The Final Pond impoundment was found to have the following deficiencies:

1. Thick vegetation and trees along the downstream slopes;
2. Minor potholes along the crest gravel access road;
3. No hydraulic/hydrologic analysis has been performed to confirm adequate freeboard and decant/overflow spillway capacity;
4. In GZA's opinion, the stability analysis for the impoundment was incomplete; and,
5. No evaluation has been conducted to verify the stability of the overflow section against piping or fines erosion.

The following recommendations and remedial measures generally describe the recommended approach to address current deficiencies at the impoundments. Prior to undertaking recommended maintenance, repairs, or remedial measures, the applicability of permits needs to be determined for activities that may occur under the jurisdiction of the appropriate regulatory agencies.

3.2 Studies and Analyses

GZA recommends that BEC/Dynegy conduct the following studies and analysis:

1. Conduct an analysis of the hydraulic/hydrologic condition of the impoundments to establish the rise in water level that occurs during the 100-year, 24-hour rain event to confirm that adequate freeboard is maintained and adequate decant and spillway capacity is available. The loading conditions established during the design storm event should be used in the evaluation of the seepage and stability evaluation of the embankments.

2. Address the deficiencies noted in Section 2.6 and Section 3.1 for the stability and seepage analysis previously conducted for the impoundments and establish a complete seepage and stability analysis for each impoundment.

3. Evaluate the potential for piping and fines erosion along the overflow sections of the Ash Pond Dike and the Settling Pond Dike.

4. Moist soil conditions were observed along the downstream slope and/or toe of the southern embankment of the SFAP. This condition may indicate the presence of seepage in that area and should be evaluated. We recommend removing all trees on the downstream slope and toe area and evaluation of the moist soil conditions.

3.3 Recurrent Operation & Maintenance Recommendations

GZA recommends the following operation and maintenance level activities:

1. Increased mowing of the grasses on the embankments to facilitate inspections and reduce the risk of burrowing animals;

2. Repair the potholes present in the gravel crest access roads. Grade the road to provide better drainage and reduce future potholing; and,

3. Clear trees and other deep rooted vegetation from the slopes and crests of the embankments.

3.4 Repair Recommendations

GZA recommends the following repairs to address observed deficiencies that may affect the stability of the embankments. The recommendations may require design by a professional engineer and construction contractor experienced in impoundment construction.

1. Repair the discharge pipe and the embankment erosion near the discharge pipe from PFAP's northern decant. Protect the embankment with riprap or other erosion control features.

2. Remove the concrete located on the downstream slope of the Ash Pond Dike. Repair any erosion observed beneath the concrete and replace with fill engineered to provide a stable embankment that is not susceptible to erosion or piping.

3. Pending the results of the hydraulic/hydrologic analysis, modify the design or operation of the impoundments to provide adequate capacity.

4. Pending the results of the complete seepage and stability analysis for each impoundment, modify the design or operation of the impoundments to provide conditions that result in embankments that meet the generally accepted factors of safety.

3.5 Alternatives

There are no practical alternatives to the repairs itemized above.

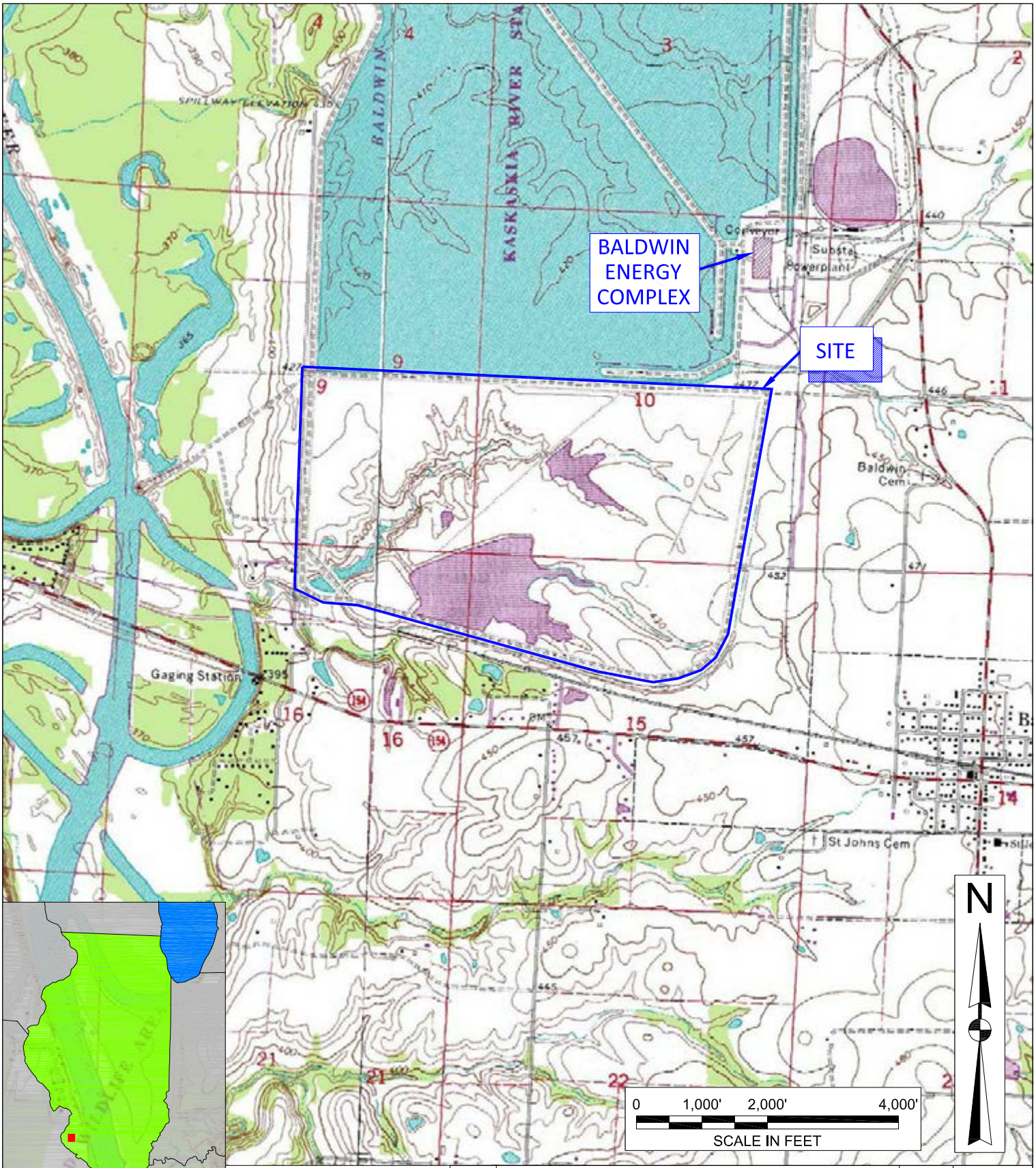
4.0 ENGINEER'S CERTIFICATION

I acknowledge that the management unit referenced herein, the BEC Primary Fly Ash Pond, Secondary Fly Ash Pond, Secondary Pond, Intermediate Pond and Final Pond Impoundments have been assessed to be in **POOR** condition on May 24 and 25, 2011.

Patrick J. Harrison, P.E.
Senior Consultant

J:\170,000-179,999\170142\170142-30 Round 10\Baldwin Energy Complex\Stability Calc Edits\2nd DRAFT - Badwin Energy Complex.docx

FIGURES



SOURCE: U.S.G.S. QUADRANGLE MAPS
BALDWIN, IL (1982)
RED BUD, IL (1982)

NO.	ISSUE/DESCRIPTION	BY	DATE

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
20900 SWENSON DRIVE, SUITE 150
WAUKESHA, WISCONSIN 53186
(262) 754-2560

PREPARED FOR:

SITE LOCATION MAP

BALDWIN ENERGY COMPLEX
DYNEGY MIDWEST GENERATING, INC.
BALDWIN, ILLINOIS

FIGURE 1

PROJ MGR:	DS	REVIEWED BY:	PJH	CHECKED BY:	DS	DATE	PROJECT NO.	REVISION NO.
DESIGNED BY:	DS	DRAWN BY:	CLK	SCALE:	1 : 24000	8/29/11	01.0170142.30	SHEET NO.

SOURCE: DIGITAL ORTHOPHOTO/AERIAL IMAGERY PRODUCED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE (USDA) AND RETRIEVED THROUGH USE OF A PROFESSIONAL LICENSE OF THE GOOGLE EARTH MAPPING PROGRAM.
DATA ACCESSED JUNE 2011

N
W E
S

600 300 0 600 Feet

CONVSERVATION ROAD

PRIMARY FLY ASH POND IMPOUNDMENT

BOTTOM ASH PORTION OF PRIMARY FLY ASH POND IMPOUNDMENT

NORTHERN DIKE

SECONDARY DIKE

SECONDARY POND

FLY ASH PORTION OF PRIMARY FLY ASH POND IMPOUNDMENT

ASH POND DIKE

SETTLING POND DIKE

FINAL POND

SECONDARY FLY ASH POND IMPOUNDMENT

INTERMEDIATE EMBANKMENT

INTERMEDIATE POND

PRIMARY FLY ASH POND IMPOUNDMENT

1995 FAILURE AREA

LEGEND

APPROXIMATE IMPOUNDMENT BOUNDARY

FLOW OF WATER FROM BOTTOM ASH SLUICE

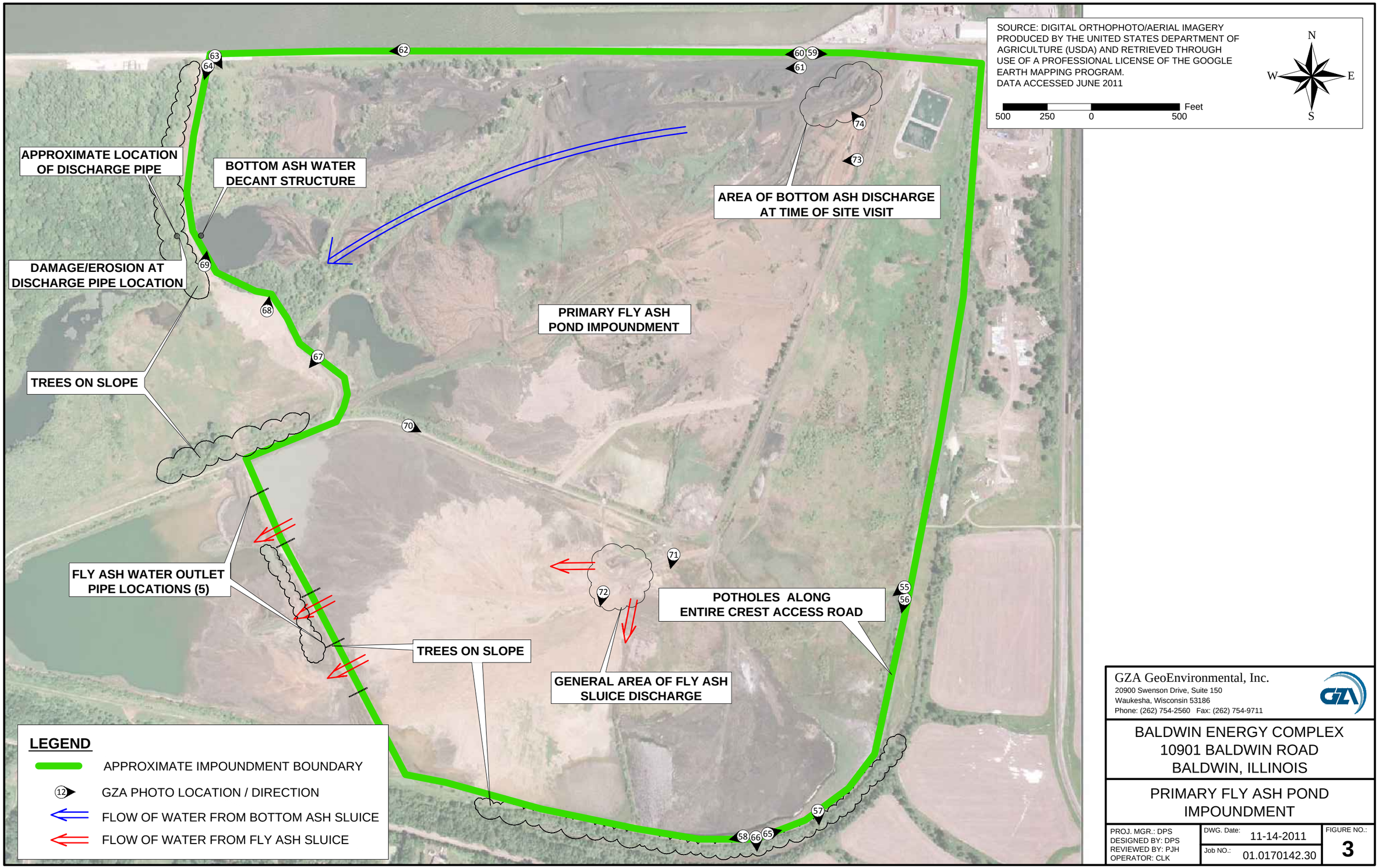
FLOW OF WATER FROM FLY ASH SLUICE

GZA GeoEnvironmental, Inc.
20900 Swenson Drive, Suite 150
Waukesha, Wisconsin 53186
Phone: (262) 754-2560 Fax: (262) 754-9711

BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD
BALDWIN, ILLINOIS

OVERALL ASH BASIN PLAN

PROJ. MGR.: DPS DESIGNED BY: DPS REVIEWED BY: PJH OPERATOR: CLK	DWG. Date: 11-14-2011 Job NO.: 01.0170142.30	FIGURE NO.: 2



SOURCE: DIGITAL ORTHOPHOTO/AERIAL IMAGERY PRODUCED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE (USDA) AND RETRIEVED THROUGH USE OF A PROFESSIONAL LICENSE OF THE GOOGLE EARTH MAPPING PROGRAM.
DATA ACCESSED JUNE 2011

N
W E
S

500 250 0 500 Feet

LEGEND

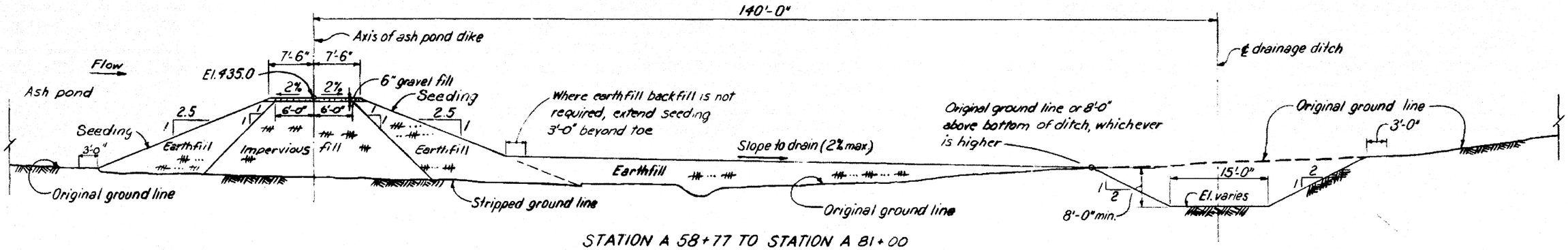
- APPROXIMATE IMPOUNDMENT BOUNDARY
- 12 GZA PHOTO LOCATION / DIRECTION
- FLOW OF WATER FROM BOTTOM ASH SLUICE
- FLOW OF WATER FROM FLY ASH SLUICE

GZA GeoEnvironmental, Inc.
20900 Swenson Drive, Suite 150
Waukesha, Wisconsin 53186
Phone: (262) 754-2560 Fax: (262) 754-9711

BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD
BALDWIN, ILLINOIS

PRIMARY FLY ASH POND IMPOUNDMENT

PROJ. MGR.: DPS DESIGNED BY: DPS REVIEWED BY: PJH OPERATOR: CLK	DWG. Date: 11-14-2011 Job NO.: 01.0170142.30	FIGURE NO.: 3



STATION A 58+77 TO STATION A 81+00

0 8' 16' 32'

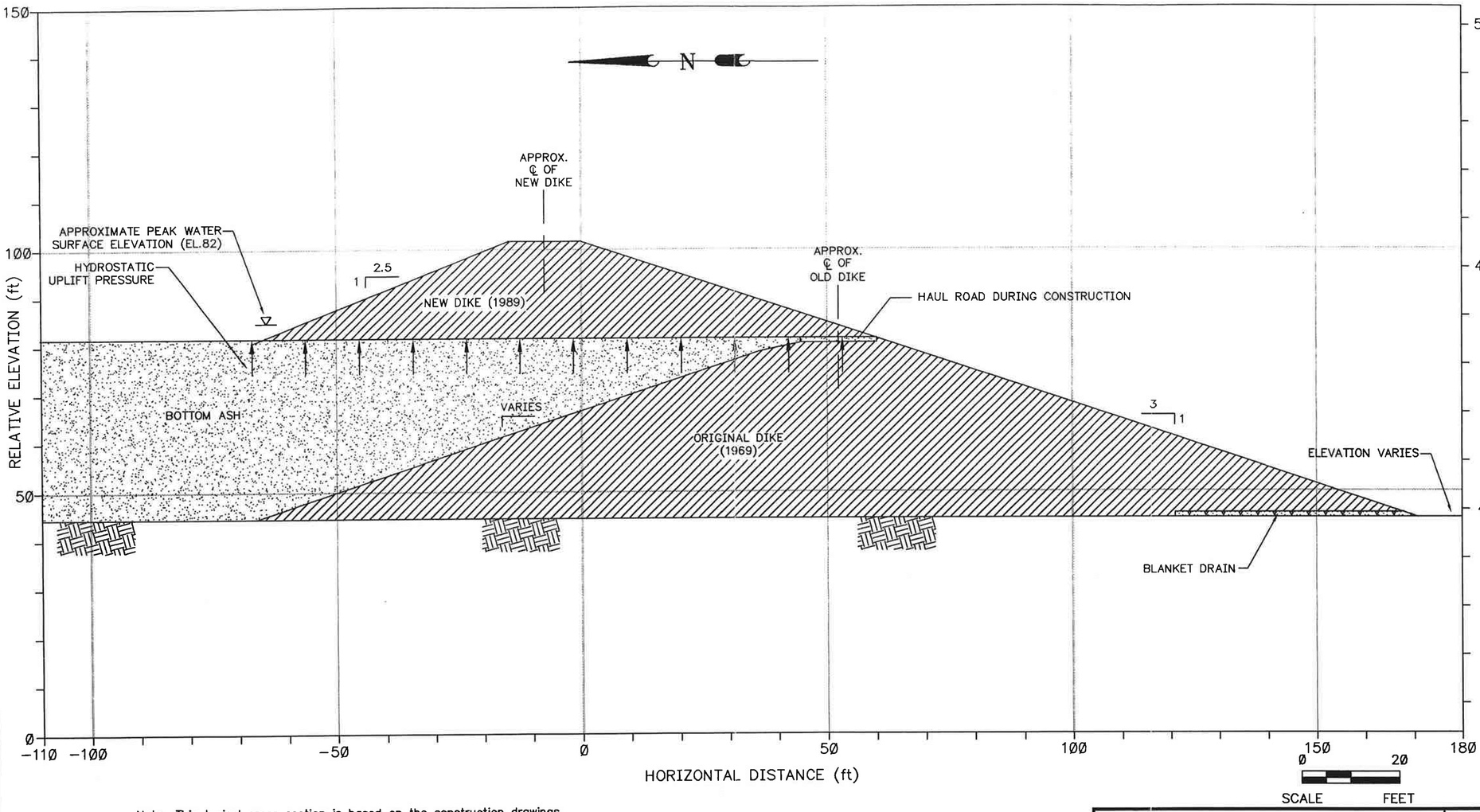
APPROXIMATE SCALE IN FEET

GZA GeoEnvironmental, Inc.
20900 Swenson Drive, Suite 150
Waukesha, Wisconsin 53186
Phone: (262) 754-2560 Fax: (262) 754-9711

BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD
BALDWIN, ILLINOIS

1969 TYPICAL SECTION OF SOUTHERN EMBANKMENT

PROJ. MGR.: DPS DESIGNED BY: DPS REVIEWED BY: PJH OPERATOR: CLK	DWG. Date: 11-14-2011 Job NO.: 01.0170142.30	FIGURE NO.: 4



Note: This typical cross section is based on the construction drawings and records provided by Illinois Power.

ILLINOIS POWER BALDWIN STATION SOUTH ASH POND DIKE BALDWIN, IL.	PROJECT NO. 5E08560
Woodward-Clyde Consultants Engineering & sciences applied to the earth & its environment	
DRN. BY: bdl 5/22/95 DSGN. BY: gaz CHKD. BY: RMB 6/23/95	As Built Section in Failed Area — FIG. NO. 3

File: F:\5E08560\TASK240\ASBLTSEC.DWG Last edited: 06/22/95 @ 6:28 p.m. @ WCC-ST.LOUIS

DATE | BY | DESCRIPTION | REV. NO.

0 5' 10' 20' APPROXIMATE SCALE IN FEET

GZA GeoEnvironmental, Inc.
Brookfield, Wisconsin 53186
Phone (262) 754-2500 ■ Fax (262) 754-9711
www.gza.com

PROJ MGR: DPS
DESIGNED BY: DPS
REVIEWED BY: PJH
OPERATOR: CLK
DATE: 11-11-2011

BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD
BALDWIN, ILLINOIS

AS BUILT OF SOUTHERN EMBANKMENT OF PRIMARY FLY ASH POND

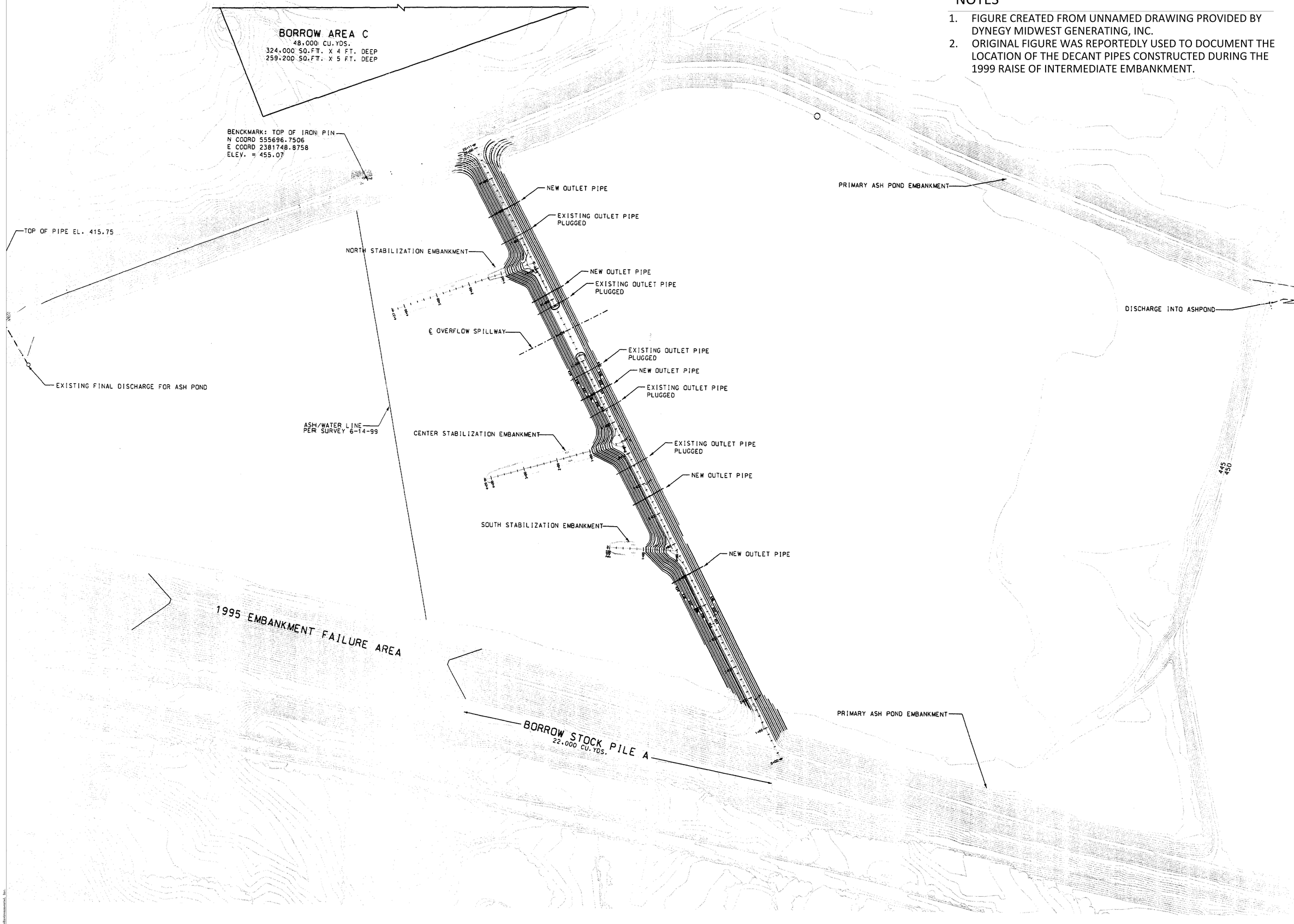
JOB NO.
01.0170142.30

FIGURE NO.
5

GZA Drawing Name: J:\GZA_USA\01.0170142.30 Ash Imp. Round 10\01.0170142.30 Task 7 - Baldwin\Drawings\Autocad\Scanned Figures.dwg Last Modified: Nov 11, 2011 - 10:10am Plotted on: Nov 11, 2011 - 10:10am by justin.hegarty

NOTES

1. FIGURE CREATED FROM UNNAMED DRAWING PROVIDED BY DYNEGY MIDWEST GENERATING, INC.
2. ORIGINAL FIGURE WAS REPORTEDLY USED TO DOCUMENT THE LOCATION OF THE DECANT PIPES CONSTRUCTED DURING THE 1999 RAISE OF INTERMEDIATE EMBANKMENT.



REV. NO.	DESCRIPTION	BY	DATE

0 50' 100' 200'
APPROXIMATE SCALE IN FEET

GZA GeoEnvironmental, Inc.
Consulting Engineers, Scientists, and Geologists
Brookfield, Wisconsin 53186
Phone (262) 754-2666 ■ Fax (262) 754-9711
www.gza.com

PROJ MGR: DPS
DESIGNED BY: DPS
REVIEWED BY: PJH
OPERATOR: CLK
DATE: 11-14-2011

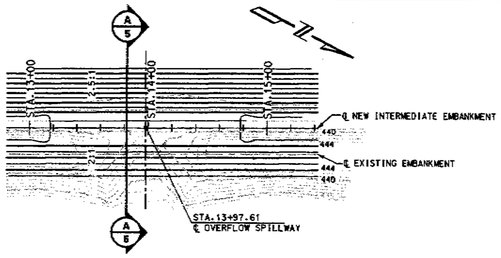
BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD
BALDWIN, ILLINOIS

PLAN VIEW OF INTERMEDIATE EMBANKMENT

JOB NO.
01.0170142.30

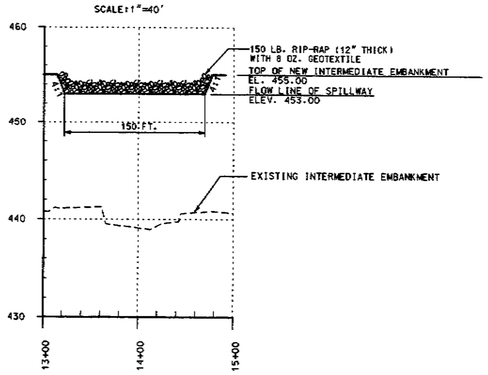
FIGURE NO.
6

GZA Drawing Name: J:\GZA_USA\01\0170142.30 Ash Imp. Round 1\01.0170142.30 Task 7 - Baldwin\Drawings\Autocad\Scanned Figures.dwg Last Modified: Nov 14, 2011 - 10:13am Plotted on: Nov 14, 2011 - 10:14am by justin.kepply



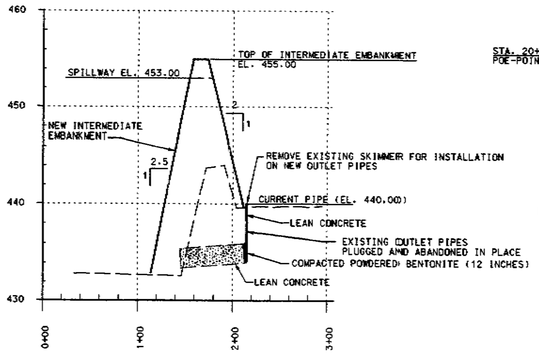
PLAN OF OVERFLOW SPILLWAY

SCALE: 1"=40'



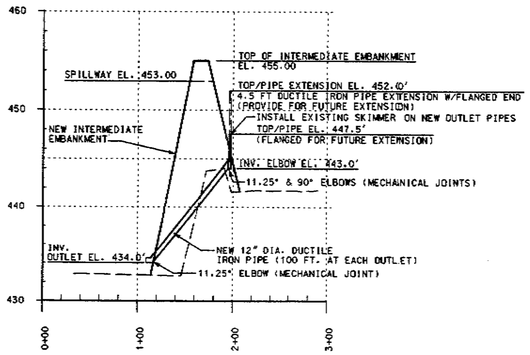
PROFILE OF OVERFLOW SPILLWAY

SCALE: 1"=50' HORZ
1"=5' VERT



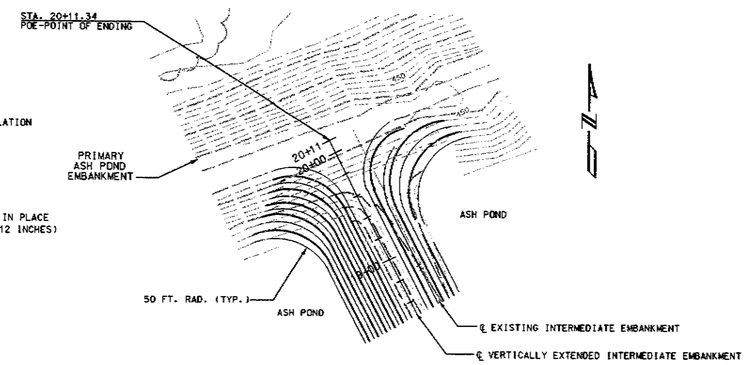
SECTION THRU EXISTING OUTLET PIPES (TYP.)

SCALE: 1"=50' HORZ
1"=5' VERT

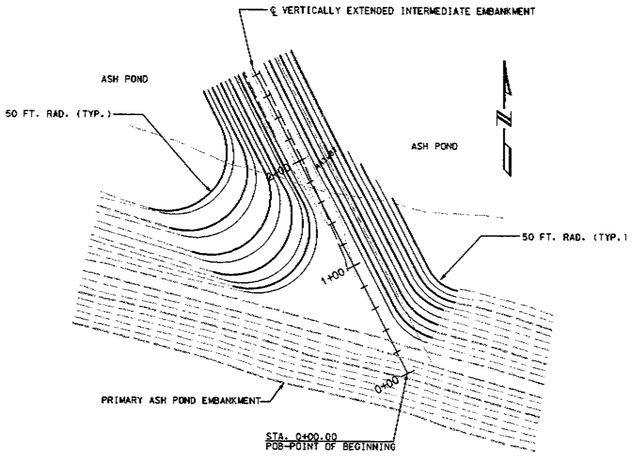


SECTION THRU NEW OUTLET PIPES (TYP.)

SCALE: 1"=50' HORZ
1"=5' VERT

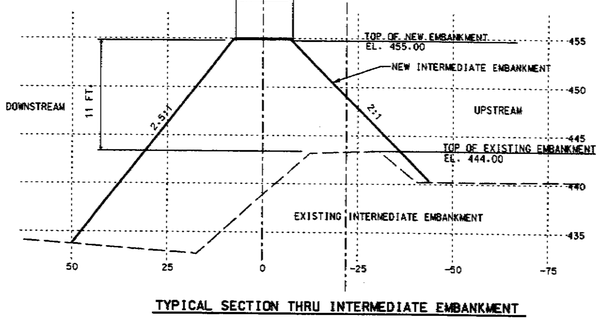


DETAIL OF NORTH END OF INTERMEDIATE EMBANKMENT



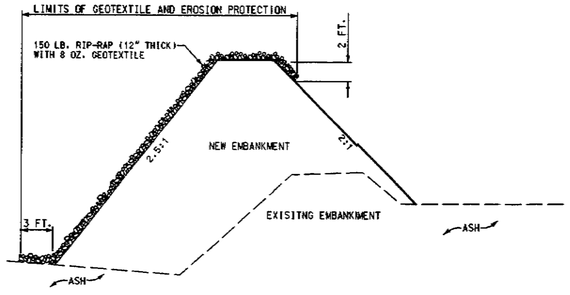
DETAIL OF SOUTH END OF INTERMEDIATE EMBANKMENT

SCALE: 1"=40'



TYPICAL SECTION THRU INTERMEDIATE EMBANKMENT

SCALE: 1"=50' HORZ
1"=5' VERT



A/5 SECTION A-A

SCALE: 1"=50' HORZ
1"=5' VERT

REVISION STATUS: □-CONSTRUCTION ○-RECORD														
NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A
1	10-4-99	GBD	REMOVED PAVEMENT AND GEOTEXTILE REINFORCING LAYERS	RCW	RCW	RCW							
2	10-5-99	GBD	CHANGED PIPE EXTENSION INFORMATION	RCW	RCW	RCW							
3	01-27-00	MEC	AS-BUILT - INTERMEDIATE EMBANKMENT, VERTICAL EXTENTION 1999	RCW	RCW	RCW							

NOTES

REFERENCES

ILLINOIS POWER COMPANY
DECATUR

MISCELLANEOUS DETAILS OF INTERMEDIATE EMBANKMENT VERTICAL EXTENSION OF INTERMEDIATE EMBANKMENT BALDWIN POWER STATION

DR RKF	CAD RKF/MEC	DATE 1-22-99
CK RCW	CK'D	SCALE
APP	PLOTTED	E-BAL1-C122
APP	2-14-2000	

E-BAL1-C122

NOTE:
IMAGE HAS BEEN REDUCED AND IS NO LONGER TO A SCALE

NO.	DATE	BY	DESCRIPTION

GZA GeoEnvironmental, Inc.
Engineers and Scientists
Brookfield, Wisconsin 53186
Phone: (262) 754-2600 ■ Fax: (262) 754-9711
www.gza.com

PROJ MGR: DPS
DESIGNED BY: DPS
REVIEWED BY: PJH
OPERATOR: CLK
DATE: 09-01-2011

BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD
BALDWIN, ILLINOIS

TYPICAL CROSS SECTIONS
THROUGH INTERMEDIATE EMBANKMENT

JOB NO.
01.0170142.30

FIGURE NO.
7

GZA Drawing Name: J:\GZA_LIVE\01.0170142.30 Ash Imp. Round 10\01.0170142.30 Task 7 - Baldwin\Drawings\Autocad\Scanned Figures.dwg Last Modified: Nov 11, 2011 - 10:15am Plotted on: Nov 11, 2011 - 10:14am by justin.hogarty

SECONDARY POND

APPROXIMATE LOCATION OF SCARP

TREES ON SLOPE

FLY ASH WATER OUTLET PIPE LOCATIONS (5)

SECONDARY FLY ASH POND DECANT STRUCTURE

PRIMARY FLY ASH POND IMPOUNDMENT

SECONDARY FLY ASH POND IMPOUNDMENT

TREES ON SLOPE

1995 FAILURE AREA

APPROXIMATE LOCATION OF POSSIBLE SEEPAGE ALONG DOWNSTREAM SLOPE/TOE

SOURCE: DIGITAL ORTHOPHOTO/AERIAL IMAGERY PRODUCED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE (USDA) AND RETRIEVED THROUGH USE OF A PROFESSIONAL LICENSE OF THE GOOGLE EARTH MAPPING PROGRAM.
DATA ACCESSED JUNE 2011

N W E S

500 250 0 500 Feet

LEGEND

APPROXIMATE IMPOUNDMENT BOUNDARY

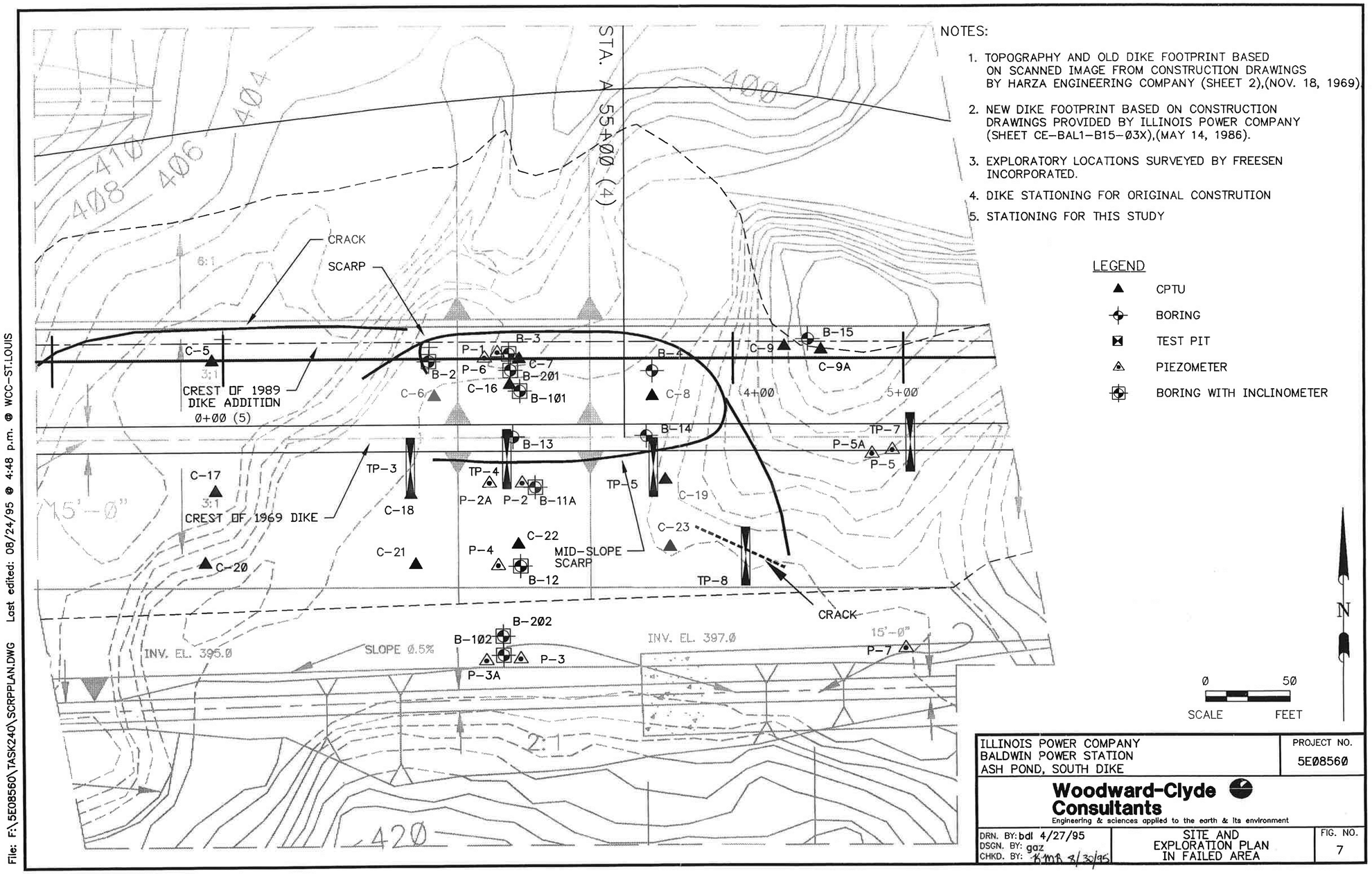
12 GZA PHOTO LOCATION / DIRECTION

GZA GeoEnvironmental, Inc.
20900 Swenson Drive, Suite 150
Waukesha, Wisconsin 53186
Phone: (262) 754-2560 Fax: (262) 754-9711

BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD
BALDWIN, ILLINOIS

SECONDARY FLY ASH POND IMPOUNDMENT

PROJ. MGR.: DPS DESIGNED BY: DPS REVIEWED BY: PJH OPERATOR: CLK	DWG. Date: 11-14-2011 Job NO.: 01.0170142.30	FIGURE NO.: 8



NOTES:

1. TOPOGRAPHY AND OLD DIKE FOOTPRINT BASED ON SCANNED IMAGE FROM CONSTRUCTION DRAWINGS BY HARZA ENGINEERING COMPANY (SHEET 2),(NOV. 18, 1969).
2. NEW DIKE FOOTPRINT BASED ON CONSTRUCTION DRAWINGS PROVIDED BY ILLINOIS POWER COMPANY (SHEET CE-BAL1-B15-03X),(MAY 14, 1986).
3. EXPLORATORY LOCATIONS SURVEYED BY FREESEN INCORPORATED.
4. DIKE STATIONING FOR ORIGINAL CONSTRUTION
5. STATIONING FOR THIS STUDY

LEGEND

- CPTU
- BORING
- TEST PIT
- PIEZOMETER
- BORING WITH INCLINOMETER

ILLINOIS POWER COMPANY BALDWIN POWER STATION ASH POND, SOUTH DIKE	PROJECT NO. 5E08560

Woodward-Clyde Consultants
Engineering & sciences applied to the earth & its environment

DRN. BY: bdl 4/27/95 DSGN. BY: gaz CHKD. BY: [illegible] 3/30/95	SITE AND EXPLORATION PLAN IN FAILED AREA	FIG. NO. 7

File: F:\5E08560\TASK240\SCRPPLAN.DWG Last edited: 08/24/95 @ 4:48 p.m. @ WCC-ST.LOUIS

DATE | BY | DESCRIPTION | REV. NO.

0 25 50
APPROXIMATE SCALE IN FEET

GZA GeoEnvironmental, Inc.
Brookfield, Wisconsin 53186
Phone: (262) 754-2500 ■ Fax: (262) 754-9701
www.gza.com

PROJ MGR: DPS
DESIGNED BY: DPS
REVIEWED BY: PJH
OPERATOR: CLK
DATE: 11-11-2011

BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD
BALDWIN, ILLINOIS

INSTRUMENTATION INSTALLED NEAR 1995 FAILURE AREA

JOB NO.
01.0170142.30

FIGURE NO.
9

GZA Drawing Name: J:\GZA_USAF\01.0170142.30 Ash Imp. Round 10\01.0170142.30 Task 7 - Baldwin\Drawings\Autocad\Scanned Figures.dwg Last Modified: Nov 11, 2011 - 10:15am Plotted on: Nov 11, 2011 - 10:16am by justin.hegarty

SOURCE: DIGITAL ORTHOPHOTO/AERIAL IMAGERY PRODUCED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE (USDA) AND RETRIEVED THROUGH USE OF A PROFESSIONAL LICENSE OF THE GOOGLE EARTH MAPPING PROGRAM.
DATA ACCESSED JUNE 2011

N
W E
S

500 250 0 500 Feet

APPROXIMATE LOCATION OF DISCHARGE PIPE

28

SECONDARY POND

APPROXIMATE LOCATION OF 36" DISCHARGE PIPE FROM SECONDARY FLY ASH POND

27

25

26

31

24

23

22

APPROXIMATE LOCATIONS OF 18" DIAMETER DECANT PIPES (6)

INTERMEDIATE POND

FINAL POND

SECONDARY DIKE

Co rvation Rd

LEGEND

APPROXIMATE IMPOUNDMENT BOUNDARY

12 GZA PHOTO LOCATION / DIRECTION

GZA GeoEnvironmental, Inc.
20900 Swenson Drive, Suite 150
Waukesha, Wisconsin 53186
Phone: (262) 754-2560 Fax: (262) 754-9711

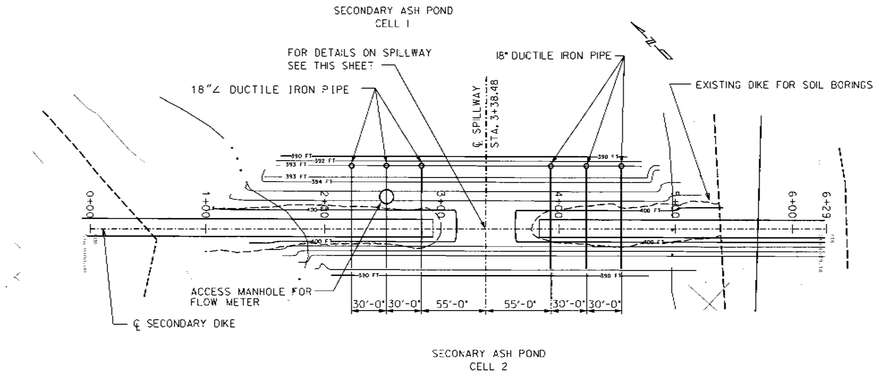
BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD
BALDWIN, ILLINOIS

SECONDARY POND IMPOUNDMENT

PROJ. MGR.: DPS
DESIGNED BY: DPS
REVIEWED BY: PJH
OPERATOR: CLK

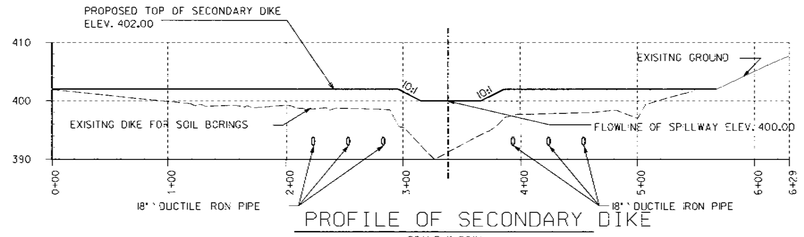
DWG. Date: 11-14-2011
Job NO.: 01.0170142.30

FIGURE NO.: 10



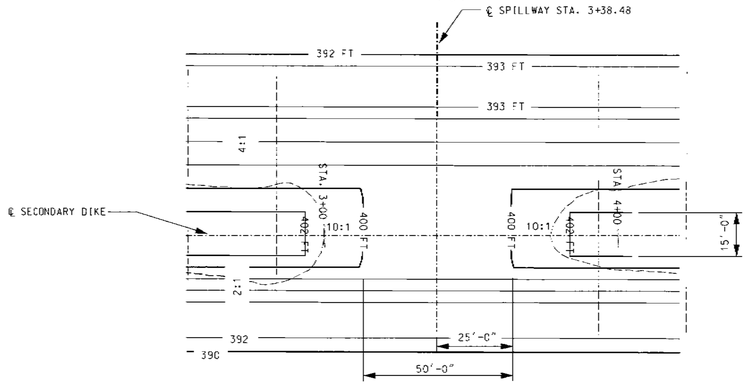
PLAN OF SECONDARY DIKE

SCALE: 1"=50'



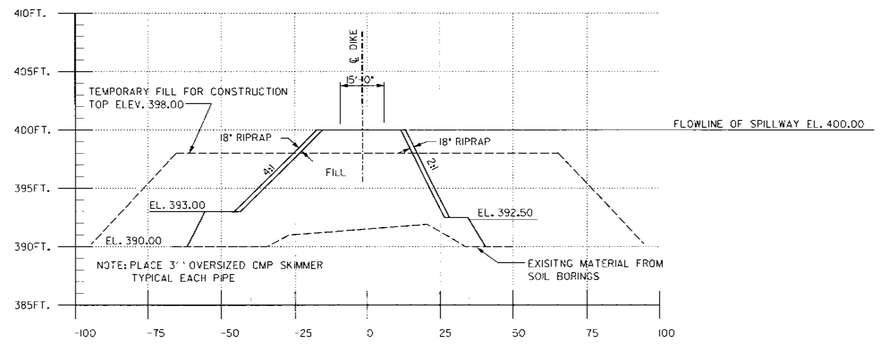
PROFILE OF SECONDARY DIKE

SCALE: 1"=50'H
1"=5'V



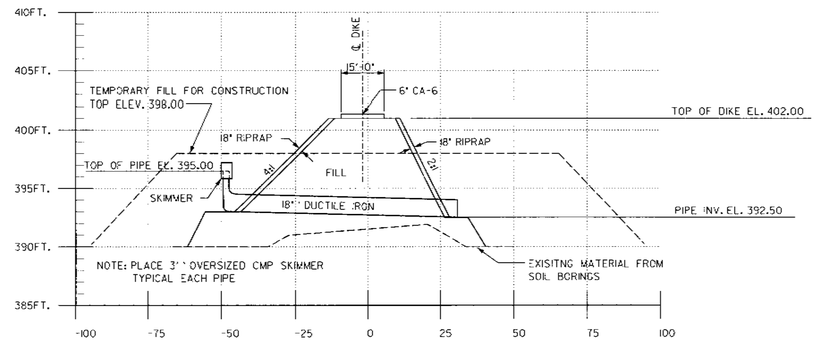
DETAIL OF SECONDARY DIKE SPILLWAY

SCALE: 1"=20'



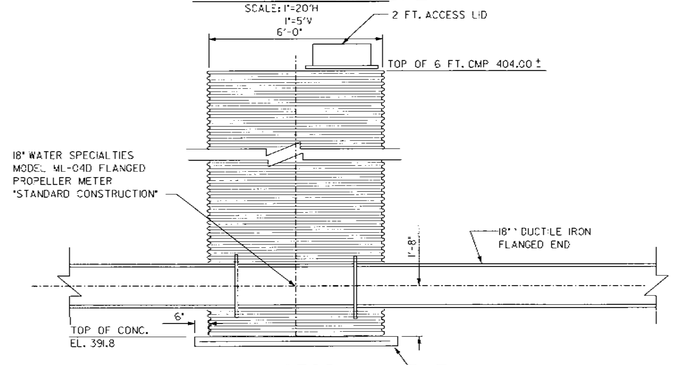
TYPICAL SECTION THRU DIKE AT SPILLWAY

SCALE: 1"=50'



TYPICAL SECTION THRU DIKE AT DISCHARGE PIPE

SCALE: 1"=20'H
1"=5'V



DETAIL OF ACCESS MANHOLE FOR FLOWMETER

NOT TO SCALE

E-BALI-C51

REVISION STATUS: □ -CONSTRUCTION ○ -RECORD														
NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A

NOTES

REFERENCES

ILLINOIS POWER COMPANY
DECATUR

DETAILS FOR
SECONDARY STORM WATER DIKE
BALDWIN POWER STATION

DR RKF	CAD RKF	DATE 11-4-96
DK	CKD	SCALE AS NOTED
APP DDO	PLOTTED 11-4-96	E-BALI-C51
APP		

COMPUTER ENG. - DO NOT REVISE MANUALLY

PC026693.DGN

NO.	DATE	BY	DESCRIPTION

0 25 50
APPROXIMATE SCALE IN FEET

GZA GeoEnvironmental, Inc.
20900 Swenson Drive ■ Waukesha, Wisconsin 53186
(262) 754-4100 ■ Fax (262) 754-4177
www.gza.com

PROJ MGR: DPS
DESIGNED BY: DPS
REVIEWED BY: PJH
OPERATOR: CLK
DATE: 11-14-2011

BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD
BALDWIN, ILLINOIS

TYPICAL SECTIONS
THROUGH SECONDARY DIKE

JOB NO.
01.0170142.30

FIGURE NO.
11

GZA Drawing Name: J:\GZA_LGM\01.0170142.30 Ash Imp. Round 1\01.0170142.30 Task 7 - Baldwin\Drawings\Autocad\Licensed Figures.dwg Last Modified: Nov 14, 2011 - 10:15am Plotted on: Nov 14, 2011 - 10:15am by justin.kapply

SOURCE: DIGITAL ORTHOPHOTO/AERIAL IMAGERY PRODUCED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE (USDA) AND RETRIEVED THROUGH USE OF A PROFESSIONAL LICENSE OF THE GOOGLE EARTH MAPPING PROGRAM.
DATA ACCESSED JUNE 2011

N
W E
S

200 100 0 200 Feet

SECONDARY POND

ASH POND DIKE

APPROXIMATE LOCATIONS OF 18" DIAMETER DECANT PIPES (6)

INTERMEDIATE POND

TREES OBSERVED ON SLOPE

DECANT STRUCTURE

FINAL POND

SECONDARY DIKE

DECANT STRUCTURE

APPROXIMATE DESIGNED LOCATION OF DISCHARGE PIPE

TREES OBSERVED ON SLOPE

POTHOLES OBSERVED ON CREST ACCESS ROAD

SETTLEMENT POND PIKE

TREES OBSERVED ON SLOPE

LEGEND

APPROXIMATE IMPOUNDMENT BOUNDARY

12 GZA PHOTO LOCATION / DIRECTION

GZA GeoEnvironmental, Inc.
20900 Swenson Drive, Suite 150
Waukesha, Wisconsin 53186
Phone: (262) 754-2560 Fax: (262) 754-9711

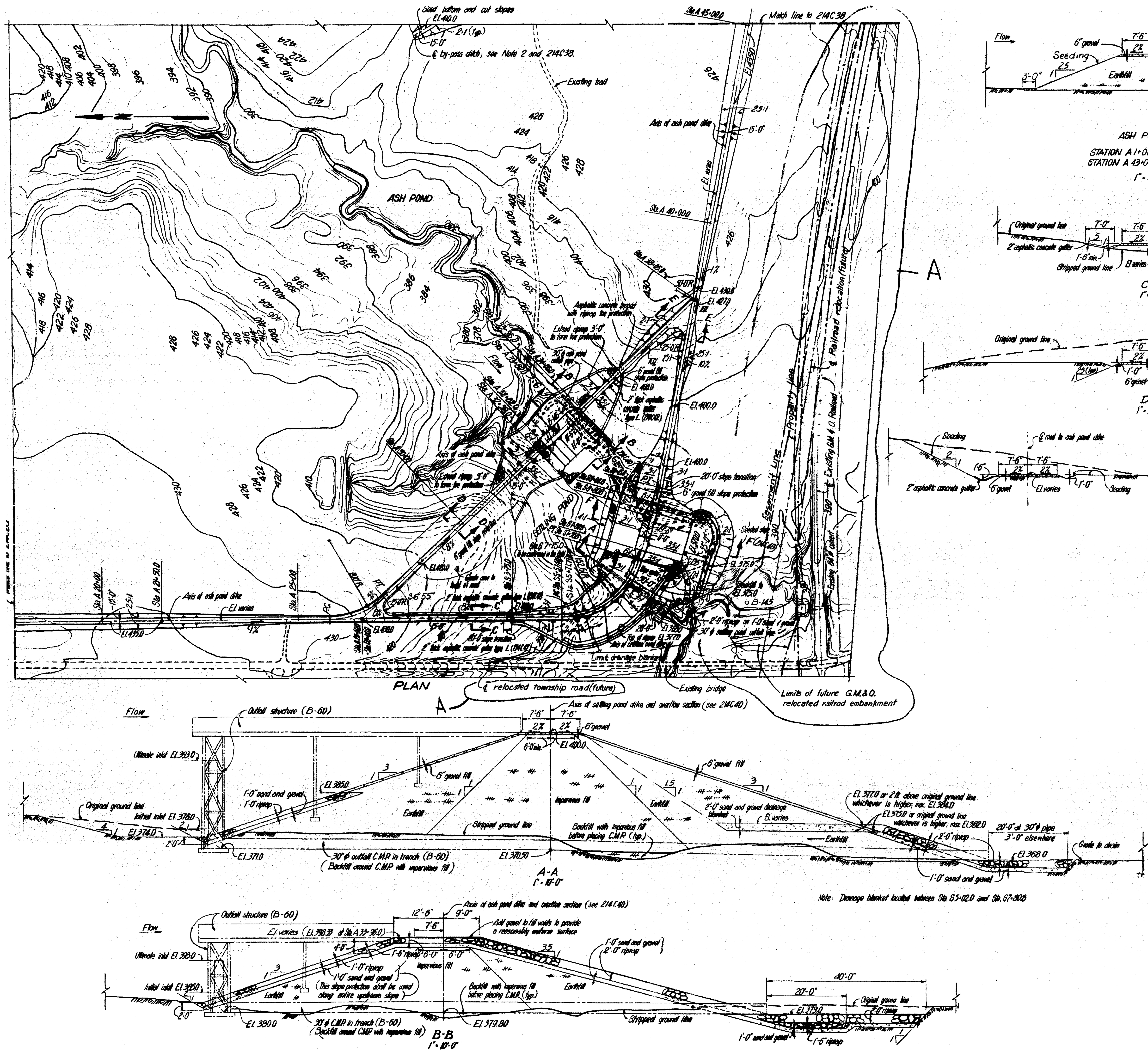
BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD
BALDWIN, ILLINOIS

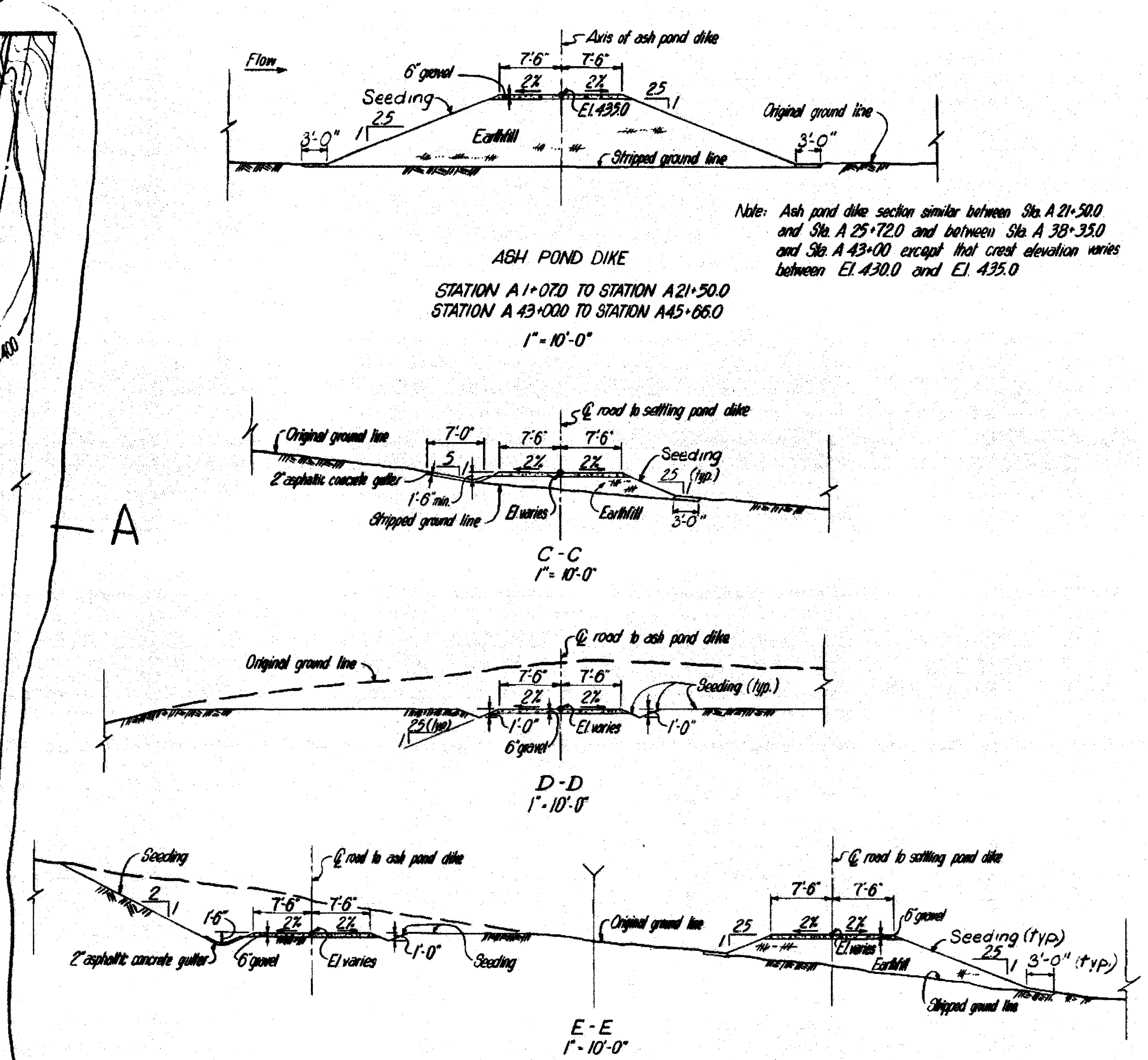
INTERMEDIATE & FINAL POND IMPOUNDMENTS

PROJ. MGR.: DPS
DESIGNED BY: DPS
REVIEWED BY: PJH
OPERATOR: CLK

DWG. Date: 11-14-2011
Job NO.: 01.0170142.30

FIGURE NO.: 12





NOTES:

1. Work this drawing with
   - 214C13 Dam and Dike Alignment
   - 214C21 Boring Logs - Sheet 7
   - 214C28 West Dike - Sheet 3
   - 214C38 Ash Pond Dike - Sheet 2
   - 214C40 Ash Pond Dike - Sheet 4
   - B-60 Ash Pond Outfall Structures

2. The dimensions of the by-pass ditch are minimum. The contractor may widen the ditch or flatten the slopes if the additional material excavated is used to construct the dikes.

0 50' 100' 200'
APPROXIMATE SCALE IN FEET

GZA GeoEnvironmental, Inc.

PROJ MGR: DPS
DESIGNED BY: DPS
REVIEWED BY: PJH
OPERATOR: CLK
DATE: 11-11-2011

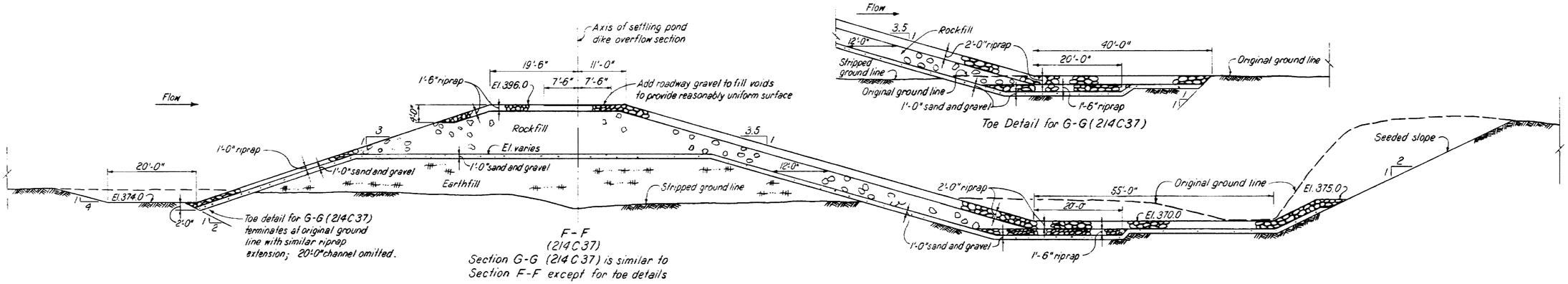
REV. NO. | DESCRIPTION | BY | DATE

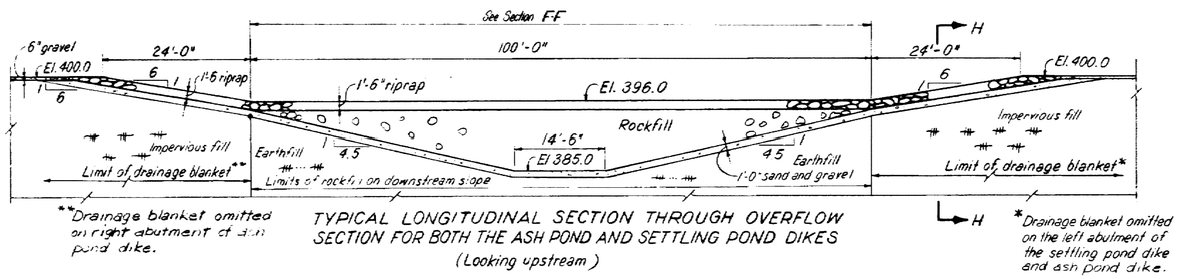
BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD
BALDWIN, ILLINOIS

PLAN AND SECTIONS OF ASH POND AND SETTLING POND DIKE

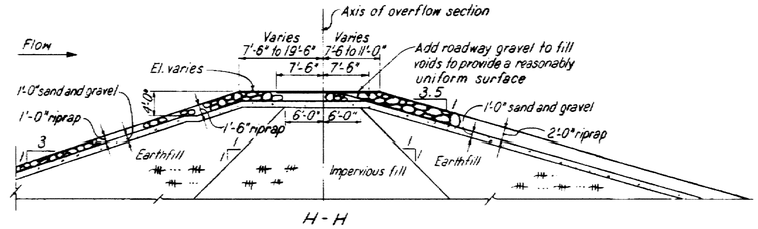
JOB NO. 01.0170142.30

FIGURE NO. 13





TYPICAL LONGITUDINAL SECTION THROUGH OVERFLOW SECTION FOR BOTH THE ASH POND AND SETTLING POND DIKES
(Looking upstream)



NOTES:
1. Work this drawing with 214.37 Ash Pond Dike - Sheet 1

NO.	DESCRIPTION	BY	DATE

APPROXIMATE SCALE IN FEET
0 5' 10' 20'

GZA GeoEnvironmental, Inc.
Engineers and Scientists
Brookfield, Wisconsin 53186
Phone (262) 754-2600 ■ Fax (262) 754-9711
www.gza.com

PROJ MGR: DPS
DESIGNED BY: DPS
REVIEWED BY: PJH
OPERATOR: CLK
DATE: 11-11-2011

BALDWIN ENERGY COMPLEX
10901 BALDWIN ROAD
BALDWIN, ILLINOIS

OVERFLOW SECTIONS FOR ASH POND DIKE AND SETTLING POND DIKE

JOB NO.
01.0170142.30

FIGURE NO.
14

GZA Drawing Name: J:\GZA_CAD\#\01.0170142.30 Ash Imp. Round 10\01.0170142.30 Task 7 - Baldwin\Drawings\Autocad\Scanned Figures.dwg Last Modified: Nov 11, 2011 - 10:17am Plotted on: Nov 11, 2011 - 10:23am by justin.hagerty

APPENDIX A

LIMITATIONS

DAM ENGINEERING & VISUAL INSPECTION LIMITATIONS

1. The observations described in this report were made under the conditions stated herein. The conclusions presented in the report were based solely on the services described therein, and not on scientific tasks or procedures beyond the scope of described services.

2. In preparing this report, GZA GeoEnvironmental, Inc. (GZA) has relied on certain information provided by Alliant Energy (and their affiliates) as well as Federal, state, and local officials and other parties referenced therein. GZA has also relied on other parties which were available to GZA at the time of the inspection. Although there may have been some degree of overlap in the information provided by these various sources, GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this work.

3. In reviewing this Report, it should be noted that the reported condition of the dam is based on observations of field conditions during the course of this study along with data made available to GZA. The observations of conditions at the dam reflect only the situation present at the specific moment in time the observations were made, under the specific conditions present. It may be necessary to reevaluate the recommendations of this report when subsequent phases of evaluation or repair and improvement provide more data.

4. It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions may be detected.

5. Water level readings have been reviewed and interpretations have been made in the text of this report. Fluctuations in the level of the groundwater and surface water may occur due to variations in rainfall, temperature, and other factors different than at the time measurements were made.

6. GZA's comments on the hydrology, hydraulics, and embankment stability for the dam are based on a limited review of available design documentation available from Alliant Energy and the Wisconsin Department of Natural Resources. Calculations and computer modeling used in these analyses were not available and were not independently reviewed by GZA.

7. This report has been prepared for the exclusive use of US EPA for specific application to the existing dam facilities, in accordance with generally accepted dam engineering practices. No other warranty, express or implied, is made.

8. This dam inspection verification report has been prepared for this project by GZA. This report is for broad evaluation and management purposes only and is not sufficient, in and of itself, to prepare construction documents or an accurate bid.

APPENDIX B

DEFINITIONS

COMMON DAM SAFETY DEFINITIONS

For a comprehensive list of dam engineering terminology and definitions refer to references published by the U.S. Army Corps of Engineers, the Federal Energy Regulatory Commission, the Department of the Interior Bureau of Reclamation, or the Federal Emergency Management Agency.

Orientation

Upstream – Shall mean the side of the dam that borders the impoundment.

Downstream – Shall mean the high side of the dam, the side opposite the upstream side.

Right – Shall mean the area to the right when looking in the downstream direction.

Left – Shall mean the area to the left when looking in the downstream direction.

Dam Components

Dam – Shall mean any artificial barrier, including appurtenant works, which impounds or diverts water.

Embankment – Shall mean the fill material, usually earth or rock, placed with sloping sides, such that it forms a permanent barrier that impounds water.

Crest – Shall mean the top of the dam, usually provides a road or path across the dam.

Abutment – Shall mean that part of a valley side against which a dam is constructed. An artificial abutment is sometimes constructed as a concrete gravity section, to take the thrust of an arch dam where there is no suitable natural abutment.

Appurtenant Works – Shall mean structures, either in dams or separate there from, including but not be limited to, spillways; reservoirs and their rims; low level outlet works; and water conduits including tunnels, pipelines, or penstocks, either through the dams or their abutments.

Spillway – Shall mean a structure over or through which water flows are discharged. If the flow is controlled by gates or boards, it is a controlled spillway; if the fixed elevation of the spillway crest controls the level of the impoundment, it is an uncontrolled spillway.

General

EAP – Emergency Action Plan - Shall mean a predetermined plan of action to be taken to reduce the potential for property damage and/or loss of life in an area affected by an impending dam break.

O&M Manual – Operations and Maintenance Manual; Document identifying routine maintenance and operational procedures under normal and storm conditions.

Normal Pool – Shall mean the elevation of the impoundment during normal operating conditions.

Acre-foot – Shall mean a unit of volumetric measure that would cover one acre to a depth of one foot. It is equal to 43,560 cubic feet. One million U.S. gallons = 3.068 acre feet.

Height of Dam – Shall mean the vertical distance from the lowest portion of the natural ground, including any stream channel, along the downstream toe of the dam to the crest of the dam.

Spillway Design Flood (SDF) – Shall mean the flood used in the design of a dam and its appurtenant works particularly for sizing the spillway and outlet works, and for determining maximum temporary storage and height of dam requirements.

Condition Rating

SATISFACTORY - 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.

FAIR - Acceptable performance is expected under all required loading conditions (static, hydrologic, seismic) in accordance with the applicable safety regulatory criteria. Minor deficiencies may exist that require remedial action and/or secondary studies or investigations.

POOR - A management unit safety deficiency is recognized for any required loading condition (static, hydrologic, seismic) in accordance with the applicable dam safety regulatory criteria. Remedial action is necessary. POOR also applies when further critical studies or investigations are needed to identify any potential dam safety deficiencies.

UNSATISFACTORY - Considered unsafe. A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution. Reservoir restrictions may be necessary.

Hazard Potential

(In the event the impoundment should fail, the following would occur):

LESS THAN LOW HAZARD POTENTIAL: Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

LOW HAZARD POTENTIAL: Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

SIGNIFICANT HAZARD POTENTIAL: Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

HIGH HAZARD POTENTIAL: Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

APPENDIX C

INSPECTION CHECKLISTS

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Baldwin Energy Complex	Date:	5/25/11
Unit Name:	Primary Ash Pond	Operator's Name:	Dynergy Midwest Generation, Inc
Unit I.D.:		Hazard Potential Classification:	High Significant Low

Inspector's Name: Patrick J. Harrison, P.E. and Doug P. Simon, P.E.

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Weekly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	447.5		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	447.5		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	453.5		Is water entering inlet, but not exiting outlet?		✓
5. Lowest dam crest elevation (operator records)?	455.0		Is water exiting outlet, but not entering inlet?		✓
6. If instrumentation is present, are readings recorded (operator records)?	✓		Is water exiting outlet flowing clear?	✓	
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	✓		From underdrain?		✓
9. Trees growing on embankment? (If so, indicate largest diameter below)	✓		At isolated points on embankment slopes?		✓
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?		✓
12. Are decant trashracks clear and in place?		✓	From downstream foundation area?		✓
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?		✓	Around the outside of the decant pipe?		✓
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?		✓	23. Water against downstream toe?		✓
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

9. Largest tree diameter noted was approximately 16 inches.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # Not Provided INSPECTOR Patrick J. Harrison, P.E.
Doug P. Simon, P.E.
Date May 25, 2011

Impoundment Name Primary Ash Pond
Impoundment Company Dynergy Midwest Generation, Inc.
EPA Region Region V
State Agency (Field Office) Addresss Illinois Department of Natural Resources
Springfield, Illinois
Name of Impoundment Primary Ash Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?	_____	X
Is water or ccw currently being pumped into the impoundment?	_____	X

IMPOUNDMENT FUNCTION: Settlement and Impoundment of Ash

Nearest Downstream Town : Name Evansville
Distance from the impoundment Approximately 7.5 miles
Impoundment Location: Longitude 89 Degrees 52 Minutes 05 Seconds
Latitude 38 Degrees 11 Minutes 33 Seconds
State Illinois County Randolph

Does a state agency regulate this impoundment? YES X NO _____

If So Which State Agency? The Illinois Department of Natural Resources regulates the discharge of water (NPDES Permit).

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

_____ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

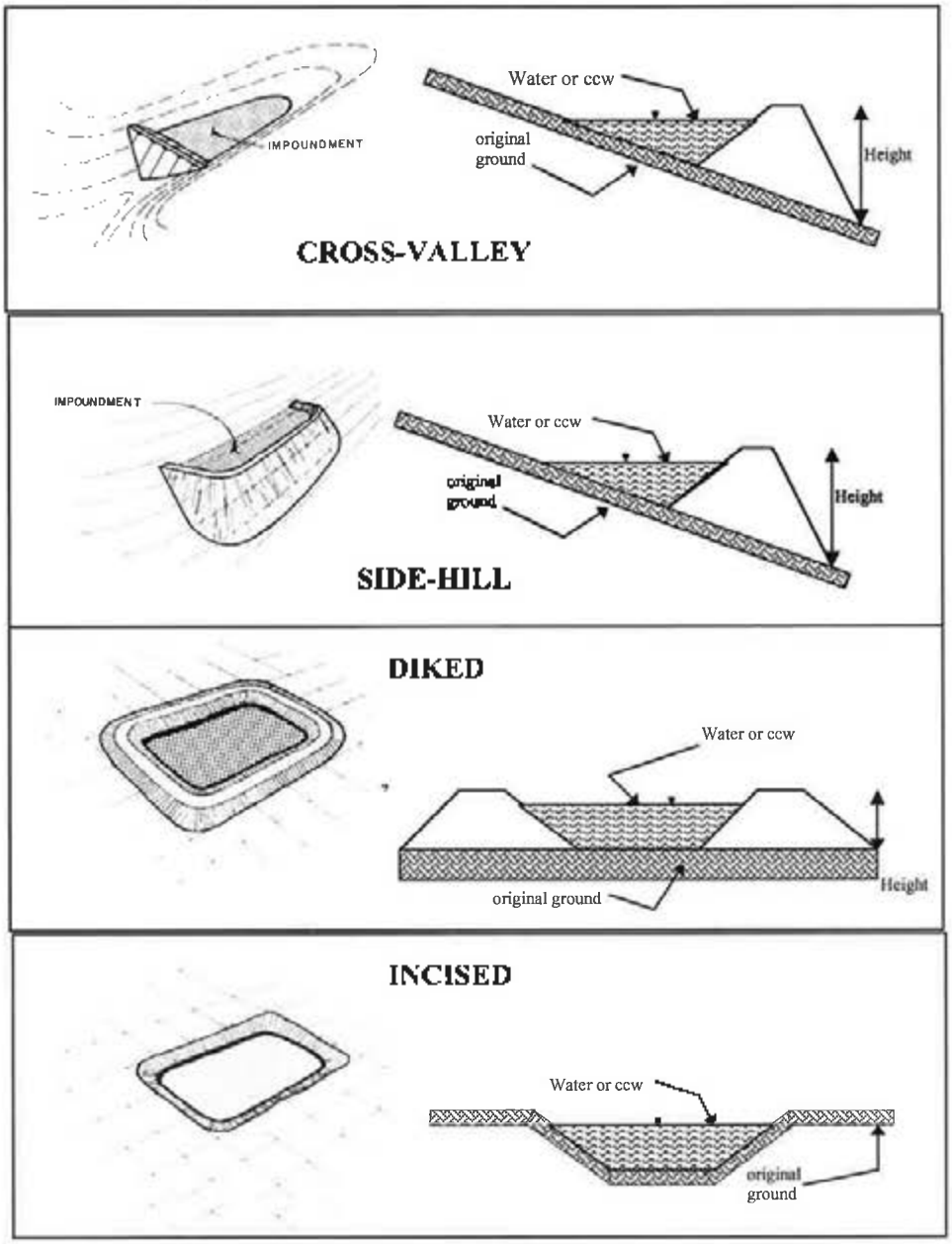
__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Failure of the dam would not result in probable loss of life but could result in economic and environmental damages to areas outside of the owners property.

CONFIGURATION:



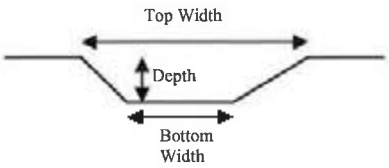
_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height __55__ feet Embankment Material __Impervious Fill__
Pool Area __5__ acres Liner __No liner present__
Current Freeboard __4__ feet Liner Permeability __NA__

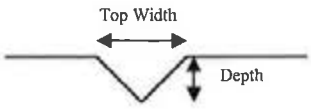
TYPE OF OUTLET (Mark all that apply)

X **Open Channel Spillway**
____ Trapezoidal
____ Triangular
____ Rectangular
____ Irregular

TRAPEZOIDAL

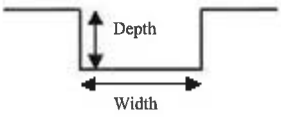


TRIANGULAR

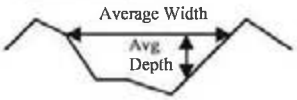


1.5 ft depth
175 ft bottom (or average) width
200 ft top width

RECTANGULAR

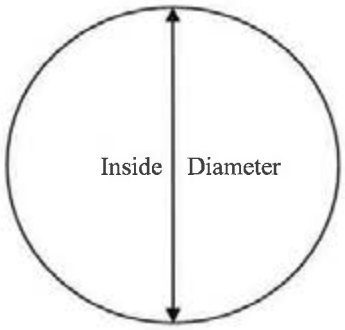


IRREGULAR



X **Outlet**

16 inside diameter
Varies: See Below.



Material
___ corrugated metal
_X_ welded steel (There are 3 outlet pipes)
____ concrete
____ plastic (hdpe, pvc, etc.)
____ other (specify) _____

Is water flowing through the outlet? YES X NO _____

____ **No Outlet**

___ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By Sargent & Lundy

Has there ever been a failure at this site? YES X NO _____

If So When? February 1995

If So Please Describe :

The executive summary of a failure analysis completed by Woodward-Clyde Consultants, describes the failure as follows:

"The slide occurred in February 1995 on the ash pond south dike over a distance of about 500 lineal feet at a location where the dike is the tallest (55 ft) and crossed a former creek. The dike was constructed in two phases; a 35 ft high compacted clay dike built in 1969, and a 20 ft high "raise" constructed in 1989 on the upstream slope of the older dike. The 1989 raise consists of two materials: 1) bottom ash placed underwater extending to the crest of the older dike, and 2)compacted clay above the bottom ash extending to the current crest. A former haul road consisting of lime treated bottom ash and gravel existing as the crest of the old dike and is hydraulically connected to the bottom ash fill. Both clay dikes were well compacted; the bottom ash is very loose due to underwater placement....The overall slide consists of two portions: shallow and deep."

The elevation of the failed portion of the embankment was lowered to elevation 434 feet and an intermediate dike built to relieve pressure. Construction of the intermediate dike separated the secondary fly ash pond from the primary ash impoundment.

Has there ever been significant seepages at this site? YES _____ NO __X__

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO N/A

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Baldwin Energy Complex	Date:	5/24/11
Unit Name:	Secondary Pond	Operator's Name:	Dynergy Midwest Generation, Inc
Unit I.D.:		Hazard Potential Classification:	High Significant Low ✓
Inspector's Name:	Patrick J. Harrison, P.E. and Doug P. Simon, P.E.		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Weekly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	396.1		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	395.0		20. Decant Pipes: See Note Below		
4. Open channel spillway elevation (operator records)?	400.0		Is water entering inlet, but not exiting outlet?		
5. Lowest dam crest elevation (operator records)?	402.0		Is water exiting outlet, but not entering inlet?		
6. If instrumentation is present, are readings recorded (operator records)?		✓	Is water exiting outlet flowing clear?		
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	✓		From underdrain?		✓
9. Trees growing on embankment? (If so, indicate largest diameter below)	✓		At isolated points on embankment slopes?		✓
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?		✓
12. Are decant trashracks clear and in place?		✓	From downstream foundation area?		✓
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?		✓	Around the outside of the decant pipe?		✓
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked? See Note Below			23. Water against downstream toe?	✓	
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

9. Largest tree diameter noted was approximately 3 inches.

16/20. Outlet not accessible due to location under downstream pond elevation.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # Not Provided

INSPECTOR Patrick J. Harrison, P.E.
Doug P. Simon, P.E.

Date May 24, 2011

Impoundment Name Secondary Pond
Impoundment Company Dynergy Midwest Generation, Inc.
EPA Region Region V
State Agency (Field Office) Addresss Illinois Department of Natural Resources
Springfield, Illinois
Name of Impoundment Secondary Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?	_____	X
Is water or ccw currently being pumped into the impoundment?	_____	X

IMPOUNDMENT FUNCTION: Clarification of water prior to discharge.

Nearest Downstream Town : Name Evansville
Distance from the impoundment Approximately 7.5 miles
Impoundment
Location: Longitude 89 Degrees 52 Minutes 33 Seconds
Latitude 38 Degrees 11 Minutes 32 Seconds
State Illinois County Randolph

Does a state agency regulate this impoundment? YES X NO _____

If So Which State Agency? The Illinois Department of Natural Resources regulates the discharge of water (NPDES Permit).

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

__X__ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

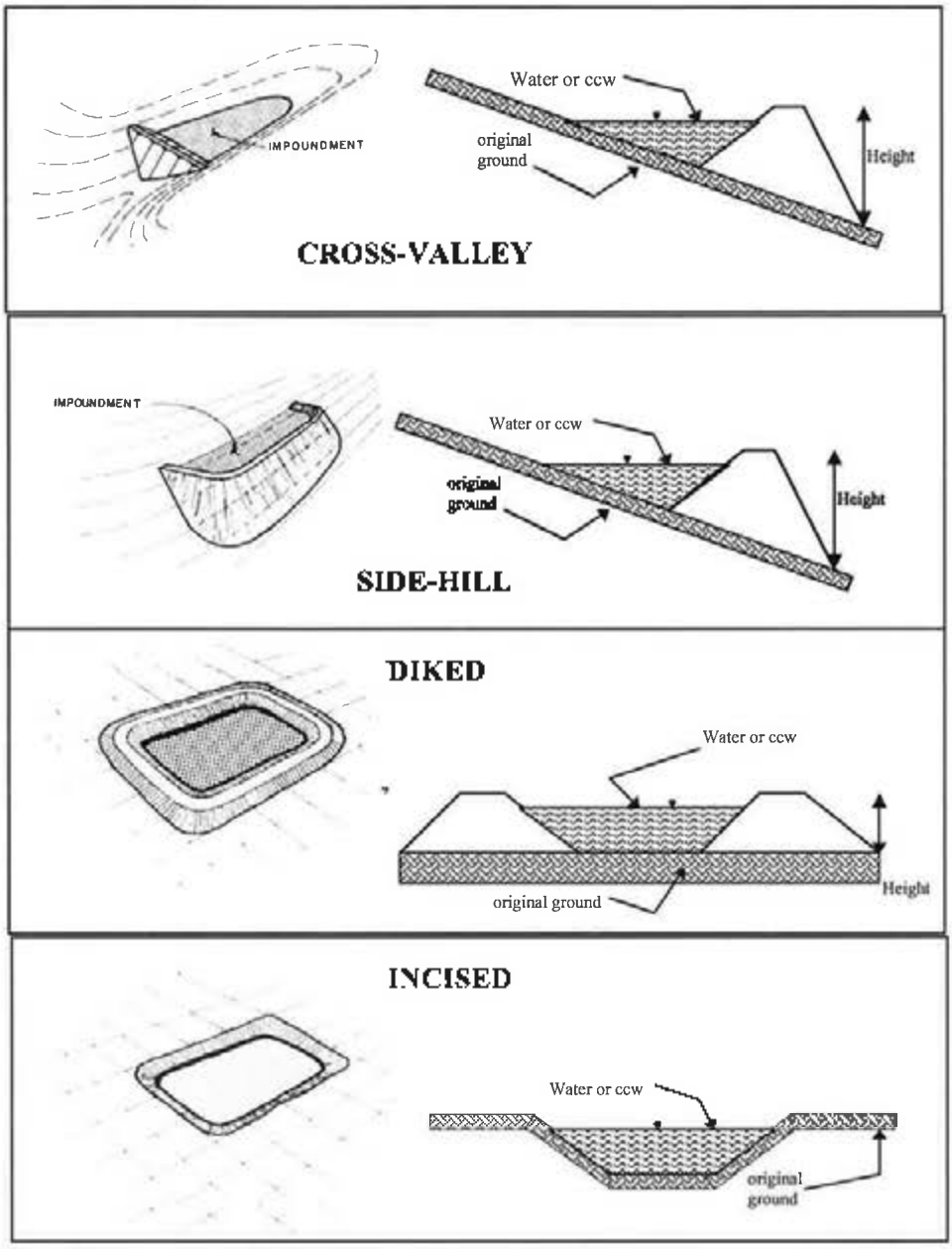
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Failure of the dam would not result in probable loss of life and economic and environmental damages would be principally limited to the owner's property.

CONFIGURATION:



_____ Cross-Valley
_____ Side-Hill
_____ Diked
Incised (form completion optional)
_X_ Combination Incised/Diked

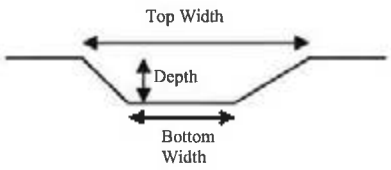
Embankment Height 10 feet
Pool Area 18.5 acres
Current Freeboard 3.9 feet

Embankment Material Unknown
Liner No liner present
Liner Permeability Unknown

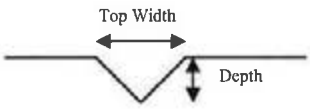
TYPE OF OUTLET (Mark all that apply)

__X__ **Open Channel Spillway**
__X__ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

TRAPEZOIDAL

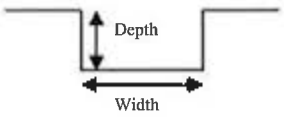


TRIANGULAR

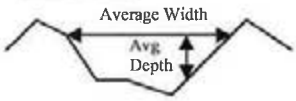


__2 ft__ depth
__50 ft__ bottom (or average) width
__100 ft__top width

RECTANGULAR

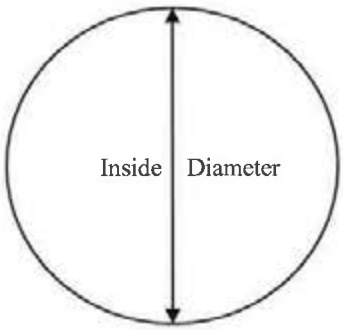


IRREGULAR



__X__ **Outlet**

__18__ inside diameter
Varies: See Below.



Material
_____ corrugated metal
__X__ welded steel (There are 6 outlet pipes)
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

Is water flowing through the outlet? YES _____ NO _____

_____ **No Outlet** The outlet structure was not accessible due to its location below the downstream pond elevation.

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By Illinois Power Company

Has there ever been a failure at this site? YES _____ NO ___X_____

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO __X____

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO N/A

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Baldwin Energy Complex	Date:	5/24/11
Unit Name:	Secondary Fly Ash Pond	Operator's Name:	Dynergy Midwest Generation, Inc
Unit I.D.:		Hazard Potential Classification:	High **Significant** ✓ Low

Inspector's Name: Patrick J. Harrison, P.E. and Doug P. Simon, P.E.

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Weekly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	430.0		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	430.0		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	NA		Is water entering inlet, but not exiting outlet?		✓
5. Lowest dam crest elevation (operator records)?	434.0		Is water exiting outlet, but not entering inlet?		✓
6. If instrumentation is present, are readings recorded (operator records)?	✓		Is water exiting outlet flowing clear?	✓	
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	✓		From underdrain?		✓
9. Trees growing on embankment? (If so, indicate largest diameter below)	✓		At isolated points on embankment slopes?		✓
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?		✓
12. Are decant trashracks clear and in place?		✓	From downstream foundation area?		✓
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, grain or diversion ditches?		✓	Around the outside of the decant pipe?		✓
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?		✓	23. Water against downstream toe?		✓
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue #	Comments
4.	There was no open channel spillway present.
9.	Largest tree diameter noted was approximately 16 inches.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # Not Provided

INSPECTOR Patrick J. Harrison, P.E.
Doug P. Simon, P.E.

Date May 24, 2011

Impoundment Name Secondary Fly Ash Pond
Impoundment Company Dynergy Midwest Generation, Inc.
EPA Region Region V
State Agency (Field Office) Addresss Illinois Department of Natural Resources
Springfield, Illinois
Name of Impoundment Secondary Fly Ash Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?	_____	X
Is water or ccw currently being pumped into the impoundment?	_____	X

IMPOUNDMENT FUNCTION: Settlement and Impoundment of ash.

Nearest Downstream Town : Name Evansville
Distance from the impoundment Approximately 7.5 miles
Impoundment Location: Longitude 89 Degrees 52 Minutes 14 Seconds
Latitude 38 Degrees 11 Minutes 26 Seconds
State Illinois County Randolph

Does a state agency regulate this impoundment? YES X NO _____

If So Which State Agency? The Illinois Department of Natural Resources regulates the discharge of water (NPDES Permit).

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

_____ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

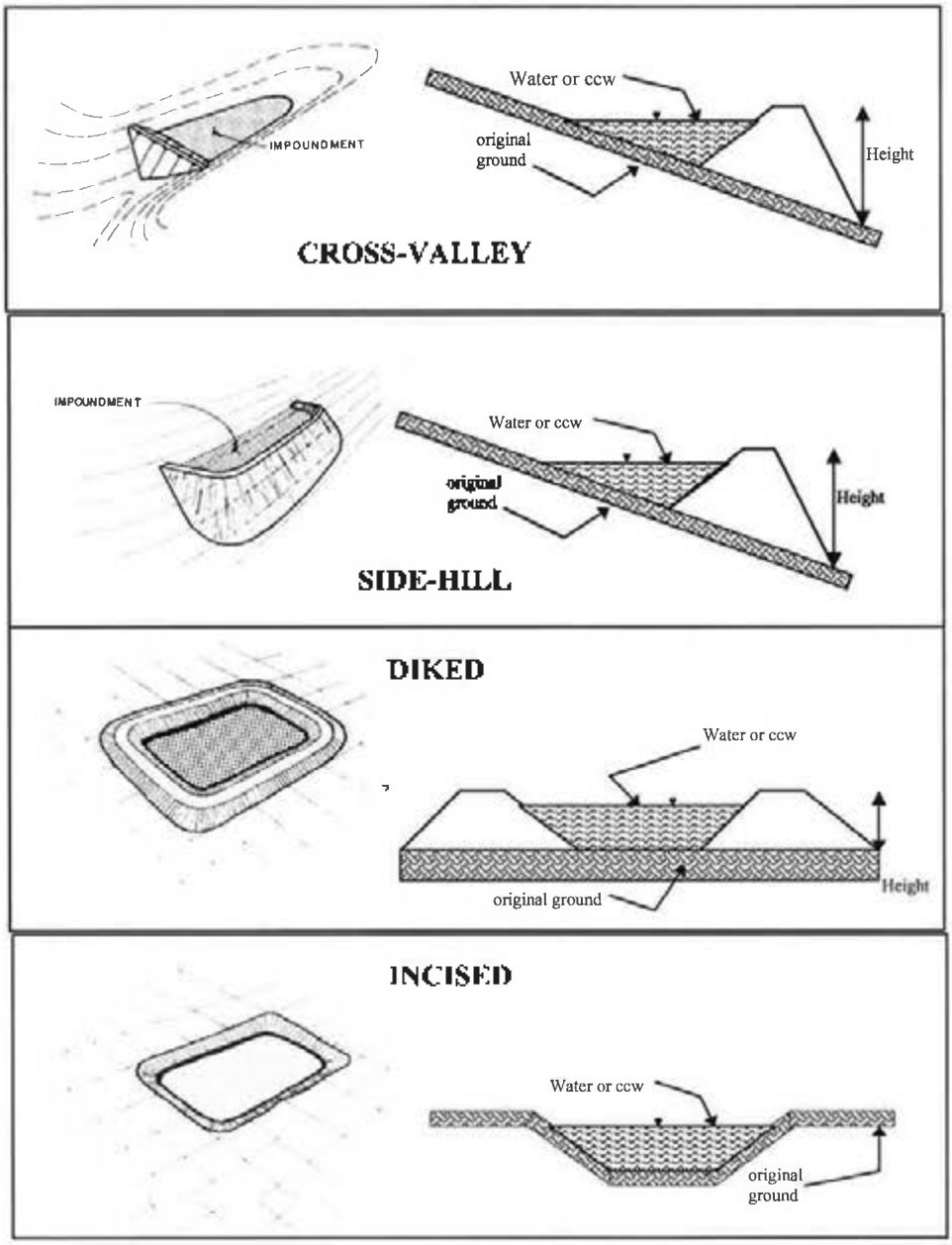
__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Failure of the dam would not result in probable loss of life but could result in economic and environmental damages to areas outside of the owners property.

CONFIGURATION:



Cross-Valley
_____ Side-Hill
_X_ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height _55_ feet
Pool Area _17.5_ acres
Current Freeboard _4_ feet

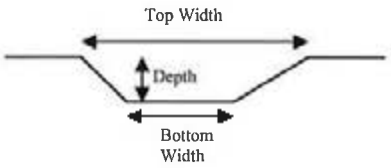
Embankment Material _Impervious Fill_
Liner _No liner present_
Liner Permeability _NA_

TYPE OF OUTLET (Mark all that apply)

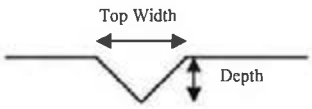
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

_____ depth
_____ bottom (or average) width
_____ top width
_____

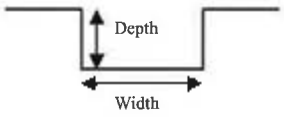
TRAPEZOIDAL



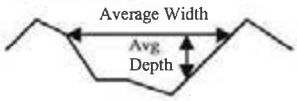
TRIANGULAR



RECTANGULAR

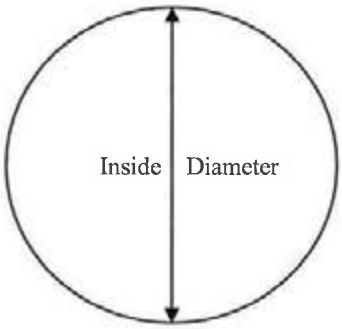


IRREGULAR



__X__ **Outlet**

__36__ inside diameter
Varies: See Below.



Material
_____ corrugated metal
_____ welded steel
__X__ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

_____

Is water flowing through the outlet? YES __X__ NO _____

_____ **No Outlet**

_____

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By __Sargent & Lundy__

_____

Has there ever been a failure at this site? YES X NO _____

If So When? February 1995

If So Please Describe : _____

The executive summary of a failure analysis completed by Woodward-Clyde Consultants, ~~describes the failure as follows:~~

~~"The slide occurred in February 1995 on the ash pond south dike over a distance~~ of about 500 lineal feet at a location where the dike is the tallest (55 ft) and crossed ~~a former~~ creek. The dike was constructed in two phases; a 35 ft high compacted clay dike built in 1969, and a 20 ft high "raise" constructed in 1989 on the upstream slope of the older dike. The 1989 raise consists of ~~two materials: 1) bottom ash placed underwater extending to the crest of the older~~ dike, and ~~2)compacted clay above the bottom ash extending to the current crest. A former~~ haul road ~~consisting of lime treated bottom ash and gravel existing as the crest of the old dike~~ and is hydraulically connected to the bottom ash fill. Both clay dikes were well compacted; the bottom ash is very loose due to underwater placement....The overall slide consists of two portions: shallow and deep."

~~The elevation of the failed portion of the embankment was lowered to elevation~~ 434 feet and an intermediate dike built to relieve pressure. Construction of the intermediate dike separated the secondary fly ash pond from the primary ash impoundment.

Has there ever been significant seepages at this site? YES _____ NO __X__

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO N/A

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Baldwin Energy Complex	Date:	5/24/11
Unit Name:	Intermediate Pond	Operator's Name:	Dynergy Midwest Generation, Inc
Unit I.D.:		Hazard Potential Classification:	High Significant Low ✓

Inspector's Name: Patrick J. Harrison, P.E. and Doug P. Simon, P.E.

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Weekly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	394.0		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	394.0		20. Decant Pipes: See Note Below		
4. Open channel spillway elevation (operator records)?	398.9		Is water entering inlet, but not exiting outlet?		
5. Lowest dam crest elevation (operator records)?	400.0		Is water exiting outlet, but not entering inlet?		
6. If instrumentation is present, are readings recorded (operator records)?		✓	Is water exiting outlet flowing clear?		
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below).		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?	✓		From underdrain?		✓
9. Trees growing on embankment? (If so, indicate largest diameter below)	✓		At isolated points on embankment slopes?		✓
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?	✓	
12. Are decant trashracks clear and in place?		✓	From downstream foundation area?		✓
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, grain or diversion ditches?		✓	Around the outside of the decant pipe?		✓
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?	See Note Below		23. Water against downstream toe?	✓	
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # _____ Comments

9. Largest tree diameter noted was approximately 3 inches.

16/20. Outlet not accessible due to dense vegetation.

21. Embankments reportedly designed as flow-through filtration structures. Based on visual estimates, 400 gallons per minute discharge through the embankment.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # Not Provided INSPECTOR Patrick J. Harrison, P.E.
Doug P. Simon, P.E.
Date May 24, 2011

Impoundment Name Intermediate Pond
Impoundment Company Dynergy Midwest Generation, Inc.
EPA Region Region V
State Agency (Field Office) Addresss Illinois Department of Natural Resources
Springfield, Illinois
Name of Impoundment Intermediate Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?	_____	X
Is water or ccw currently being pumped into the impoundment?	_____	X

IMPOUNDMENT FUNCTION: Clarification of water prior to discharge.

Nearest Downstream Town : Name Evansville
Distance from the impoundment Approximately 7.5 miles
Impoundment Location: Longitude 89 Degrees 52 Minutes 38 Seconds
Latitude 38 Degrees 11 Minutes 27 Seconds
State Illinois County Randolph

Does a state agency regulate this impoundment? YES X NO _____

If So Which State Agency? The Illinois Department of Natural Resources regulates the discharge of water (NPDES Permit).

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

__X__ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

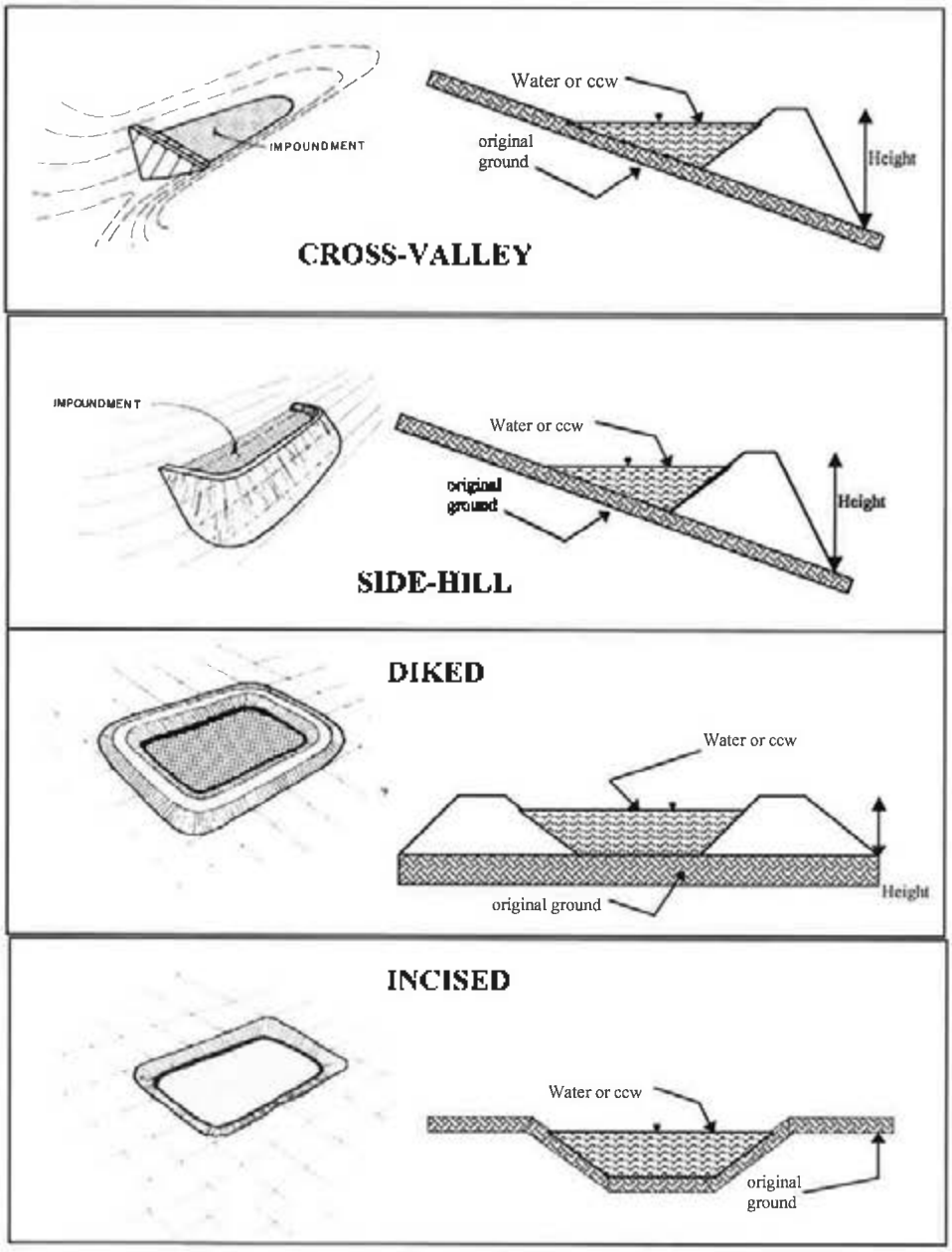
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Failure of the dam would not result in probable loss of life and economic and environmental damages would principally limited to the owner's property.

CONFIGURATION:



_____ Cross-Valley
_____ Side-Hill
_____ Diked
___ Incised (form completion optional)
_X_ Combination Incised/Diked

Embankment Height 19 feet
Pool Area 2 acres
Current Freeboard 1.7 feet

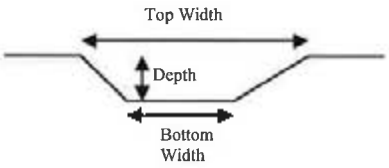
Embankment Material Unknown
Liner No liner present
Liner Permeability Unknown

TYPE OF OUTLET (Mark all that apply)

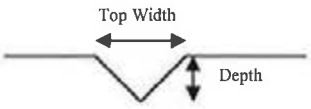
__X__ **Open Channel Spillway**
__X__ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

1.1 ft depth
75 ft bottom (or average) width
100 ft top width

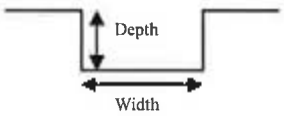
TRAPEZOIDAL



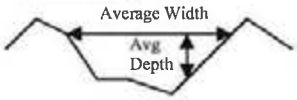
TRIANGULAR



RECTANGULAR

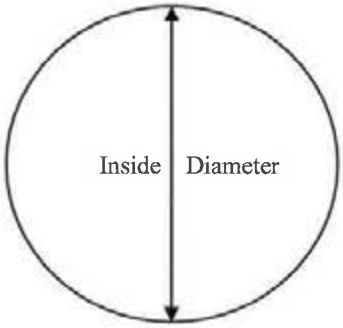


IRREGULAR



__X__ **Outlet**

30 inside diameter
Varies: See Below.



Material
__X__ corrugated metal
_____ welded steel
_____ concrete
___ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

Is water flowing through the outlet? YES _____ NO _____

The outlet structure was not accessible due to heavy vegetation.

_____ **No Outlet**

__X__ **Other Type of Outlet** (specify) The embankment is reportedly designed as a "flow-through" embankment and approximately 400 gpm was observed flowing through the embankment

The Impoundment was Designed By Sargent and Lundy

Has there ever been a failure at this site? YES _____ NO X

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES X NO _____

If So When? _____

IF So Please Describe: _____

The embankment is reportedly designed as a 'flow through' dam.

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO N/A

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Baldwin Energy Complex	Date:	5/24/11
Unit Name:	Final Pond	Operator's Name:	Dynergy Midwest Generation, Inc
Unit I.D.:		Hazard Potential Classification:	High Significant Low

Inspector's Name: Patrick J. Harrison, P.E. and Doug P. Simon, P.E.

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Weekly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	392.7		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	392.7		20. Decant Pipes. See Note Below		
4. Open channel spillway elevation (operator records)?	394.3		Is water entering inlet, but not exiting outlet?		
5. Lowest dam crest elevation (operator records)?	398.0		Is water exiting outlet, but not entering inlet?		
6. If instrumentation is present, are readings recorded (operator records)?		✓	Is water exiting outlet flowing clear?		
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?	✓		From underdrain?		✓
9. Trees growing on embankment? (If so, indicate largest diameter below)	✓		At isolated points on embankment slopes?		✓
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?	✓	
12. Are decant trashracks clear and in place?		✓	From downstream foundation area?		✓
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?		✓	Around the outside of the decant pipe?		✓
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked? See Note Below			23. Water against downstream toe?	✓	
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

9. Largest tree diameter noted was approximately 18 inches.

16/20. Outlet not accessible due to dense vegetation.

21. Embankments reportedly designed as flow-through filtration structures. Based on visual estimates, 400 to 800 gallons per minute discharge through the embankment.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # Not Provided

INSPECTOR Patrick J. Harrison, P.E.
Doug P. Simon, P.E.

Date May 24, 2011

Impoundment Name Final Pond
Impoundment Company Dynergy Midwest Generation, Inc.
EPA Region Region V
State Agency (Field Office) Addresss Illinois Department of Natural Resources
Springfield, Illinois
Name of Impoundment Final Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?	_____	X
Is water or ccw currently being pumped into the impoundment?	_____	X

IMPOUNDMENT FUNCTION: Clarification of water prior to discharge.

Nearest Downstream Town : Name Evansville
Distance from the impoundment Approximately 7.5 miles
Impoundment
Location: Longitude 89 Degrees 52 Minutes 41 Seconds
Latitude 38 Degrees 11 Minutes 25 Seconds
State Illinois County Randolph

Does a state agency regulate this impoundment? YES X NO _____

If So Which State Agency? The Illinois Department of Natural Resources regulates the discharge of water (NPDES Permit).

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

_____ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

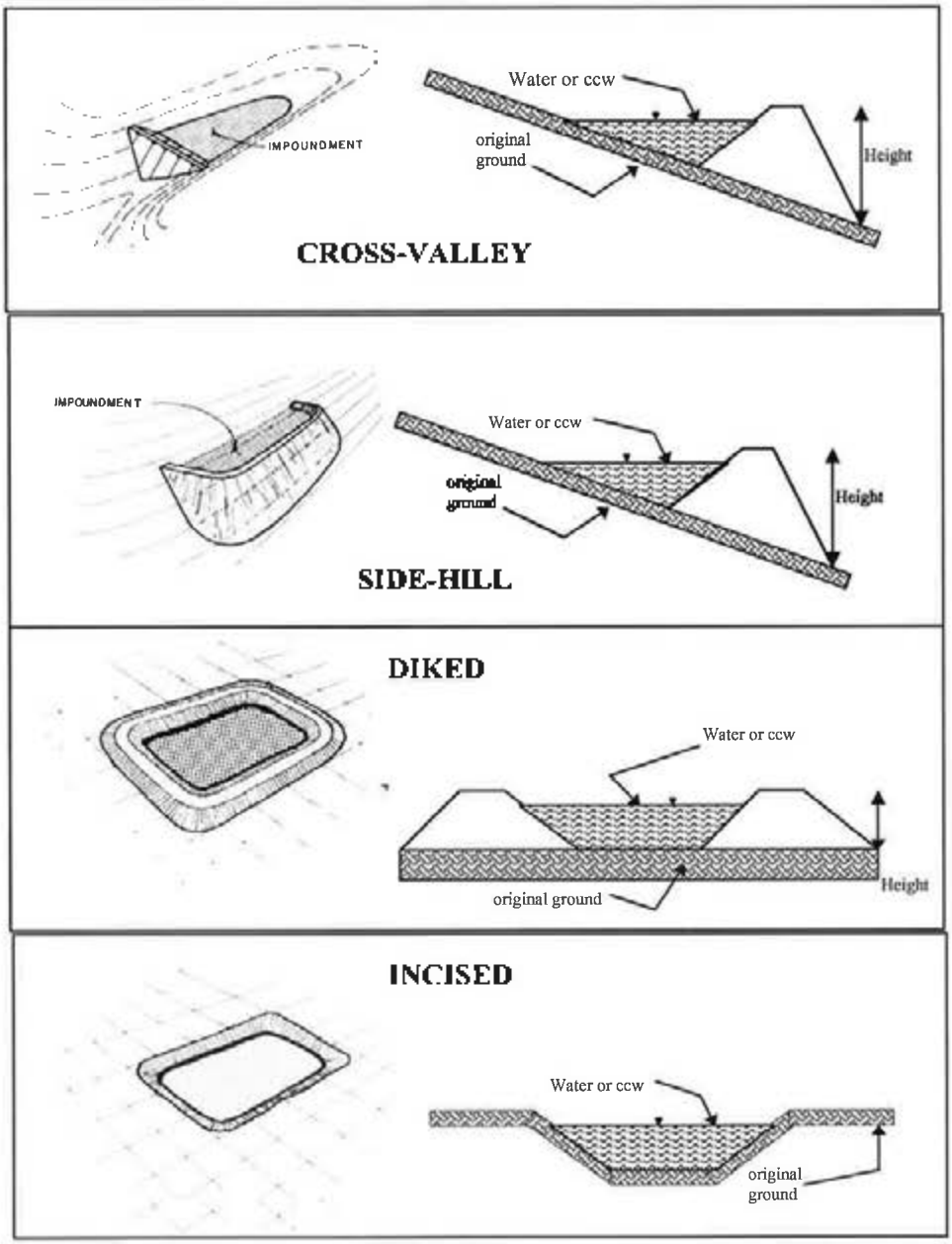
_X_ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Potential failure of the impoundment embankment could result in significant environmental impacts to areas outside of Utility owned property.

CONFIGURATION:



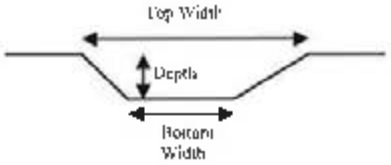
_____ Cross-Valley
_____ Side-Hill
_____ Diked
_____ Incised (form completion optional)
_X_ Combination Incised/Diked

Embankment Height 23 feet
Pool Area 2 acres
Current Freeboard 1.7 feet
Embankment Material Unknown
Liner No liner present
Liner Permeability Unknown

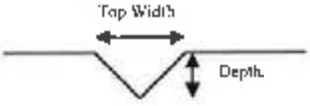
TYPE OF OUTLET (Mark all that apply)

__X__ **Open Channel Spillway**
__X__ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

TRAPEZOIDAL

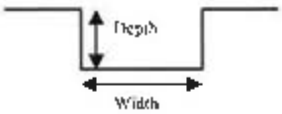


TRIANGULAR



4 ft depth
90 ft bottom (or average) width
130 ft top width

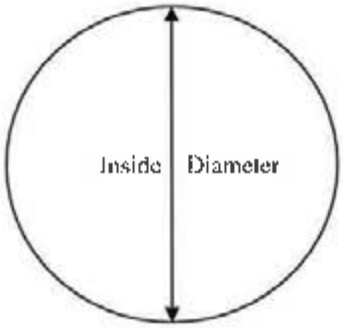
RECTANGULAR



IRREGULAR

__X__ **Outlet**

30 inside diameter
Varies: See Below.



Material
__X__ corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

Is water flowing through the outlet? YES _____ NO _____

The outlet structure was not accessible due to heavy vegetation.

_____ **No Outlet**

__X__ **Other Type of Outlet** (specify) The embankment is reportedly designed as a "flow-through" embankment and approximately 400 to 800 gpm were flowing through the embankment.

The Impoundment was Designed By Sargent & Lundy

Has there ever been a failure at this site? YES _____ NO X

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES ___X___ NO _____

If So When? _____

IF So Please Describe: _____

The embankment is reportedly designed as a 'flow through' dam.

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO N/A

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

APPENDIX D

PREVIOUS INSPECTION REPORTS

Dam Inspection Report

Name of Dam Baldwin Energy Complex Ash Ponds **Dam ID No.** N/A

Permit Number N/A **Class of Dam** N/A

Location **Section Township** **Range**

Owner Dynegy Midwest Generation — **Name**
618-785-2294 — **Telephone Number (Day)**

10901 Baldwin Rd — **Street**
618-785-2228 — **Telephone Number (Night)**

Baldwin, IL — **City**
62217 — **Zip Code**
County Randolph / St Clair

Type of Dam Homogeneous Earth Dams

Type of Spillway Drop Inlets

Date(s) Inspected February 20, 2009

Weather When Inspected Sunny

Temperature When Inspected 35 degrees F

Pool Elevation When Inspected

Tailwater Elevation When Inspected NA

Professional Engineer's Seal

Inspection Personnel:

Name	Title
Kenneth M Berry, P.E.	Sr Proj Engr (URS)
Phil L. Morris, P.E.	Environmental Professional

The Department of Natural Resources is requesting information that is necessary to accomplish the statutory purpose as outlined under the River, Lakes and Streams Act. 615 ILCS 5. Submittal of this information is REQUIRED. Failure to provide the required information could result in the initiation of non.-compliance procedures as outlined in Section 3702.160 of the "Rules for Construction and Maintenance of Dams.

CONDITION CODES

NE - No evidence of a problem

GC - Good condition

MM - Item needing minor maintenance and/or repairs within the year, the safety or integrity of the item is not yet imperiled

IM - Item needing immediate maintenance to restore or ensure its safety or integrity

EC - Emergency condition which if not immediately repaired or other appropriate measures taken could lead to failure of the dam

OB - Condition requires regular observation to ensure that the condition does not become worse

NA - Not applicable to this dam

NI - Not inspected -list the reason for non-inspection under deficiencies

---

Vegetation needs to be cut and periodic inspections are recommended.

EARTH EMBANKMENT

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Surface Cracks	NE	NA	
Vertical and Horizontal Alignment of Crest	GC	NA	
Unusual Movement or Cracking' At or Beyond Toe	NE	NA	
Sloughing or Erosion of Embankment and Abutment Slopes	OB/MM	NA	Erosion from pumping activities at SW corner of active secondary fly ash pond. Observe and make repairs if erosion worsens. Likewise, observe occasional erosion channels on south exterior embankment. Large stretches of exterior embankments contained thick and tall vegetation which limited vision.
Upstream Face Slope Protection	GC	NA	
Seepage	NE	NA	
Filter and Filter Drains	NE	NA	

EARTH EMBANKMENT
(Continued)

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Animal Damage	NE	NA	
Embankment Drainage Ditches	GC	NA	
Vegetative Cover	MM	MM	Vegetation needs to be cut along interior and exterior of berms. Trees in excess of 3 inches in diameter should be removed and have compacted earth placed where the root ball was removed. Trees less than 3 inches in diameter should be cut or sprayed with a herbicide.
Other (Name)	NA		
Other –	NA		
Other -	NA		
Other	NA		

CONCRETE OR MASONRY DAMS

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Seepage	NA		
Structure to Abutment! Embankment Junctions	NA		
Water Passages	NA		
Foundation	NA		
Surface Cracks in Concrete Surfaces	NA		
Structural Cracking	NA		
Vertical and Horizontal Alignment	NA		

CONCRETE OR MASONARY DAMS
(CONTINUED)

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Monolith Joints	NA		
Contruction Joints	NA		
Spalling of Concrete	NA		
Filters; Drains, etc.	NA		
Riprap	NA		
Other (Name)	NA		

IF THE DAM IS GATED – Fill out the portion of the Principal Spillway Form related to Gated Spillways

PRINCIPAL SPILLWAY
APPROACH CHANNEL

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Debris	NA		
Side Slope Stability	NA		
Slope Protection	NA		
Other (Name)	NA		
Other	NA		
Other	NA		
Other	NA		

PRINCIPAL SPILLWAY

x Drop Inlet Spillway ☐ Overflow Spillway Structure ☐ Gated

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion, Spalling, Cavitation	NE	Underwater	
Structure to Embankment Junction	GC	Underwater	
Drains	NA	NA	
Seepage Around or Into Structure	NI	Underwater	
Surface Cracks	NI	Underwater	
Structural Cracks	NI	Underwater	

IF THE SPILLWAY IS GATED FILL OUT THE SPILLWAY SECTION

PRINCIPAL SPILLWAY
(Continued)

x Drop Inlet Spillway ☐ Overflow Spillway Structure ☐ Gated

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Alignment of Abutment Walls	NA	NA	
Construction Joints	NA	NA	
Filter and Filter Drains	NA	NA	
Trash Racks	NA	NA	
Bridge and Piers	NA	NA	
Differential Settlement	NA	NA	
Other (Name)	NA	NA	

IF THE SPILLWAY IS GATED FILL OUT THE GATES SECTION

PRINCIPAL SPILLWAY
(Continued)

x Conduit ☐ Gated

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion, Spalling, Cavitation	NE	NA	
Joint Separation	NE	NA	
Seepage Around of Into Conduit	NE	NA	
Surface Cracks	NE	NA	
Structural Cracks	NA	NA	
Trash Racks	NA	NA	
Differential Settlement	NE	NA	
Alignment	NE	NA	
Other (Name)	NA	NA	

IF THE SPILLWAY IS GATED FILL OUT THE GATES SECTION

PRINCIPAL SPILLWAY
(Continued)

☐ Chute

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion, Spalling, Cavitation	NA		
Structure to Embankment Junction	NA		
Construction Joints	NA		
Expansion and Contraction Joints	NA		
Differential Settlement	NA		
Surface Cracks	NA		
Structural Cracks	NA		
Wall Alignment	NA		
Other (Name)	NA		

IF THE SPILLWAY IS GATED FILL OUT THE GATES SECTION

PRINCIPAL SPILLWAY

☐ Principal Spillway ☐ Dewatering ☐ Other:

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Gate Sill	NA		
Gate Seals	NA		
Gate and Frame	NA		
Operating Machinery	NA		
Emergency Operating Machinery	NA		
Other (Name)	NA		
Other	NA		

OUTLET WORKS
IF SEPARATE FROM PRINCIPAL SPILLWAY STRUCTURE

ITEM	CONDITION CODE'	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion. Spalling, Cavitation	NA		
Joint Separation	NA		
Seepage Around or Into Conduit	NA		
Intake Structure	NA		
Outlet Structure	NA		
Outlet Channel	NA		
Riprap	NA		
Other (Name)	NA		
Other	NA		

ENERGY DISSIPATOR

☐ Principal Spillway
Type:

☐ Outlet Works

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion, Spalling, Cavitation	NA		
Structure to Embankment Junction	NA		
Construction Joints	NA		
Surface Cracks	NA		
Structural Cracks	NA		
Differential Alignment	NA		
Expansion and Contraction Joints	NA		

ENERGY DISSIPATOR
(Continued)

☐ Principal Spillway ☐ Outlet Works

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Riprap	NA	NA	
Outlet Channel	NA	NA	
Debris	NA	NA	
Other (Name)	NA		
Other	NA		
Other	NA		
Other	NA		

EMERGENCY SPILLWAY

☐ Earth ☐ Other: Name _____

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion	NA		
Weeds, Logs. Other Obstructions	NA		
Side Slope Sloughing	NA		
Vegetation	NA		
Sedimentation	NA		
Riprap	NA		
Settlement of Crest	NA		
Downstream Channel	NA		
Other (Name)	NA		

SUMMARY OF MAINTENANCE DONE AND/OR

REPAIRS MADE SINCE THE LAST INSPECTION

DATE OF PRESENT INSPECTION February 20, 2009

DATE OF LAST INSPECTION

1. EARTH EMBANKMENT DAMS

2. CONCRETE MASONARY DAMS

3. PRINCIPAL SPILLWAY

4. OUTLET WORKS

5. EMERGENCY SPILLWAY

DOWNSTREAM DEVELOPMENT
APPROXIMATE WIDTH OF AFFECTED FLOODPLAIN _____ MILES.

MILES DOWNSTREAM FROM DAM	DOWNSTREAM DEVELOPMENT												Loss Of Life Potential			Economic Loss Potential			SKETCH IN DEVELOPMENTS DOWNSTREAM OF THE DAM
	OCCUPIED HOMES	UNOCCUPIED HOMES	AGRICULTURAL BUILDINGS	INDUSTRIAL BUILDINGS	COMMERCIAL BUILDINGS	SCHOOLS	HOSPITALS	ROADS & BRIDGES	DAMS	OVERHEAD UTILITIES	OTHER DEVELOPMENT (Name)	OTHER DEVELOPMENT (Name)	NONE	1 TO 10	OVER 10	MINIMAL EXPECTED	APPRECIABLE EXPECTED	EXCESSIVE EXPRECTED	
0 to ¼		0	0	0	0	0	0	0	0	0	0	0	x			x			
¼ to ½													x			x			
½ to ¾													x			x			
¾ to 1													x			x			
1 to 1 ¼													x			x			
1 ¼ to 1 ½													x			x			
1 ½ to 1 ¾													x			x			
1 ¾ to 2													x			x			
OVER 2													x			x			

The number of homes, buildings, or other items in the floodplain downstream of the dam should be placed in the appropriate row and column to designate their location.

Owner's Maintenance Statement

I, _____, owner of Baldwin PS Ash Disposal Complex dam,

Dam Identification Number _____, in Randolph County,

am maintaining the dam in accordance with the accepted maintenance plan

which is part of Permit Number_____.

_____
Signature

_____
Date

Owner's Operation and Maintenance Plan Statement

I, _____, owner of Dynegy PS Ash Disposal Complex dam,

Dam Identification Number _____, in Randolph County,

have reviewed the operation and maintenance plan including the Emergency

Action Plan (EAP), which is part of Permit Number_____.

I ☐ have enclosed the appropriate revisions or

☐ have determined that no revisions to the plan are necessary.

_____
Signature

_____
Date

The Department of Natural Resources is requesting information that is necessary to accomplish the statutory purposes as outlined under the River, Lakes and Streams Act, 615 IL CS 5. Submittal of this information is REQUIRED. Failure to provide the required information could result in ineligible or non-compliance procedures as outlined in Section 3702.160 of the "Rules for Construction and Maintenance of Dams."

Dam Inspection Report

Name of Dam Baldwin Energy Complex Ash Ponds **Dam ID No.** N/A

Permit Number N/A **Class of Dam** N/A

Location **Section Township** **Range**

Owner Dynegy Midwest Generation
Name

618-785-2294
Telephone Number (Day)

10901 Baldwin Rd
Street

618-785-2228
Telephone Number (Night)

Baldwin, IL 62217
City **Zip Code**

County Randolph

Type of Dam Homogeneous Earth Dams

Type of Spillway Drop Inlets

Date(s) Inspected March 24, 2010

Weather When Inspected Sunny

Temperature When Inspected 50 degrees F

Pool Elevation When Inspected +/- 430 secondary ash pond, +/- 450 primary

Tailwater Elevation When Inspected NA

Inspection Personnel:

Name	Title
Kenneth M Berry, P.E.	Sr Proj Engr (URS)
Phil L. Morris, P.E.	Environmental Professional
Dominic Wright, P.E.	Plant Engineer

Professional Engineer's Seal

Name **Title**

The Department of Natural Resources is requesting information that is necessary to accomplish the statutory purpose as outlined under the River, Lakes and Streams Act. 615 ILCS 5. Submittal of this information is REQUIRED. Failure to provide the required information could result in the initiation of non.-compliance procedures as outlined in Section 3702.160 of the "Rules for Construction and Maintenance of Dams.

CONDITION CODES

NE - No evidence of a problem

GC - Good condition

MM - Item needing minor maintenance and/or repairs within the year, the safety or integrity of the item is not yet imperiled

IM - Item needing immediate maintenance to restore or ensure its safety or integrity

EC - Emergency condition which if not immediately repaired or other appropriate measures taken could lead to failure of the dam

OB - Condition requires regular observation to ensure that the condition does not become worse

NA - Not applicable to this dam

NI - Not inspected -list the reason for non-inspection under deficiencies

---

Vegetation needs to be cut and periodic inspections are recommended.

EARTH EMBANKMENT

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Surface Cracks	NE	NA	Visibility was very limited due to vegetation.
Vertical and Horizontal Alignment of Crest	GC	NA	
Unusual Movement or Cracking' At or Beyond Toe	NE	NA	
Sloughing or Erosion of Embankment and Abutment Slopes	OB/MM	MM	Two deep erosion channels were observed on south exterior embankment. The channels should be cleaned out and backfilled with compacted soil covered with topsoil and reseeded.
Upstream Face Slope Protection	NA	NA	
Seepage	NE	NA	Access and visibility for locating seepage or wet areas was very limited due to vegetation.
Filter and Filter Drains	NE	NA	

EARTH EMBANKMENT
(Continued)

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Animal Damage	NE	NA	
Embankment Drainage Ditches	NE	NA	
Vegetative Cover	MM	MM	Vegetation needs to be cut along interior and exterior of embankments. Trees in excess of 3 inches in diameter should be removed and have compacted earth placed where the root ball was removed. Trees less than 3 inches in diameter should be cut or sprayed with a herbicide.
Other (Name)	NA		
Other –	NA		
Other -	NA		
Other	NA		

CONCRETE OR MASONRY DAMS

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Seepage	NA		
Structure to Abutment! Embankment Junctions	NA		
Water Passages	NA		
Foundation	NA		
Surface Cracks in Concrete Surfaces	NA		
Structural Cracking	NA		
Vertical and Horizontal Alignment	NA		

CONCRETE OR MASONARY DAMS
(CONTINUED)

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Monolith Joints	NA		
Contruction Joints	NA		
Spalling of Concrete	NA		
Filters; Drains, etc.	NA		
Riprap	NA		
Other (Name)	NA		

IF THE DAM IS GATED – Fill out the portion of the Principal Spillway Form related to Gated Spillways

PRINCIPAL SPILLWAY
APPROACH CHANNEL

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Debris	NA		
Side Slope Stability	NA		
Slope Protection	NA		
Other (Name)	NA		
Other	NA		
Other	NA		
Other	NA		

PRINCIPAL SPILLWAY

x Drop Inlet Spillway ☐ Overflow Spillway Structure ☐ Gated

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion, Spalling, Cavitation	NE/NI	Underwater	
Structure to Embankment Junction	NA	Underwater	
Drains	NA	NA	
Seepage Around or Into Structure	NI	Underwater	
Surface Cracks	NI	Underwater	
Structural Cracks	NI	Underwater	

IF THE SPILLWAY IS GATED FILL OUT THE SPILLWAY SECTION

PRINCIPAL SPILLWAY
(Continued)

x Drop Inlet Spillway ☐ Overflow Spillway Structure ☐ Gated

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Alignment of Abutment Walls	NA	NA	
Construction Joints	NI	NA	
Filter and Filter Drains	NA	NA	
Trash Racks	NA	NA	
Bridge and Piers	NA	NA	
Differential Settlement	NA	NA	
Other (Name)	NA	NA	

IF THE SPILLWAY IS GATED FILL OUT THE GATES SECTION

PRINCIPAL SPILLWAY
(Continued)

x Conduit ☐ Gated

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion, Spalling, Cavitation	NI	Underwater	
Joint Separation	NI	Underwater	
Seepage Around of Into Conduit	NI	Underwater	
Surface Cracks	NI	Underwater	
Structural Cracks	NI	Underwater	
Trash Racks	NI	NA	
Differential Settlement	NI	Underwater	
Alignment	NI	Underwater	
Other (Name)	NA	NA	

IF THE SPILLWAY IS GATED FILL OUT THE GATES SECTION

PRINCIPAL SPILLWAY
(Continued)

☐ Chute

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion, Spalling, Cavitation	NA		
Structure to Embankment Junction	NA		
Construction Joints	NA		
Expansion and Contraction Joints	NA		
Differential Settlement	NA		
Surface Cracks	NA		
Structural Cracks	NA		
Wall Alignment	NA		
Other (Name)	NA		

IF THE SPILLWAY IS GATED FILL OUT THE GATES SECTION

PRINCIPAL SPILLWAY

☐ Principal Spillway ☐ Dewatering ☐ Other:

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Gate Sill	NA		
Gate Seals	NA		
Gate and Frame	NA		
Operating Machinery	NA		
Emergency Operating Machinery	NA		
Other (Name)	NA		
Other	NA		

OUTLET WORKS
IF SEPARATE FROM PRINCIPAL SPILLWAY STRUCTURE

ITEM	CONDITION CODE'	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion. Spalling, Cavitation	NA		
Joint Separation	NA		
Seepage Around or Into Conduit	NA		
Intake Structure	NA		
Outlet Structure	NA		
Outlet Channel	NA		
Riprap	NA		
Other (Name)	NA		
Other	NA		

ENERGY DISSIPATOR

☐ Principal Spillway
Type:

☐ Outlet Works

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion, Spalling, Cavitation	NA		
Structure to Embankment Junction	NA		
Construction Joints	NA		
Surface Cracks	NA		
Structural Cracks	NA		
Differential Alignment	NA		
Expansion and Contraction Joints	NA		

ENERGY DISSIPATOR
(Continued)

☐ Principal Spillway ☐ Outlet Works

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Riprap	NA	NA	
Outlet Channel	NA	NA	
Debris	NA	NA	
Other (Name)	NA		
Other	NA		
Other	NA		
Other	NA		

EMERGENCY SPILLWAY

☐ Earth ☐ Other: Name _____

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion	NA		
Weeds, Logs. Other Obstructions	NA		
Side Slope Sloughing	NA		
Vegetation	NA		
Sedimentation	NA		
Riprap	NA		
Settlement of Crest	NA		
Downstream Channel	NA		
Other (Name)	NA		

SUMMARY OF MAINTENANCE DONE AND/OR

REPAIRS MADE SINCE THE LAST INSPECTION

DATE OF PRESENT INSPECTION March 24, 2010

DATE OF LAST INSPECTION February 20, 2009

1. EARTH EMBANKMENT DAMS

None

2. CONCRETE MASONARY DAMS

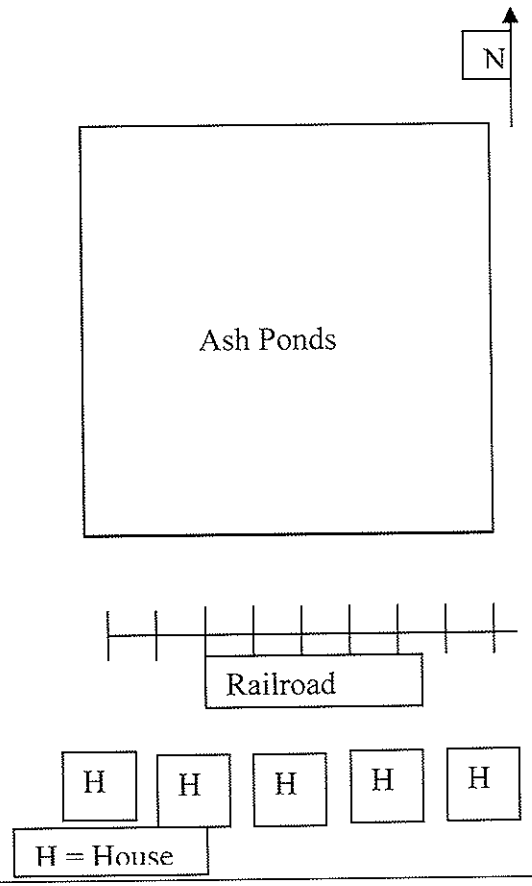
3. PRINCIPAL SPILLWAY

4. OUTLET WORKS

5. EMERGENCY SPILLWAY

DOWNSTREAM DEVELOPMENT
APPROXIMATE WIDTH OF AFFECTED FLOODPLAIN 0.25 MILES.

MILES DOWNSTREAM FROM DAM	DOWNSTREAM DEVELOPMENT												Loss Of Life Potential			Economic Loss Potential			SKETCH IN DEVELOPMENTS DOWNSTREAM OF THE DAM
	OCCUPIED HOMES	UNOCCUPIED HOMES	AGRICULTURAL BUILDINGS	INDUSTRIAL BUILDINGS	COMMERCIAL BUILDINGS	SCHOOLS	HOSPITALS	ROADS & BRIDGES	DAMS	OVERHEAD UTILITIES	OTHER DEVELOPMENT (Name)	OTHER DEVELOPMENT (Name)	NONE	1 TO 10	OVER 10	MINIMAL EXPECTED	APPRECIABLE EXPECTED	EXCESSIVE EXPRECTED	
0 to ¼	12	0	3	2	0	0	0	0	0	0	0	0		x		x			
¼ to ½													x			x			
½ to ¾													x			x			
¾ to 1													x			x			
1 to 1 ¼													x			x			
1 ¼ to 1 ½													x			x			
1 ½ to 1 ¾													x			x			
1 ¾ to 2													x			x			
OVER 2													x			x			



The number of homes, buildings, or other items in the floodplain downstream of the dam should be placed in the appropriate row and column to designate their location.

Owner's Maintenance Statement

I, _____, owner of Baldwin PS Ash Disposal Complex dam,

Dam Identification Number _____, in Randolph County,

am maintaining the dam in accordance with the accepted maintenance plan

which is part of Permit Number_____.

_____
Signature

_____
Date

Owner's Operation and Maintenance Plan Statement

I, _____, owner of Dynegy PS Ash Disposal Complex dam,

Dam Identification Number _____, in Randolph County,

have reviewed the operation and maintenance plan including the Emergency

Action Plan (EAP), which is part of Permit Number_____.

I ☐ have enclosed the appropriate revisions or

☐ have determined that no revisions to the plan are necessary.

_____
Signature

_____
Date

The Department of Natural Resources is requesting information that is necessary to accomplish the statutory purposes as outlined under the River, Lakes and Streams Act, 615 IL. CS 5. Submittal of this information is REQUIRED. Failure to provide the required information could result in the initiation on non-compliance procedures as outlined in Section 3702.169 of the "Rules for Construction and Maintenance of Dams."

APPENDIX E

PHOTOGRAPHS

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
1	5/24/11

Direction Photo Taken:
Northwest

Description:
Downstream slope and crest of the Ash Pond Dike which retains the water that forms the Intermediate Pond.

Photo No.	Date:
2	5/24/11

Direction Photo Taken:
Northwest

Description:
Downstream slope of the Ash Pond Dike.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
3	5/24/11

Direction Photo Taken:
South

Description:
Seepage from the downstream slope of the Ash Pond Dike.

Photo No.	Date:
4	5/24/11

Direction Photo Taken:
Southeast

Description:
Surface grouting/concrete along the downstream slope of Ash Pond Dike. Seepage present beneath the surface grouting in several locations.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
5	5/24/11

Direction Photo Taken:
South

Description:
Seepage beneath the surface grouting on Ash Pond Dike.

Photo No.	Date:
6	5/24/11

Direction Photo Taken:
West

Description:
Valley slope along the Final Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
7	5/24/11

Direction Photo Taken:
Southwest

Description:
Upstream slope of the Final Pond.

Photo No.	Date:
8	5/24/11

Direction Photo Taken:
South

Description:
Upstream slope of the Final Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No. 9 | **Date:** 5/24/11

Direction Photo Taken:
West

Description:
Upstream slope and decant structure of the Final Pond.

Photo No. 10 | **Date:** 5/24/11

Direction Photo Taken:
South

Description:
Crest and downstream slope of the Final Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
11	5/24/11

Direction Photo Taken:
South

Description:
Downstream slope of the Final Pond.

Photo No.	Date:
12	5/24/11

Direction Photo Taken:
North

Description:
Downstream slope of the Final Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
13	5/24/11

Direction Photo Taken:
Northwest

Description:
Riprap on downstream slope of the Final Pond.

Photo No.	Date:
14	5/24/11

Direction Photo Taken:
Southwest

Description:
Seepage on downstream slope of the Final Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
15	5/24/11

Direction Photo Taken:
Northeast

Description:
Gravel lined drainage ditch on downstream slope of the Final Pond.

Photo No.	Date:
16	5/24/11

Direction Photo Taken:
Northeast

Description:
Platform and decant structure for the Final Pond

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
17	5/24/11

Direction Photo Taken:
Northeast

Description:
Decant structure of the Final Pond showing the decant pipe appears to be nearly at capacity.

Photo No.	Date:
18	5/24/11

Direction Photo Taken:
West

Description:
Crest of the Settling Pond Dike.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
19	5/24/11

Direction Photo Taken:
Northwest

Description:
Crest of the Settling Pond Dike.

Photo No.	Date:
20	5/24/11

Direction Photo Taken:
East

Description:
Crest of the Settling Pond Dike near the overflow section.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
21	5/24/11

Direction Photo Taken:
Southwest

Description:
Upstream slope of the Intermediate Pond

Photo No.	Date:
22	5/24/11

Direction Photo Taken:
Northeast

Description:
Upstream slope of the Secondary Pond

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
23	5/24/11

Direction Photo Taken:
Southwest

Description:
Upstream slope of the Ash Pond Dike as seen from Secondary Dike

Photo No.	Date:
24	5/24/11

Direction Photo Taken:
Northwest

Description:
Crest, upstream and downstream slope of the Secondary Dike

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
25	5/24/11

Direction Photo Taken:
North

Description:
Upstream slope of the Secondary Pond

Photo No.	Date:
26	5/24/11

Direction Photo Taken:
South

Description:
Upstream slope of the Secondary Dike.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No. 27	Date: 5/24/11

Direction Photo Taken:
East

Description:
Upstream slope of Secondary Pond

Photo No. 28	Date: 5/24/11

Direction Photo Taken:
East

Description:
Upstream slope of the Secondary Pond

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
29	5/24/11

Direction Photo Taken:
East

Description:
Discharge pipe for Bottom Ash Process water from the northern part of the Primary Fly Ash Pond to the Secondary Pond.

Photo No.	Date:
30	5/24/11

Direction Photo Taken:
South

Description:
Discharge pipe for Bottom Ash Process water from the northern part of the Primary Fly Ash Pond to the Secondary Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
31	5/24/11

Direction Photo Taken:
East

Description:
Upstream slope of the Secondary Pond

Photo No.	Date:
32	5/24/11

Direction Photo Taken:
East

Description:
Downstream slope of the southern embankment of the Secondary Fly Ash Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
33	5/24/11

Direction Photo Taken:
East

Description:
Conditions at the downstream toe of the southern embankment of the Secondary Fly Ash Pond.

Photo No.	Date:
34	5/24/11

Direction Photo Taken:
East

Description:
Downstream slope and toe of the southern embankment of the Secondary Fly Ash Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No. 35 | **Date:** 5/24/11

Direction Photo Taken:
East

Description:
Downstream slope and toe of the southern embankment of the Secondary Fly Ash Pond.

Photo No. 36 | **Date:** 5/24/11

Direction Photo Taken:
Northwest

Description:
Downstream slope and crest of Intermediate Embankment.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
37	5/24/11

Direction Photo Taken:
Northwest

Description:
Downstream slope and crest of the Intermediate Embankment.

Photo No.	Date:
38	5/24/11

Direction Photo Taken:
Northwest

Description:
Downstream slope of the Intermediate Embankment showing an area that had been armored with riprap.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
39	5/24/11

Direction Photo Taken:
Northwest

Description:
Downstream slope and crest of the Intermediate Embankment.

Photo No.	Date:
40	5/24/11

Direction Photo Taken:
Southwest

Description:
Downstream slope and toe of the northern embankment of the Secondary Fly Ash Pond

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
41	5/24/11

Direction Photo Taken:
Northeast

Description:
Downstream slope and toe of the northern embankment of the Secondary Fly Ash Pond.

Photo No.	Date:
42	5/24/11

Direction Photo Taken:
East

Description:
Scarp on downstream slope of the Northern Dike.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
43	5/24/11

Direction Photo Taken:
East

Description:
Scarp on downstream slope of the Northern Dike.

Photo No.	Date:
44	5/24/11

Direction Photo Taken:
Southeast

Description:
Scarp on downstream slope of the Northern Dike.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No. 45 | **Date:** 5/24/11

Direction Photo Taken:
Northeast

Description:
Downstream slope and toe of the northern embankment of the Secondary Fly Ash Pond.

Photo No. 46 | **Date:** 5/24/11

Direction Photo Taken:
Northeast

Description:
Downstream slope and toe of the northern embankment of the Secondary Fly Ash Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
47	5/24/11

Direction Photo Taken:
East

Description:
Crest and upstream Slope of the southern embankment of the Secondary Fly Ash Pond.

Photo No.	Date:
48	5/24/11

Direction Photo Taken:
East

Description:
Crest and upstream slope of the Secondary Fly Ash Pond in the area of the 1995 Failure.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No. 49 | **Date:** 5/24/11

Direction Photo Taken:
North

Description:
Downstream slope of the southern embankment of the Secondary Fly Ash Pond. Looking up slope in the area of the 1995 Failure.

Photo No. 50 | **Date:** 5/24/11

Direction Photo Taken:
Northeast

Description:
One of several decant pipes used to transport water from the southern portion of the Primary Fly Ash Pond to the Secondary Fly Ash Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
51	5/24/11

Direction Photo Taken:
Northeast

Description:
Decant pipe transmitting water from the Primary Fly Ash Pond to the Secondary Fly Ash Pond.

Photo No.	Date:
52	5/24/11

Direction Photo Taken:
Southwest

Description:
One of several discharge pipes from the Primary Fly Ash Pond into the Secondary Fly Ash Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
53	5/24/11

Direction Photo Taken:
Southeast

Description:
Discharge pipe from the Secondary Fly Ash Pond into the Secondary Pond.

Photo No.	Date:
54	5/24/11

Direction Photo Taken:
Northeast

Description:
Upstream slope and decant structure in the Secondary Fly Ash Pond

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
55	5/25/11

Direction Photo Taken:
Southwest

Description:
Downstream slope of the eastern embankment of the Primary Fly Ash Pond.

Photo No.	Date:
56	5/25/11

Direction Photo Taken:
Southwest

Description:
Downstream slope of the eastern embankment of the Primary Fly Ash Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No. 57 | **Date:** 5/25/11

Direction Photo Taken:
South

Description:
Downstream slope of the eastern embankment of the Primary Fly Ash Pond.

Photo No. 58 | **Date:** 5/25/11

Direction Photo Taken:
West

Description:
Crest and upstream slope of the southern embankment of the Primary Fly Ash Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
59	5/25/11

Direction Photo Taken:
East

Description:
Toe and downstream slope of the northern embankment of the Primary Fly Ash Pond.

Photo No.	Date:
60	5/25/11

Direction Photo Taken:
West

Description:
Toe and downstream slope of the northern embankment of the Primary Fly Ash Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
61	5/25/11

Direction Photo Taken:
West

Description:
Crest of the northern embankment of the Primary Fly Ash Pond.

Photo No.	Date:
62	5/25/11

Direction Photo Taken:
West

Description:
Toe and downstream slope of the northern embankment of the Primary Fly Ash Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
63	5/25/11

Direction Photo Taken:
Southeast

Description:
Crest of the northern embankment of the Primary Fly Ash Pond.

Photo No.	Date:
64	5/24/11

Direction Photo Taken:
South

Description:
Crest and upstream slope of the northern embankment of the Primary Fly Ash Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
65	5/25/11

Direction Photo Taken:
Northeast

Description:
Crest and upstream slope of the southern embankment of the Primary Fly Ash Pond.

Photo No.	Date:
66	5/25/11

Direction Photo Taken:
North

Description:
Upstream slope of the Primary Fly Ash Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No. 67 | **Date:** 5/25/11

Direction Photo Taken:
Southwest

Description:
Downstream slope of the western embankment of the Primary Fly Ash Pond.

Photo No. 68 | **Date:** 5/25/11

Direction Photo Taken:
North

Description:
Crest and upstream area of the western embankment of the Primary Fly Ash Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
69	5/25/11

Direction Photo Taken:
West

Description:
Decant from the northern portion of the Primary Fly Ash Pond.

Photo No.	Date:
70	5/25/11

Direction Photo Taken:
Southeast

Description:
Interior berm in Primary Fly Ash Pond separating the northern and southern portions.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
71	5/25/11

Direction Photo Taken:
South

Description:
Intermediate pump station for the fly ash process water.

Photo No.	Date:
72	5/25/11

Direction Photo Taken:
South

Description:
Transport pipes for fly ash process water.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No. 73 | **Date:** 5/25/11

Direction Photo Taken:
West

Description:
One of several discharge lines into the bottom ash (northern) area of the Primary Fly Ash Pond.

Photo No. 74 | **Date:** 5/25/11

Direction Photo Taken:
Northwest

Description:
Several discharge lines into the bottom ash processing area of the Primary Fly Ash Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
75	5/24/11

Direction Photo Taken:
Southwest

Description:
Crest and upstream slope of the Ash Pond Dike.

Photo No.	Date:
76	5/24/11

Direction Photo Taken:
South

Description:
Crest and upstream slope of the Ash Pond Dike.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. EPA	Site Location: Baldwin Energy Complex Baldwin, Illinois	Project No. 01.0170142.30

Photo No.	Date:
77	5/24/11

Direction Photo Taken:
West

Description:
Decant structure of the Intermediate Pond.

APPENDIX F

REFERENCES

REFERENCE LIST
BALDWIN POWER STATION

Sargent & Lundy Engineers. "Ash Pond Outfall Structures, Baldwin Power Station, Illinois Power Company, Baldwin, Illinois." Drawing No. E-BAL1-B60. Dated January 16, 1967.

Sargent & Lundy Engineers. "Ash Pond Dike; Sheet 1." Drawing No. E-BAL1-B37. Dated March 16, 1967.

Sargent & Lundy Engineers. "Ash Pond Dike; Sheet 2." Drawing No. E-BAL1-B38. Dated March 16, 1967.

Sargent & Lundy Engineers. "Ash Pond Dike; Sheet 3." Drawing No. E-BAL1-B39. Dated March 16, 1967.

Sargent & Lundy Engineers. "Ash Pond Dike; Sheet 4." Drawing No. E-BAL1-B40. Dated March 16, 1967.

Illinois Power Company, Decatur. "Miscellaneous Details of Intermediate Embankment, Vertical Extension of Intermediate Embankment, Baldwin Power Station." Drawing No. E-BAL1-C122. Dated July 22, 1999.

Illinois Power Company, Decatur. "Site Plan, Secondary Ash Pond Storm Water Dike and Detention Basin, Baldwin Power Station." Drawing No. E-BAL1-C50. Dated October 31, 1996.

Illinois Power Company, Decatur. "Details For Secondary Storm Water Dike, Baldwin Power Station." Drawing No. E-BAL1-C51. Dated November 4, 1996.

Illinois Power Company. "Preliminary Secondary Ash Pond Redirection, Baldwin Power Station." Drawing No. CE-BAL1-C31. Dated June 11, 1996.

Illinois Power Company. "Preliminary-Typical Sections Secondary Ash Pond Dam Structure, Baldwin Power Station." Drawing No. CE-BAL1-C30. Dated June 10, 1996.

Illinois Power Company, Decatur. "Preliminary Ash Pond Site Plan, Vertical Extension of Intermediate Embankment, Baldwin Power Station." Drawing No. MSK-19593-2. Dated July 20, 1999.

Illinois Power Company, Decatur. "Plan and Profile, Vertical Extension of Intermediate Embankment, Baldwin Power Station." Drawing No. E-BAL1-C120. Dated January 27, 2000.

Illinois Power Company, Decatur. "Final Outlet Pipe Replacement, Primary Ash Pond, Baldwin Power Station." Drawing No. MSK-19593-10. Dated July 22, 1999.

Harza Engineering Company. “General Layout – Ash Pond No. 2.” Drawing No. E-BAL1-99-B1490. Dated January 6, 1981.

Illinois Power Company, Decatur. “1991 Control Map, Traverse Around Ash Pond Area, Baldwin Power Station.” Drawing No. CE-BAL1-01.2-2. Dated August 11, 1995.

Illinois Power Company, Decatur. “General Location of Discharge Sewer Pipe Replacement, Ash Pond, Baldwin Power Station.” Drawing No. E-BAL1-C56-1. Dated September 14, 1994.

Illinois Power Company, Decatur. “Plan – Discharge Replacement, Fly Ash Pond, Baldwin Power Station.” Drawing No. E-BAL1-C56-2. Dated September 14, 1994.

Illinois Power Company, Decatur. “Details Outlet Structure, Discharge Pipe Replacement of Fly Ash Pond, Baldwin Power Station.” Drawing No. E-BAL1-C56-4. Dated September 13, 1994.

Illinois Power Company, Decatur. “Flow Diagram, Fly Ash Pond, Baldwin Unit 1, 2 & 3.” Drawing No. E-BAL1-M2425. Dated June 11, 1999.

Illinois Power Company, Decatur. “PRB Coal Conversion Project, Fly Ash Pond – Misc. Foundations, Baldwin Power Station – Units 1-3. Drawing No. B2226. Dated September 24, 1999.

Illinois Power Company, Decatur. “Primary Ash pond Site Plan, Vertical Extension of Intermediate Embankment, Baldwin Power Station.” Drawing No. E-BAL1-C119.

Illinois Power Company, Decatur. “Outlet Pipe Details of North Dike, Ash Pond No. 2.” Drawing No. E-BAL1-99-B1492. Dated June 6, 1979.

Illinois Power Company. “ Preliminary, Secondary Ash Pond Redirection, Baldwin Power Station.” Drawing No. CE-BAL1-. Dated June 11, 1996.

Illinois Power Company, Decatur. “Erection Diagram, Final Pond Outlet Structure, Baldwin Power Station. Drawing No. and date not available.

Illinois Power Company, Decatur. “Topography Survey (1988), Spillway Ash Pond, Baldwin Power Station.” Drawing No. CE-BAL1-B1509. Dated September 21, 1988.

Illinois Power Company, Decatur. “Cross Sections 77+00 & 80+00, Ash Pond #2 – South Dike Addition, Baldwin Power Station.” Drawing No. CE-BAL1-B1504-5X. Dated April 18, 1988.

Illinois Power Company, Decatur. “Cross Sections 66+00 to 74+00, Ash Pond #2 – South Dike Addition, Baldwin Power Station.” Drawing No. CE-BAL1-B1504-4X. Dated April 18, 1988.

Illinois Power Company, Decatur. “Cross Sections 56+00 to 65+00, Ash Pond #2 – South Dike Addition, Baldwin Power Station.” Drawing No. CE-BAL1-B1504-3. Dated April 15, 1988.

Illinois Power Company, Decatur. “Cross Sections 42+00 to 47+00, Ash Pond #2 – South Dike Addition, Baldwin Power Station.” Drawing No. CE-BAL1-B1504-1. Dated April 15, 1988.

Illinois Power Company, Decatur. “Cross Sections, North Dike Extensions – Ash Pond, Baldwin Power Station,” Drawing No. CE-BAL1-B1488-2. Dated January 16, 1989.

Illinois Power Company, Decatur. “Cross Sections, North Dike Extension – Ash Pond, Baldwin Power Station.” Drawing No. CE-BAL1-B1488-1. Dated January 16, 1989.

Illinois Power Company, Decatur. “Survey Control Monumentation, Baldwin Power Station.” Drawing No. DE-BAL1-C04-17. Dated March 6, 1997.

Illinois Power Company, Decatur. “Partial Plot Plan, Pond Ash Piping, Baldwin Unit 1, 2 & 3.” Drawing No. MSK-003. Date unavailable.

Illinois Power Company, Decatur. “Baldwin Sewage Treatment Lagoon, Overall Site Plan, Baldwin Power Plant.” Drawing No. E-BAL1-C130. Dated May 22, 2000.

Illinois Power Company, Decatur. “Modifications to Dusting Embankment, Primary Ash Pond, Baldwin Power Station.” Drawing No. MSK-26529-1. Dated October 27, 1997.

Illinois Power Company, Decatur. “Site Plan, Secondary Ash Pond Storm Water Dike and Detention Basin, Baldwin Power Station.” Drawing No. E-BAL-C50. Dated October 31, 1996.