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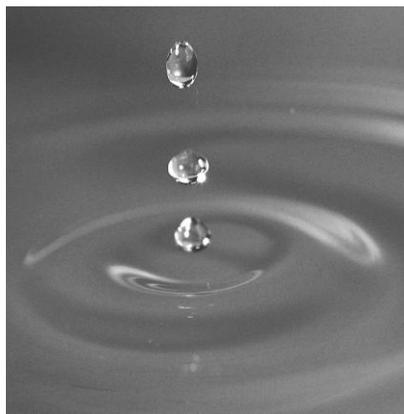
Geotechnical
Environmental and
Water Resources
Engineering

DRAFT
**Specific Site Assessment for
Coal Combustion Waste
Impoundments at
Intermountain Power Station
Delta, Utah**

Submitted to:
U.S. Environmental Protection Agency
Office of Resource Conservation and Recovery
5304P
1200 Pennsylvania Avenue NW
Washington, DC 20460

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Acronym List

CCW	coal combustion waste
DNR/DWR	Department of Natural Resources, Utah Division of Water Rights
DWP	Los Angeles Department of Water and Power
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
GEI	GEI Consultants, Inc.
HDPE	high density polyethylene
IDF	inflow design flood
IPS	Intermountain Power Station
IPSC	Intermountain Power Service Corporation
MW	megawatts
NDDH	Utah Department of Health
NOAA	National Oceanic and Atmospheric Administration
PMF	probable maximum flood
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USGS	U.S. Geological Survey

1.0 Introduction

1.1 Purpose

This report presents the results of a specific site assessment of the dam safety of coal combustion waste (CCW) impoundments at the Intermountain Power Station (IPS) in Millard County, near Delta, Utah. The Intermountain Power Station is owned by Intermountain Power Agency and operated by Intermountain Power Service Corporation (IPSC). The impoundments are the Bottom Ash Basin #1, #2, and #3 and the Wastewater Holding Basin. The specific site assessment was performed on October 26, 2010.

The specific site assessment was performed with reference to Federal Emergency Management Agency (FEMA) guidelines for dam safety, which includes other federal agency guidelines and regulations (such as U.S. Army Corps of Engineers [USACE] and U.S. Bureau of Reclamation [USBR]) for specific issues, and includes defaults to state requirements where not specifically addressed by federal guidance or if the state requirements were more stringent.

1.2 Scope of Work

The scope of work between GEI Consultants, Inc. (GEI) and the U.S. Environmental Protection Agency (EPA) for the specific site assessment is summarized in the following tasks:

1. Acquire and review existing reports and drawings relating to the safety of the project provided by the EPA and IPSC.
2. Conduct detailed physical inspections of the project facilities. Document observed conditions on Field Assessment Check Lists provided by EPA for each management unit being assessed.
3. Review and evaluate stability analyses of the project's coal combustion waste impoundment structures.
4. Review the appropriateness of the inflow design flood (IDF), and adequacy of ability to store or safely pass the inflow design flood, provision for any spillways, including considering the hazard potential in light of conditions observed during the inspections or to the downstream channel.
5. Review existing dam safety performance monitoring programs and recommend additional monitoring, if required.
6. Review existing geologic assessments for the projects.
7. Submit draft and final reports.

1.3 Authorization

GEI performed the coal combustion waste impoundment assessment as a contractor to the EPA. This work was authorized by EPA under Contract No. EP09W001698, Order No. EP-B10S-00018 between EPA and GEI, dated September 23, 2010.

1.4 Project Personnel

The scope of work for this task order was completed by the following personnel from GEI:

Stephen G. Brown, P.E.	Project Manager/Task Leader
Nick Miller, P.E.	Project Water Resources Engineer
Gillian M. Hinchliff	Project Geotechnical Engineer

The Program Manager for the EPA was Stephen Hoffman.

1.5 Limitation of Liability

This report summarizes the assessment of dam safety of coal combustion waste impoundments Bottom Ash Basins #1, #2, and #3 and the Wastewater Holding Basin at Intermountain Power Station, in Millard County, near Delta, Utah. The purpose of each assessment is to evaluate the structural integrity of the impoundments and provide summaries and recommendations based on the available information and on engineering judgment. GEI used a professional standard of practice to review, analyze, and apply pertinent data. No warranties, express or implied, are provided by GEI. Reuse of this report for any other purpose, in part or in whole, is at the sole risk of the user.

1.6 Project Datum

The project coordinate system is identified as Utah State Plane Central Zone, 1927, and the elevations are based on 1929 Mean Sea Level datum as noted on the drawing titled "Topography, Generating Station Site Intermountain Generating Station, Drawing Number SL-CM412", dated May 1985, prepared by Los Angeles Department of Water and Power (DWP).

1.7 Prior Inspections

Inspections for the CCW impoundments are performed every five years by a State of Utah Department of Natural Resources, Utah Division of Water Rights (DNR/DWR) inspector. Detailed inspections of the CCW impoundments are performed annually by IPS professional engineers. Routine maintenance inspections of the CCW impoundments are performed monthly.

2.0 Description of Project Facilities

2.1 General

Intermountain Power Station is a coal-fired power plant consisting of two units that generate about 1900 megawatts (MW) combined. The power plant is located approximately 11 miles north of Delta in Millard County, Utah (see Figure 1). Both generating units are owned by Intermountain Power Agency and operated by Intermountain Power Service Corporation. Unit 1 went online in 1986 and Unit 2 went online in 1987.

Intermountain Power Station uses raw water pumped from the raw water holding pond located on the southeast side of the site. Water used in the power plant is discharged to either the Bottom Ash Basins or the Wastewater Holding Basin, and is reused as make-up water in the ash water management system, and the sulfur dioxide removal system. Intermountain Power Station does not discharge water to any waterway and is not located on a waterway.

The CCW impoundments are located west of the power plant. The CCW impoundments include the Bottom Ash Basin #1, #2, and #3, and the Wastewater Holding Basin and are permitted to store fly ash/flue gas emission, bottom ash, and other process residuals. Design records and construction drawings of the impoundments were available for review during the preparation of this report.

Several other impoundments are involved in the power station water management process, which reuses water for cooling and other processes until the total dissolved solids become unacceptable for use. The other impoundments at the IPS include the Ash Recycle Basin, the Settling Basin, six Evaporation Ponds and the Landfill Run-Off Basin. The Ash Recycle Basin is located directly south of the Bottom Ash Basins, and the Settling Basin is located south east of the Ash Recycle Basin. The six Evaporation Ponds are located directly west of the Bottom Ash Basins. The Landfill Run-Off Basin is located north of the Evaporation Ponds, at the northwest corner of the CCW landfill.

2.2 Impoundment Dams and Reservoirs

The embankment dams of the CCW impoundments have been assigned a Low Hazard potential by the Utah Department of Natural Resources. Hazard potential classifications for the impoundments are described in Section 4.0 of this report. The basic dimensions and geometry of the CCW impoundments are summarized in Table 2.1.

The Bottom Ash Basins were commissioned in 1986. The Bottom Ash Basins provides decant water to the Ash Water Recycle Basin for reuse in the ash water system and the sulfur dioxide removal system. The major waste sources to the pond are the bottom ash, boiler

slag, and other process materials including pulverizer rejects, and chemical clean residue. The Bottom Ash Basins were designed and constructed with a high density polyethylene (HDPE) liner (80 mil thickness) to minimize seepage from the basins. Seepage from the Bottom Ash Basins is collected and pumped back to the Ash Recycle Basin. IPS personnel indicated that currently about 200 gallons per day (gpd) is collected and pumped back into the Ash Recycle Basin.

The Bottom Ash Basins covers 105 acres (three ponds at 35 acres each) and has a nominal capacity of 3,000 acre-feet (three ponds at 1,000 acre-feet) at a maximum design depth of 46 . The perimeter embankment is approximately 8,600 linear feet, with two 2,250 feet long interior embankments. The Bottom Ash Basins has a minimum crest width of 20 feet and 3H:1V side slopes. The embankment slopes are either exposed earth or covered with sparse vegetation.

The Wastewater Holding Basin was commissioned in 1986. The major waste sources to the basin include flue gas emission control residuals and other process material including process water separated for re-use, wash down, coal pile run-off, boiler blowdown, cooling tower blowdown, regenerant rinsate, leachate from bottom ash, boiler slag, and pulverizer rejects. The Wastewater Holding Basin was designed and constructed with a high density polyethylene (HDPE) liner (80 mil thickness) to minimize seepage from the basins.

The Wastewater Holding Basin covers 53 acres with a storage capacity of approximately 650 acre feet. It is impounded by approximately 6,000 linear feet of perimeter embankment dikes approximately 15 feet high with crest widths of approximately 20 feet. The embankment side slopes are 3H:1V. The embankment slopes are either exposed earth or covered with sparse vegetation.

Table 2:1: Summary Information for Impoundment Dam Parameters

Parameter	Value	
	Bottom Ash Basins (3)	Wastewater Holding Basin
Dam	Bottom Ash Basins (3)	Wastewater Holding Basin
Estimated Maximum Height ¹ (ft)	46	20
Estimated Perimeter Length ² (ft)	8,600	6,000
Minimum Crest Width ¹ (ft)	20	20
Crest Elevation ¹ (ft)	4685.0	4650.0
Design Side Slopes Upstream/Downstream (H:V) ¹	3:1/3:1	3:1/3:1
Estimated Freeboard (ft) at time of site visit (#1, #2, #3)	31.1, 35.6, 33.9	5.9
Storage Capacity ³ (ac-ft)	1,000 each	650
Surface Area ³ (acres)	35 each	53

¹ Based on drawings "Pond and Embankment Sections and Details", Drawing Number 9255-9STU-S3090, prepared by Black and Veatch Consulting Engineers, dated February 1984.

² Estimated from Aerial Photographs.

³ Surface area and capacity based on CERCLA 104(e) Request for Information prepared by IPSC at the request of the EPA, dated March 23, 2009.

There are no records of the original geotechnical design or material properties for the embankment perimeter dikes. However, several site specific geotechnical investigations and studies for the plant site and CCW impoundments were available for review. IPS staff indicated to GEI during the site visit that the CCW impoundment embankments were constructed of on-site, natural soils. Based on the available data provided by IPS personnel, the on-site soils consist primarily of silty sand and sandy silts, but may also contain clean sands and lean clay.

2.3 Spillways

None of the impoundments have spillways.

2.4 Intakes and Outlet Works

Inlets to the Bottom Ash Basins include four 10-inch diameter steel pipes placed on the Bottom Ash Basins' north embankment crest and discharge directly into the Bottom Ash Basins' energy dissipation discharge structures. The energy dissipation discharge structures consist of a 4-foot wide, 3-foot high concrete rundown structure that contains several 18-inch wide baffle blocks spaced at 3-foot on centers. When a Bottom Ash Basin approaches storage capacity, the discharge is directed by plant personnel into one of the other basins to allow for the full basin to be drained, and the bottom ash excavated and hauled to the on-site landfill. The outlet drop-inlet decant structure is provided in each Bottom Ash Basin. The outlet structure is an 18-foot by 14-foot by 47-foot high concrete structure located at the south end of each of the Bottom Ash Basins. The large concrete decant structures drains decant water by gravity through a 24-inch steel concrete encased discharge pipe to the Ash Water Recycle Basin for reuse in the ash water system and the sulfur dioxide removal system.

The inlet to the Wastewater Holding Basin is a buried and submerged inlet pipeline located near the northeast corner of the basin along the east embankment. The outlet drop-inlet decant structure is provided in the Wastewater Holding Basin. The outlet structure is a large concrete structure located at the north end of the Wastewater Holding Basin. The structure supplies water to the Wastewater Holding Basin Pump Station. From the pump station the decant water can be sent to either the Ash Water Recycle Basin or Evaporation Ponds.

2.5 Vicinity Map

Intermountain Power Station is located in Millard County approximately 11 miles north of Delta, Utah, as shown on Figure 1. The CCW impoundments are located west of the station, as shown on Figure 2.

2.6 Plan and Sectional Drawings

Survey drawings for the CCW impoundments were provided by IPSC and were prepared as part of the design package. Construction record drawings from the original construction project were provided by IPSC.

2.7 Standard Operational Procedures

IPS is a coal-fired power plant producing a total combined capacity of 1900 MW. Coal is delivered to the power plant by train, where it is then combusted to power the steam turbines. IPS is a wet coal ash disposal facility, producing significant amounts of sluiced CCW material.

Waste includes fly ash/flue gas emissions, bottom ash, boiler slag and other process materials. The waste is sluiced to either the Bottom Ash Basins or to the Wastewater Holding Basin. Water that accumulates in the Bottom Ash Basins is decanted and conveyed to the Ash Water Recycle Basin, where it can then be pumped back to the plant for use as make-up water for the ash water system and the sulfur dioxide removal system. Water that accumulates in the Wastewater Holding Basin is decanted and either pumped to the Ash Water Recycle Basin or to the Evaporation Ponds.

When a Bottom Ash Basin approaches storage capacity, the discharge is directed by plant personnel into one of the other Bottom Ash Basins to allow for the full basin to be drained, and the bottom ash excavated and hauled to the on-site landfill. Periodically, the Wastewater Holding Pond is dewatered to allow the accumulated sludge deposits to be excavated for disposal in the on-site landfill.

According to IPS staff, an operation and maintenance crew inspects the liner condition and water levels monthly. Once every shift or twice a day, a plant operator drives around the CCW impoundments for a visual inspection. Additionally, once every year a detailed visual inspection of the CCW impoundments is performed by IPS professional engineers.

3.0 Summary of Construction History and Operation

Unit 1 at the Intermountain Power Station began commercial operation in June of 1986 and Unit 2 began commercial operation in May of 1987. The Bottom Ash Basins and Wastewater Holding Basin were commissioned in 1986. The other impoundments at IPS were commissioned in 1986, with the exception of the Settling Basin which was commissioned in 1983.

During the winter of 1988, the HDPE liner was damaged due to extreme shrinkage during a period of cold weather that resulted in multiple liner tears within the storage basins. During this event, water seeped through the bottom of the ash ponds, where it currently remains perched on an underlying clay layer, as indicated by recent measurements in the groundwater monitoring wells. IPS personnel reports that seepage or saturated areas along the embankment or at the toe of the embankment were not observed at the time of the release. Following the event, the liner was repaired and temperature expansion/contraction compensation panels were installed. In addition, groundwater recovery wells were installed to monitor, capture and pump the water perched on the underlying clay layer to the Ash Recycle Basin. IPS personnel indicated that about 200 gallons per day of leachate is collected and pumped back into the pond. The HDPE liners are continually observed visually and minor repairs are performed as needed by plant staff or sub-contractors. Also, IPS personnel indicated that periodically the embankment crests or slopes are re-graded to repair minor erosion gullies that have formed due to infrequent rainfall events.

Drawings of the original design and construction of the CCW facilities were available for review. Numerous site-specific geotechnical studies for the plant site and CCW impoundments were available for review. IPS staff indicated that the CCW impoundment embankments were constructed of on-site, natural soils. Based on the available data provided by IPS staff, the on-site soils consist primarily of silty sand and sandy silts, but may also contain clean sands and lean clay.

The CCW embankment impoundments were constructed over a foundation consisting of the natural site soils based on the design drawings and timing of the construction relative to power station commissioning. No evidence of prior releases, failures or patchwork construction was observed during the site visit or disclosed by plant personnel.

4.0 Hazard Potential Classification

4.1 Overview

According to the Federal Guidelines for Dam Safety, the hazard potential classification for the CCW impoundments is based on the possible adverse incremental consequences that result from release of stored contents due to failure of the dam or misoperation of the dam or appurtenances. Impoundments are classified as Low, Significant, or High hazard, depending on the potential for loss of human life and/or economic and environmental damages.

4.2 Bottom Ash Basins

The Bottom Ash Basins perimeter dikes, containing a total surface area of about 105 acres, total storage capacity of 3,000 acre-feet and a height of about 46 feet would be considered an “Intermediate” sized dam in accordance with the USACE Recommended Guidelines for Safety Inspection of Dams ER 1110-2-106 criteria.

The Bottom Ash Basins are not located on a waterway. An uncontrolled release of the Bottom Ash Basins content due to a failure or misoperation is not considered to cause loss of human life and the economic and environmental damages would be relatively low. The flooded area would be extensive because of the very flat surrounding topography. However, the resulting flood waters would be widespread with shallow depths. Based on the pond height and volume, the inundation area would be primarily limited to IPS property, which is very large and does not have developed property within several miles of the power station.

Based on the low potential environmental impacts to the plant site and surrounding area and consistent with the Federal Guidelines for Dam Safety and the Utah Department of Natural Resources Division of Water Rights Dam Safety Section, we recommend the Bottom Ash Basins be classified as a “Low” hazard structure.

4.3 Wastewater Holding Basin

The Wastewater Holding Basin perimeter dikes, containing a surface area of about 53 acres, storage capacity of 650 acre-feet and a height of about 15 feet would be considered a “Low” sized dam in accordance with the USACE Recommended Guidelines for Safety Inspection of Dams ER 1110-2-106 criteria.

The Wastewater Holding Basin is not located on a waterway. An uncontrolled release of the Wastewater Holding Basin content due to a failure or misoperation is not considered to cause loss of human life and the economic and environmental damages would be relatively low. The flooded area would be extensive because of the very flat surrounding topography. However, the resulting flood waters would be widespread with shallow depths. Based on the

pond height and volume, the inundation area would be primarily limited to IPS property, which is very large and does not have developed property within several miles of the power station.

Based on the low potential environmental impacts to the plant site and surrounding area and consistent with the Federal Guidelines for Dam Safety and the Utah Department of Natural Resources Division of Water Rights Dam Safety Section, we recommend the Wastewater Holding Basin be classified as a “Low” hazard structure.

5.0 Hydrology and Hydraulics

5.1 Floods of Record

Floods of record have not been evaluated and documented for the CCW impoundments at the Intermountain Power Station (IPS).

5.2 Inflow Design Floods

Currently the CCW impoundments at IPS are classified as “Low” hazard structures according to the Utah Department of Natural Resources Division of Water Rights. Based on observations during the field inspection, we concur with the “Low” hazard classifications for the Bottom Ash Basins and Wastewater Holding Basin structures (see Section 4.0). Based on the hazard classification, the State of Utah Statutes and Administrative Rules for Dam Safety specifies “Low” hazard dams be capable of passing the 100-year storm event with a minimum of 3-feet of freeboard. The USACE Recommended Guidelines for Safety Inspection of Dams ER 1110-2-106 recommends an intermediate size “Low” hazard dam be capable of passing floods ranging from the 100-year to 50 percent probable maximum flood (PMF) without overtopping the dam. Similarly, the USACE guidelines recommend a small size “Low” hazard dam be capable of passing the 50-year to 100-year storm event without overtopping the dam. Considering the “Low” hazard rating, the scale of the economic and environmental damages that could potentially occur upon failure, and the recommended range of inflow design storms, it is reasonable to select the 100-year storm event as the inflow design storm for both the intermediate sized Bottom Ash Basins and the small sized Wastewater Holding Basin. The 24-hour 100-year precipitation at the Intermountain Power Station is about 2.0 inches based on National Oceanic and Atmospheric Administration (NOAA) Atlas 14 precipitation data.

5.2.1 Bottom Ash Basins

The Bottom Ash Basins contributing drainage area is limited to the total impoundment area (approximately 105 acres) because the perimeter dikes prevent surface water run-on from adjacent land. The Bottom Ash Basins currently have significant freeboard that ranges from about 31.1-feet to 35.6-feet, providing an available combined storage capacity of approximately 1,400 acre-feet. Based on the 24-hour 100-year precipitation, the Bottom Ash Basins would receive a total of approximately 17.5 acre-feet (5.8 acre-feet each) of stormwater assuming no losses. Based on this result, the Bottom Ash Basins are expected to meet the regulatory requirements for storing or passing of the 24-hour 100-year precipitation inflow design flood.

5.2.2 Wastewater Holding Basin

The Wastewater Holding Basin contributing drainage area is limited to the impoundment area (approximately 53 acres) because the perimeter dikes prevent surface water run-on from

adjacent land. The Wastewater Holding Basin currently has approximately 5.9-feet of freeboard, providing an approximately 100 acre-feet of available storage capacity. Based on the 24-hour 100-year precipitation, the Wastewater Holding Basin would receive a total of approximately 8.8 acre-feet of stormwater assuming no losses. Based on this result, the Wastewater Holding Basin is expected to meet the regulatory requirements for storing or passing of the 24-hour 100-year precipitation inflow design flood.

5.2.3 Determination of the PMF

Not applicable.

5.2.4 Freeboard Adequacy

Based on a very simplified evaluation using conservative assumptions, the freeboard appears to be adequate at Bottom Ash Basins and Wastewater Holding Basin.

5.2.5 Dam Break Analysis

Dam break analyses have not been performed for the CCW impoundments at the IPS.

5.3 Spillway Rating Curves

Not applicable.

5.4 Evaluation

Based on the current facility operations and inflow design floods documents, the CCW impoundments at the IPS appear to have adequate capacity to store the regulatory design floods with adequate freeboard based on the recommended hazard classifications for the dams.

6.0 Geologic and Seismic Considerations

The following geologic and seismic information is based on multiple site specific geotechnical studies performed for the Intermountain Power Station that were provided at the time of the inspection. The Intermountain Power Station site is near the center of the northern Sevier Desert in the Basin and Range Physiographic Province. The area of the plant site is located in the Sevier Lake drainage system and is located on a broad alluvial fan. The ground surface within this area is relatively flat, sloping only slightly to the west. The average ground surface gradient is about 25 feet per mile. No major drainages cross the site area.

At the CCW impoundments area there are two main subsurface units. The upper unit consists primarily of interbedded lenses of sand and silty sand. This unit is about 20 feet thick. The top few feet of this deposit is comprised of eolian sand, fluvial sand, and fine gravel. The underlying unit consists of fine grained silts and stiff clays of lacustrine origin. This unit is thickly bedded and extends to a depth of at least one hundred feet. Both of the two major subsurface units dip slightly toward the west, paralleling the existing topographic slope.

Groundwater levels at the CCW impoundment areas were measured during the geotechnical investigations. Ground water levels indicated a relatively flat groundwater surface roughly paralleling the ground surface. The average groundwater surface gradient is about 0.5 percent to the west-southwest. The depths of the groundwater surface in the area range between 17 and 45 feet below the existing ground surface. No evidence of perched or artesian conditions was encountered at depths ranging from 50 to 100 feet below the ground surface during the geotechnical investigations.

The site topography is dominated by the L-1 fault system which trends northeastward through the site. The fault zone consists of relatively short, predominantly down-to-the-west faults with subdued topographic expression at the ground surface. The ridge to the east is the result of the bounding L-1 fault. The topographic expression of the western bounding faults is not as dominant with the relief about half that of the eastern bounding fault. The geotechnical studies indicate the minimum amount of displacement across the fault zone is on the order of 50 to 100 feet. However, based on analysis of aerial photographs and subsurface explorations, no faults with 50 to 100 feet of movement appear to exist beneath the CCW impoundment areas. According to the 2008 U.S. Geological Survey (USGS) Seismic Hazard Map of Utah, the site has a regional probabilistic peak ground acceleration of approximately 0.16g with a 2 percent Probability of Exceedance within 50 years (recurrence interval of approximately 2,500 years).

7.0 Instrumentation

7.1 Location and Type

Water level staff gauges are installed at all of the Intermountain Power Station CCW impoundments and are read manually. Several ground water monitoring wells are installed around the CCW impoundments perimeter to monitor water quality and for leak detection. IPS personnel indicated the groundwater monitoring wells are sampled and measured twice a year. IPS personnel provided the most recent records of water level readings from the CCW impoundments.

7.2 Readings

7.2.1 Flow Rates

Discharge through the outlet structures are not recorded at any of the CCW impoundments.

7.2.2 Staff Gauges

Water level staff gauges are located at the Bottom Ash Basins and Waste Water Holding Basin and are read manually.

7.3 Evaluation

Staff gauges and groundwater monitoring wells are the only instruments installed at the IPS CCW impoundments. It would be beneficial to install flow measurement devices at the CCW impoundments to measure and record flows into and out of the storage basins. High level alarms should also be considered to reduce the risk of overtopping the embankments. Surveyed benchmarks and embankment settlement monuments to measure and record any movement of the dikes should also be considered.

8.0 Field Assessment

8.1 General

A site visit to assess the condition of the CCW impoundments at the Intermountain Power Station was performed on October 26, 2010, by Stephen G. Brown, P.E., and Nick D Miller, P.E. of GEI. Blaine Ipson and Rand Crafts of IPSC, and Dat Quach of the Department of Water and Power City of Los Angeles assisted in the assessment.

The weather during the site visit (October 26, 2010) was sunny, with temperatures around 50 degrees Fahrenheit. The majority of the ground was dry at the time of the site visit.

At the time of inspection, GEI completed an EPA inspection checklist, which is provided in Appendix A, and photographs, which are provided in Appendix B. Field assessment of the CCW impoundments included a site walk to observe the dam crest, upstream slope, downstream slope, and intake structures.

8.2 Embankment Dam

8.2.1 Dam Crest

The dam crest of the Bottom Ash Basins and Wastewater Holding Basin appeared to be in good condition. No signs of cracking, settlement, movement, erosion or deterioration were observed during the assessment. The dam crest surface is generally composed of gravel road base material.

8.2.2 Upstream Slope

The upstream slope of the Bottom Ash Basins and Wastewater Holding Basin is protected by an 80 mil HDPE liner. The HDPE liner and the upstream slopes appeared to be in satisfactory condition. No scarps, sloughs, depressions or other indications of slope instability were observed during the inspection of the CCW impoundments. The previously described lining failure at the Wastewater Holding Basin resulted in saturated embankments. The repairs included improving the saturated subgrade with flowable concrete such that repairs could be made to the lining. A result of the repair is somewhat uneven appearance of the embankment, though the subgrade is judged to be sound.

8.2.3 Downstream Slope

The downstream slopes of the Bottom Ash Basins and Wastewater Holding Basin showed no signs of scarps, sloughs, depressions or other indications of slope instability during the inspection. The downstream slopes of the Bottom Ash Basins and Wastewater Holding

Basin are sparsely covered with vegetation consisting greasewood shrubs, wheat grass and other native vegetation. The downstream slopes showed no signs of significant erosion. However, minor erosion rill on the downstream slope of the Wastewater Holding Basin west embankment was observed, most likely due to surface runoff.

8.3 Seepage and Stability

No evidence of ongoing seepage or potential seepage was observed at the Bottom Ash Basins and Wastewater Holding Basin.

8.4 Appurtenant Structures

8.4.1 Outlet Structures

The concrete outlet structures at the Bottom Ash Basins and Wastewater Holding Basin appeared to be in good condition. The outlet pipelines were submerged and not visible at the time of the inspections. Minor amounts of flow were discharging into the outlet structures at the Bottom Ash Basins during the time of the inspections. The Wastewater Holding Basin was discharging to the pump structure at the time of the inspection. Plant staff estimated the discharge through the Wastewater Holding Basin outlet structure to be about 200 gallons per minute (gpm). The outlet structures have been in service for approximately 24 years.

8.4.2 Pump Structures

The equipment in the Wastewater Holding Basin pump structure located along the north embankment appeared to be working properly.

8.4.3 Emergency Spillway

There are no emergency spillways present at the CCW impoundments.

8.4.4 Water Surface Elevations and Reservoir Discharge

The water levels in the Bottom Ash Basins #1, #2, and #3 were at elevations 4654.4, 4649.9, and 4651.6, respectively. Freeboard at the Bottom Ash Basins ranged from 31.1 to 35.6 feet. The water level in the Wastewater Holding Basin was at El. 4644.6, providing about 5.9 feet of freeboard.

9.0 Structural Stability

9.1 Visual Observations

The assessment team saw no visible signs of instability associated with the dikes of the CCW impoundments during the October 26, 2010 site assessment.

9.2 Field Investigations

Based on the design drawings and geotechnical studies, the following subsurface investigations were performed at the site:

- Preliminary investigations were performed at the Intermountain Power Station plant site by Dames & Moore. The reports were dated May 1978, October 1978, and April 1979.
- Multiple borings, CPT soundings and laboratory tests were performed for Waste Disposal Area by Ertech. Based on the report dated 12/19/1980, prepared by Fugro (Ertech) exploration programs appear to have been performed in 1980.
- Additional field investigations were performed for the Wastewater lagoon and landfill area, which included a total of six borings and the installation of six groundwater observation wells. According to the report, the exploration program was performed during April of 1981.
- Several groundwater monitoring wells have been installed around the perimeter of the CCW impoundments to monitor groundwater quality and for leak detection. Information collected during the installation of the groundwater monitoring wells was not provided.

9.3 Methods of Analysis

Slope stability analyses have not been performed for the CCW impoundments at the Intermountain Power Station.

9.4 Seismic Stability – Liquefaction Potential

The liquefaction potential at the CCW impoundments has not been previously evaluated based on review of the available documents. However, liquefaction and dynamic settlement analyses were evaluated for the plant site and concluded that the potential for liquefaction at the plant site is very low. Given the soils at the CCW impoundment are very similar to the plant site soils, we consider the liquefaction potential at the CCW impoundments to also be low.

10.0 Maintenance and Methods of Operation

10.1 Procedures

A detailed visual inspection of the CCW impoundments is performed annually by IPS professional engineers. An operation and maintenance crew inspects the liner condition and water levels monthly.

10.2 Maintenance of Impoundments

General maintenance of the CCW impoundments is performed by IPS staff under the guidance of IPS managers and engineers. Maintenance repairs of the HDPE liner are performed by IPS staff or specialty subcontractors. Dam safety-inspections for the CCW impoundments are performed every five years by a State of Utah Department of Natural Resources, Utah Division of Water Rights inspector.

10.3 Surveillance

Once every shift, or twice a day, a plant operator drives around the CCW impoundments for a visual inspection. There are no automatic alarm systems at the CCW impoundments. Plant personnel are available at the power plant and on 24-hour call for emergencies that may arise.

11.0 Conclusions

11.1 Assessment of Dams

11.1.1 Field Assessment

The dams and outlet works facilities associated with the CCW impoundments at the Intermountain Power Station were found to be in satisfactory condition. No visual signs of instability, movement or seepage were observed. The Wastewater Holding Basin west embankment slopes show signs of minor erosion from surface runoff and a few small animal burrow holes.

11.1.2 Adequacy of Structural Stability

There are no records of a structural stability evaluation of the CCW impoundments.

11.1.3 Adequacy of Hydrologic/Hydraulic Safety

The two CCW impoundments currently appear to have adequate freeboard and storage capacity to safely store the 24-hour, 100-year storm event inflow design flood.

11.1.4 Adequacy of Instrumentation and Monitoring of Instrumentation

The CCW impoundments have staff gauges and groundwater monitoring wells. Instrumentation and monitoring programs for the CCW impoundments are considered inadequate. The facility should have surveyed benchmarks, embankment settlement monuments to measure and record any movement of the dikes. High level alarms and flow measurement devices should be considered.

11.1.5 Adequacy of Maintenance and Surveillance

The CCW impoundments at the Intermountain Power Station have adequate maintenance and surveillance programs. The facilities are generally well maintained and routine surveillance is performed by IPS staff. Dam safety-inspections for the CCW impoundments are performed every five years by a State of Utah Department of Natural Resources, Utah Division of Water Rights inspector.

11.1.6 Adequacy of Project Operations

Operating personnel are knowledgeable and are well trained in the operation of the project. The current operations of the facilities are satisfactory.

12.0 Recommendations

12.1 Corrective Measures and Analyses for the Structures

Slope stability analyses for the CCW impoundments should be performed on the maximum section of each CCW impoundment with a phreatic surface representative of steady seepage with normal water surface conditions assuming no liner. The slope stability analysis should be presented relative to the appropriate dam analysis guidelines such as the U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, or the Federal Energy Regulatory Committee.

12.2 Corrective Measures Required for Instrumentation and Monitoring Procedures

Daily water levels of the CCW impoundments are monitored by plant staff and recorded monthly. No piezometers or settlement monuments are installed at CCW impoundments. It is recommended that a more thorough instrumentation and monitoring program be developed and implemented that would include, at a minimum, settlement monuments installed along the perimeter dikes of the impoundments that receive wet coal combustion waste. Additionally, we recommended that high level alarms be installed and incorporated into the CCW impoundments.

12.3 Corrective Measures Required for Maintenance and Surveillance Procedures

We recommended IPS personnel develop and document formal inspections of the CCW impoundments, at a minimum to be performed annually by plant staff. We recommend a brief daily check inspection be conducted by IPS personnel and that a written record be maintained for the monthly inspections being conducted by IPS personnel. Also, continue efforts repair minor erosion rills observed on the embankment slopes. Due to the lack of erosion protection, minor erosion rills should be repaired promptly to prevent extensive damage to the embankment slopes.

12.4 Corrective Measures Required for the Methods of Operation of the Project Works

None.

12.5 Summary

The following factors were the main considerations in determining the final rating of the CCW impoundments at IPS.

- The dikes at the Bottom Ash Basins and Wastewater Holding Basin are Low-Hazard structures based on federal and state classifications.
- The CCW impoundments were generally observed to be in good condition in the field assessment.
- There is no stability analysis on record for the CCW impoundments.
- There is currently no instrumentation in place for the CCW impoundments, except for staff gages and groundwater monitoring wells. There is no method of accurately monitoring of perimeter dike performance (i.e. movement, settlement, etc.).
- Operational procedures are considered adequate.

12.6 Acknowledgement of Assessment

I acknowledge that the management unit(s) referenced herein was personally inspected by me and was found to be in the following condition (**select one only**):

SATISFACTORY

FAIR

POOR

UNSATISFACTORY

DEFINITIONS:

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.

I acknowledge that the management unit referenced herein:

Has been assessed on October 26, 2010 (date)

Signature: _____

List of Participants:

Stephen G. Brown, P.E.	Project Engineer, GEI Consultants, Inc.
Nick D. Miller, P.E.	Project Engineer, GEI Consultants, Inc.
Blaine Ipson	Intermountain Power Service Corporation
Rand Crafts	Intermountain Power Service Corporation
Dat Quach	Department of Water & Power City of Los Angeles

13.0 References

Black & Veatch Consulting Engineers. Select Design and Construction Drawings, 1983 through 1987, 2010.

Ertec Western, Inc (1981). "Intermountain Power Project Hydrogeologic Study of Proposed Temporary Construction Landfill and Wastewater Lagoon Sites", prepared for Los Angeles Department of Water and Power, June 1981.

Ertec Western, Inc (1981). "Intermountain Power Project Supplemental Site Specific Geotechnical Studies Volume IA Plant Site", prepared for Intermountain Power Project and Los Angeles Department of Water and Power, October 1981.

Fugro, Inc (1980). "Intermountain Power Project Site Specific Geotechnical Studies Volume I Plant Site", prepared for Intermountain Power Project and Los Angeles Department of Water and Power, November 1980.

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Intermountain Power Project, Los Angeles Department of Water and Power (DWP) (1984). "Construction Permit Wastewater Holding, Recycle, and Evaporation Ponds (Bottom Ash Basins; Bottom Ash Water Recycle Basin; Wastewater Holding Basin; Evaporation Ponds and Landfill Runoff Basin)", prepared for State of Utah Department of Health Division of Environmental Health Utah Water Pollution Control Committee, March 1984.

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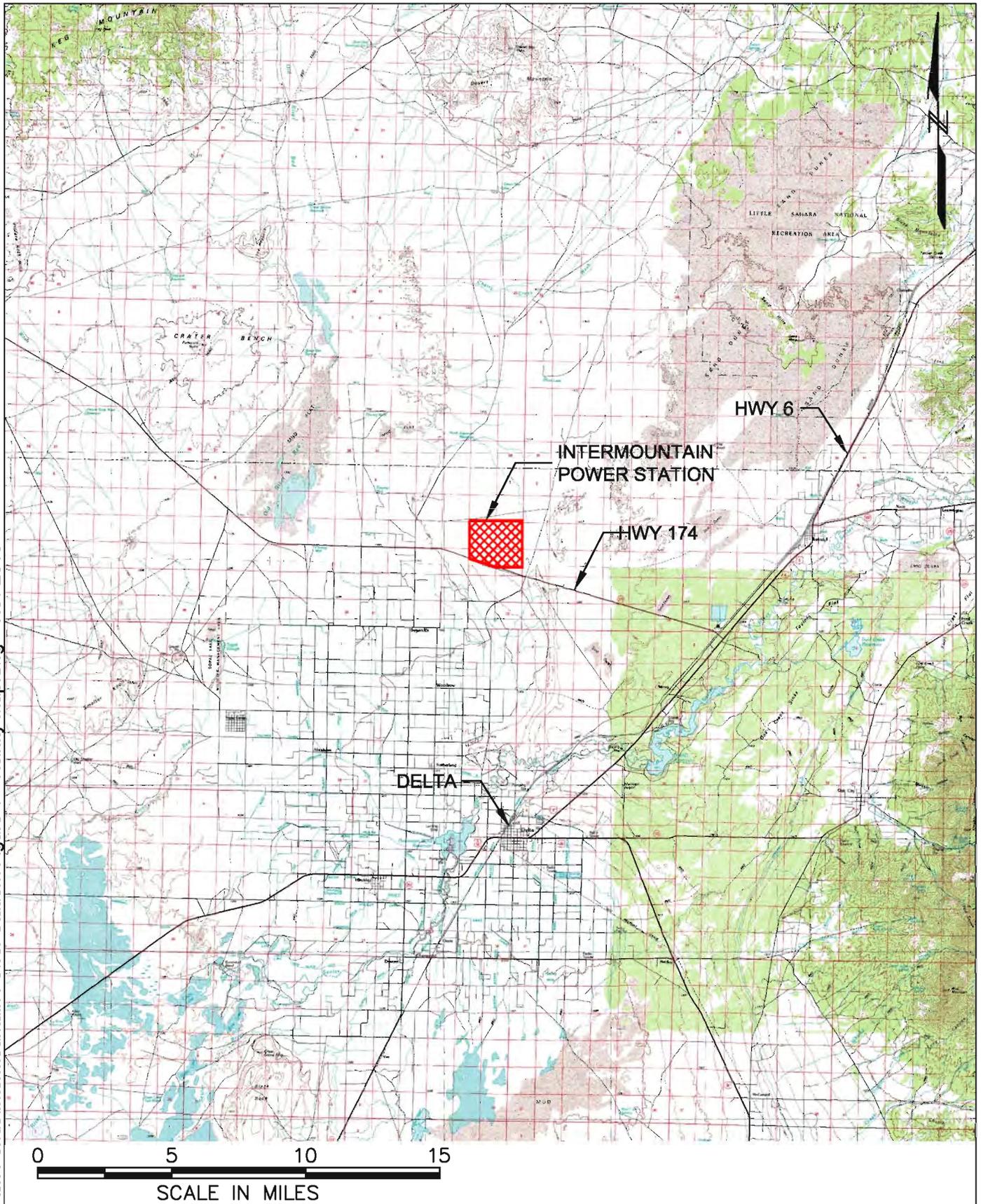
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V.W. Chee, Civil Engineering Associates (1983). “Intermountain Power Project Design Criteria and Operation Plan for Combustion By-Products Landfill”, prepared for City of Los Angeles Department of Water and Power, July 1983.

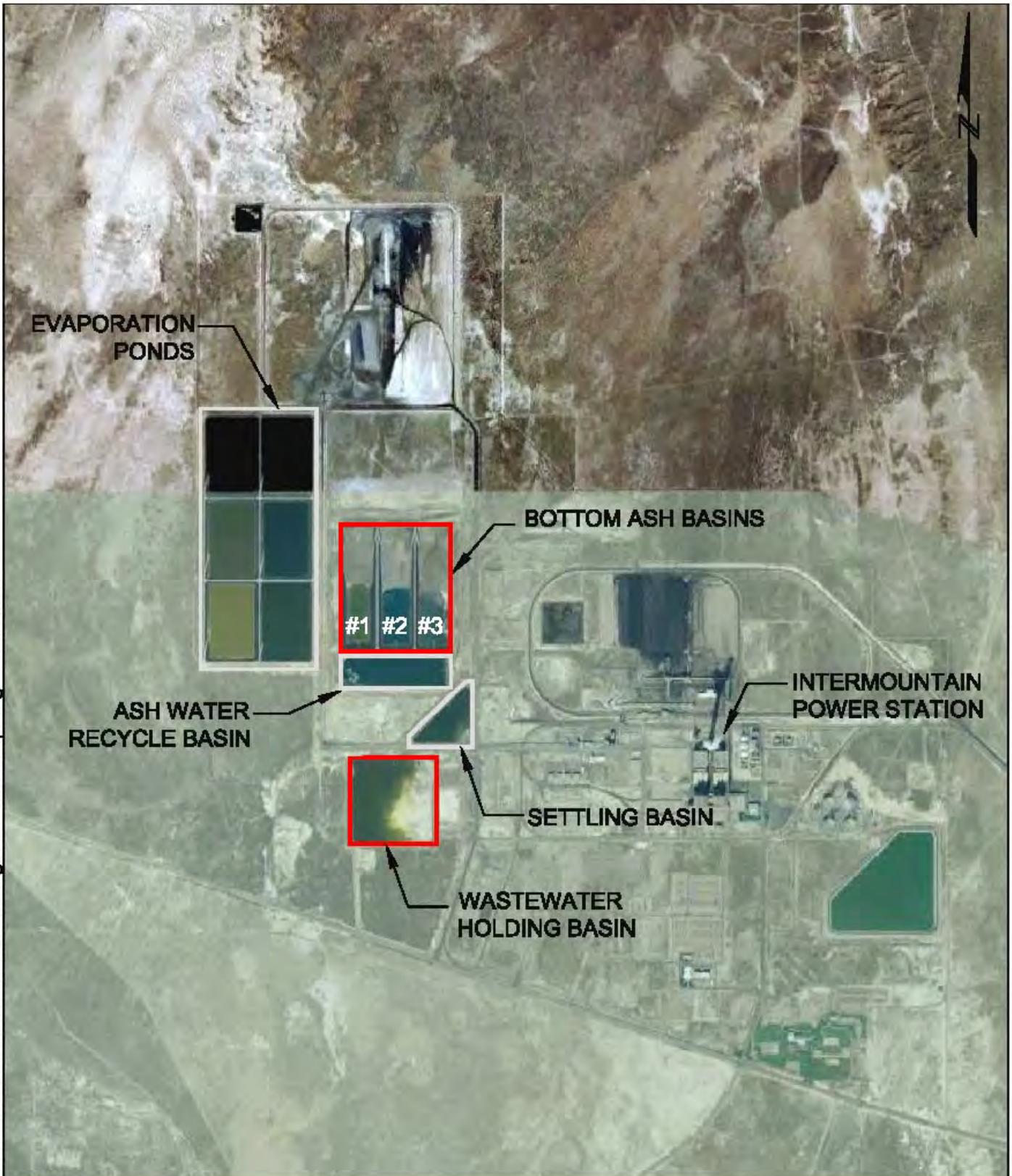
Figures



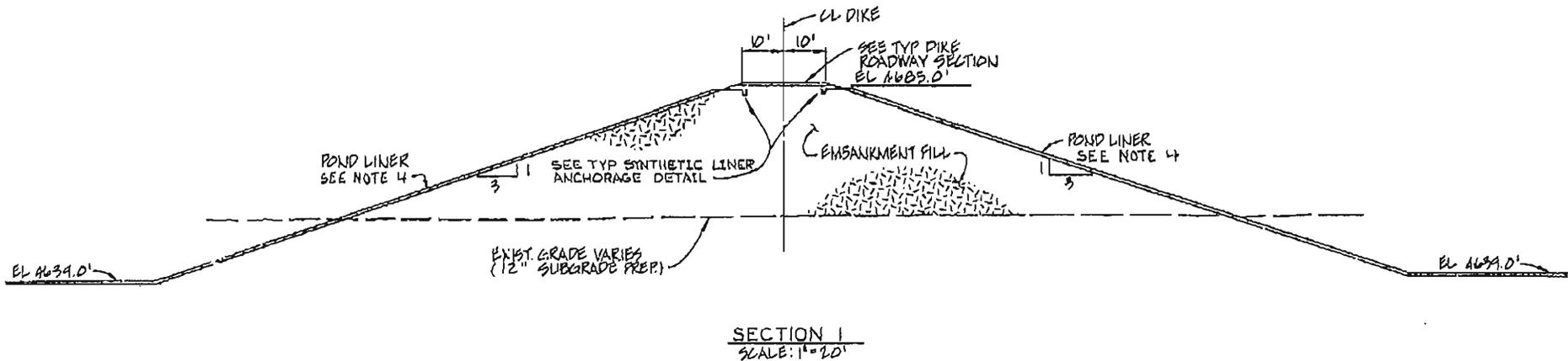
Assessment of Dam Safety of Coal Combustion
Waste Impoundments at
Intermountain Power Station
Environmental Protection Agency
Washington, D.C.

GEI Consultants
Project 092884

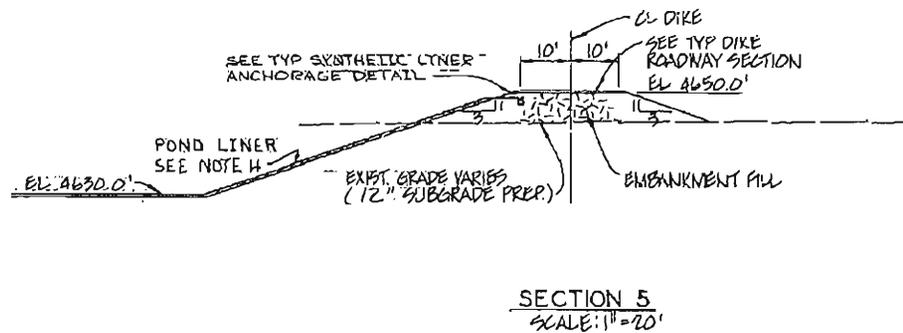
VICINITY MAP
December 2010
Figure 1



<p>Assessment of Dam Safety of Coal Combustion Waste Impoundments at Intermountain Power Station</p>		<p>SITE MAP</p>	
<p>Environmental Protection Agency Washington, D.C.</p>	<p>Project 092884</p>	<p>December 2010</p>	<p>Figure 2</p>



BOTTOM ASH BASIN SECTION



WASTEWATER HOLDING BASIN SECTION

<p>Assessment of Dam Safety of Coal Combustion Waste Impoundments at Intermountain Power Station</p>		<p>TYPICAL SECTIONS</p>	
<p>Environmental Protection Agency Washington, D.C.</p>	<p>Project 092884</p>	<p>December 2010</p>	<p>Figure 3</p>

Appendix A

Inspection Checklists

October 26, 2010



Coal Combustion Waste (CCW) Impoundment Inspection

Impoundment NPDES Permit # Utah Ground Water Permit UGW270004 INSPECTOR Steve Brown / Nick Miller

Date October 26, 2010

Impoundment Name Bottom Ash Basin #1

Impoundment Company Intermountain Power Service Corp.

EPA Region 8

State Agency (Field Office) Address 1595 Wynkoop St
Denver, CO 80202

Name of Impoundment Bottom Ash Basin #1

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New _____ Update _____

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

IMPOUNDMENT FUNCTION: Storage of bottom ash and boiler slag.

Nearest Downstream Town: Name Delta, UT (impoundment is not located on a stream or drainage)

Distance from the impoundment 11 miles

Impoundment

Location: Longitude 112 Degrees 35 Minutes 51.7 Seconds
 Latitude 39 Degrees 31 Minutes 5.4 Seconds
 State UT County Millard

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

If So Which Sate Agency? Utah Department of Natural Resources, Div. of Water Quality.

US EPA ARCHIVE DOCUMENT

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.

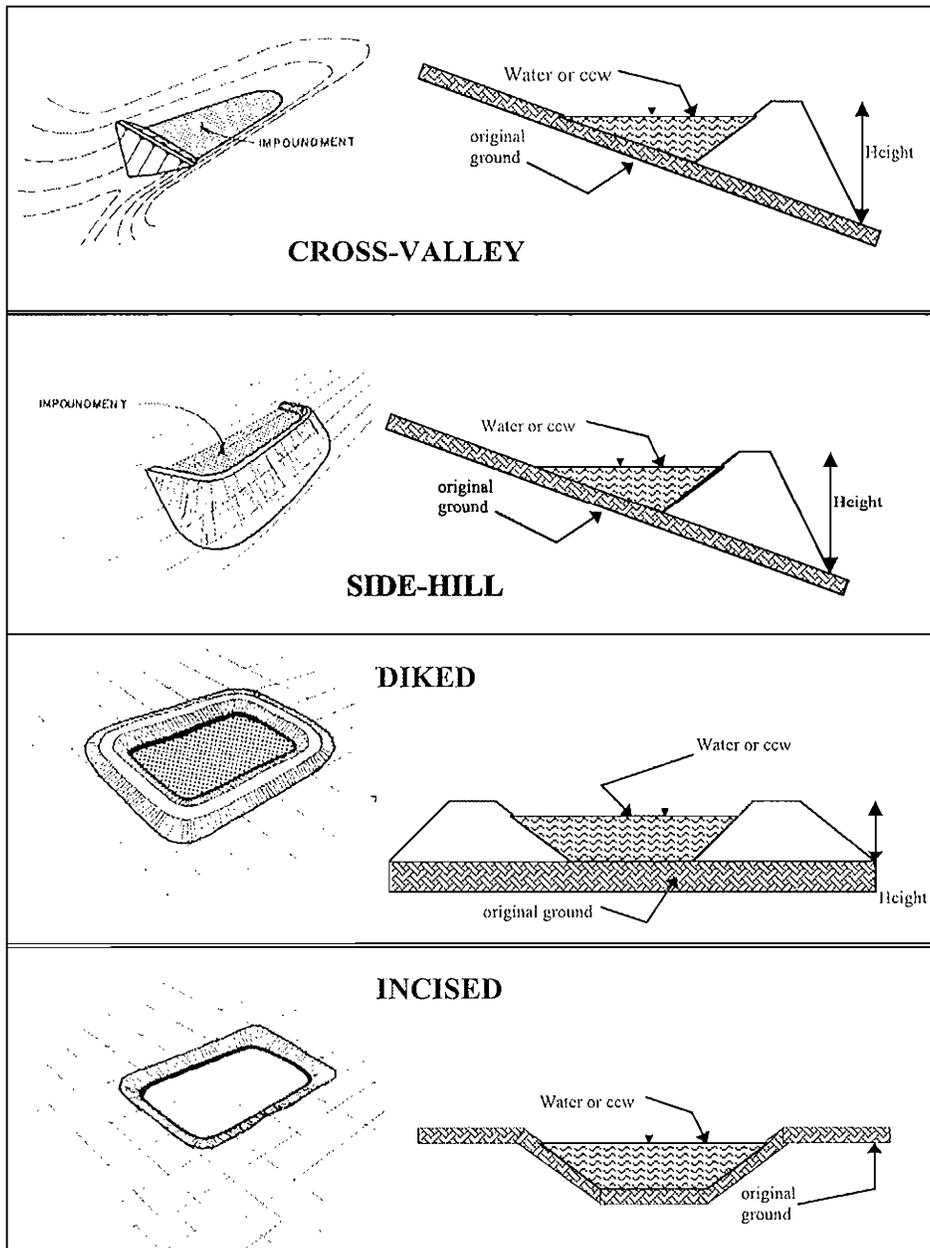
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. 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.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

An uncontrolled release of the structure's contents due to a failure or misoperation is not considered to cause loss of human life and the economic and environmental damages would be relatively low. The flood extent would be limited by the very flat surrounding topography. Flood waters would likely be widespread with shallow depths. Based on the pond height and volume, the inundation area would be primarily limited to Company property. Consistent with the Federal Guidelines for Dam Safety, the dam should be classified as a "Low" hazard structure.

CONFIGURATION:



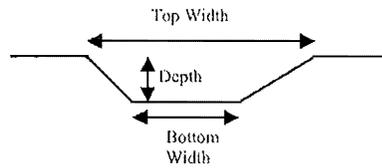
Cross-Valley
 Side-Hill
 Diked
 Incised (form completion optional)
 Combination Incised/Diked
 Embankment Height 46 feet Embankment Material Earth
 Pool Area 35 acres Liner HDPE Liner
 Current Freeboard 31.1 feet Liner Permeability 1x10⁻⁸ cm/sec for intact HDPE

TYPE OF OUTLET (Mark all that apply)

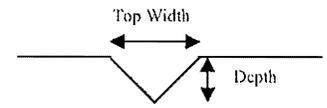
None Open Channel Spillway

- Trapezoidal
- Triangular
- Triangular
- Depth
- Bottom (or average) width
- Top width

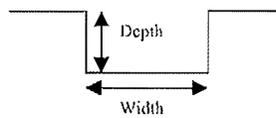
TRAPEZOIDAL



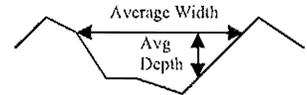
TRIANGULAR



RECTANGULAR



IRREGULAR

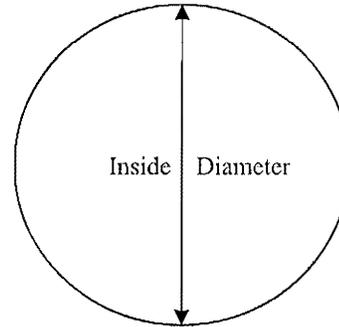


Outlet

~~24 in~~ inside diameter

Material

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



Is water flowing through the outlet? YES NO

No Outlet

Other Type of Outlet (Specify) _____

The Impoundment was Designed By Black & Veatch Consulting Engineers



Coal Combustion Waste (CCW) Impoundment Inspection

Impoundment NPDES Permit # Utah Ground Water Permit UGW270004 INSPECTOR Steve Brown / Nick Miller

Date October 26, 2010

Impoundment Name Bottom Ash Basin #2

Impoundment Company Intermountain Power Service Corp.

EPA Region 8

State Agency (Field Office) Address 1595 Wynkoop St
Denver, CO 80202

Name of Impoundment Bottom Ash Basin #2

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New _____ Update _____

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

IMPOUNDMENT FUNCTION: Storage of bottom ash and boiler slag.

Nearest Downstream Town: Name Delta, UT (impoundment is not located on a stream or drainage)

Distance from the impoundment 11 miles

Impoundment

Location: Longitude 112 Degrees 36 Minutes 04 Seconds
 Latitude 39 Degrees 31 Minutes 54 Seconds
 State UT County Millard

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

If So Which Sate Agency? Utah Department of Natural Resources, Div. of Water Quality.

US EPA ARCHIVE DOCUMENT

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.

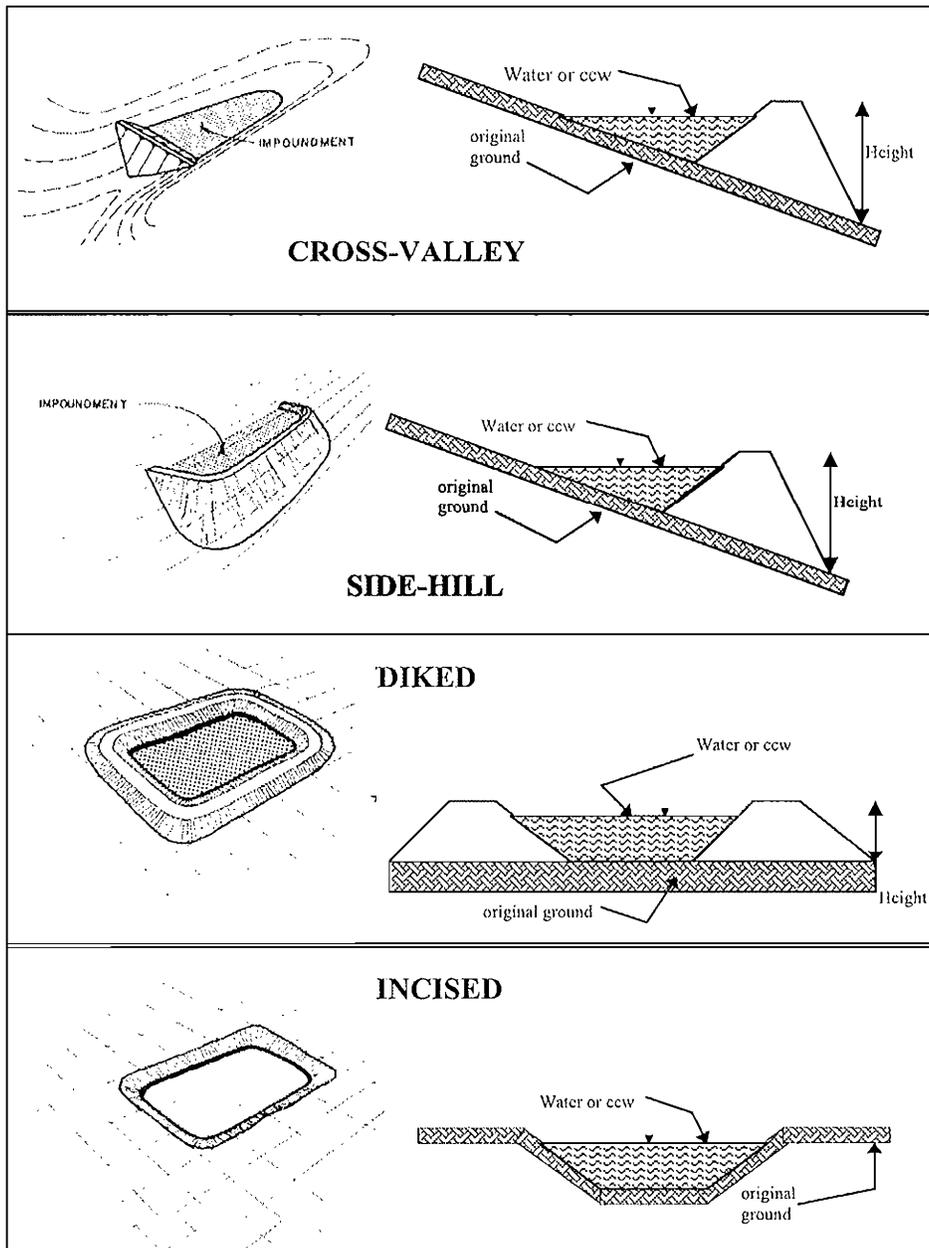
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. 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.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

An uncontrolled release of the structure's contents due to a failure or misoperation is not considered to cause loss of human life and the economic and environmental damages would be relatively low. The flood extent would be limited by the very flat surrounding topography. Flood waters would likely be widespread with shallow depths. Based on the pond height and volume, the inundation area would be primarily limited to Company property. Consistent with the Federal Guidelines for Dam Safety, the dam should be classified as a "Low" hazard structure.

CONFIGURATION:



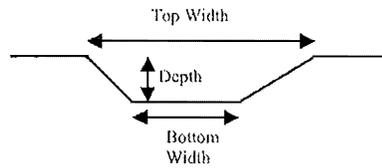
Cross-Valley
 Side-Hill
 Diked
 Incised (form completion optional)
 Combination Incised/Diked
 Embankment Height 46 feet Embankment Material Earth
 Pool Area 35 acres Liner HDPE Liner
 Current Freeboard 35.6 feet Liner Permeability 1x10⁻⁸ cm/sec for intact HDPE

TYPE OF OUTLET (Mark all that apply)

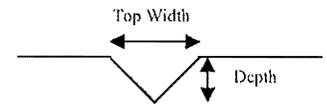
None Open Channel Spillway

- Trapezoidal
- Triangular
- Triangular
- Depth
- Bottom (or average) width
- Top width

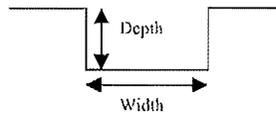
TRAPEZOIDAL



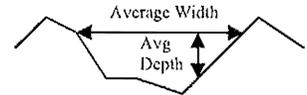
TRIANGULAR



RECTANGULAR



IRREGULAR

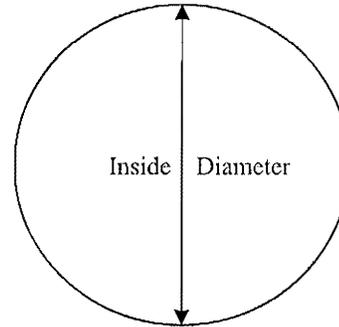


Outlet

~~24 in~~ inside diameter

Material

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



Is water flowing through the outlet? YES NO

No Outlet

Other Type of Outlet (Specify) _____

The Impoundment was Designed By Black & Veatch Consulting Engineers



Coal Combustion Waste (CCW) Impoundment Inspection

Impoundment NPDES Permit # Utah Ground Water Permit UGW270004 INSPECTOR Steve Brown / Nick Miller

Date October 26, 2010

Impoundment Name Bottom Ash Basin #3

Impoundment Company Intermountain Power Service Corp.

EPA Region 8

State Agency (Field Office) Address 1595 Wynkoop St
Denver, CO 80202

Name of Impoundment Bottom Ash Basin #3

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New _____ Update _____

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

IMPOUNDMENT FUNCTION: Storage of bottom ash and boiler slag.

Nearest Downstream Town: Name Delta, UT (impoundment is not located on a stream or drainage)

Distance from the impoundment 11 miles

Impoundment

Location: Longitude 112 Degrees 36 Minutes 8.7 Seconds
 Latitude 39 Degrees 31 Minutes 5.4 Seconds
 State UT County Millard

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

If So Which Sate Agency? Utah Department of Natural Resources, Div. of Water Quality.

US EPA ARCHIVE DOCUMENT

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.

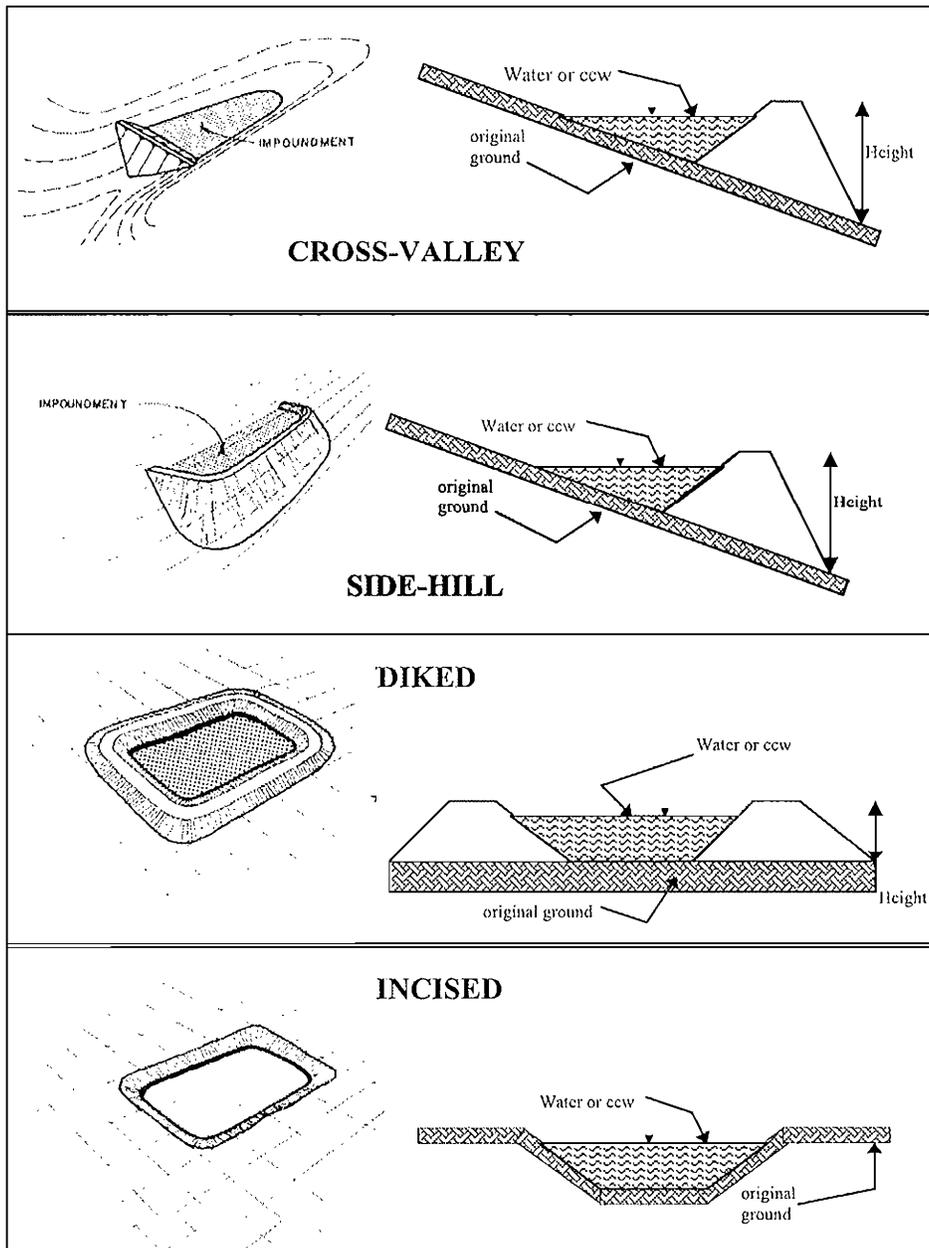
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. 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.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

An uncontrolled release of the structure's contents due to a failure or misoperation is not considered to cause loss of human life and the economic and environmental damages would be relatively low. The flood extent would be limited by the very flat surrounding topography. Flood waters would likely be widespread with shallow depths. Based on the pond height and volume, the inundation area would be primarily limited to Company property. Consistent with the Federal Guidelines for Dam Safety, the dam should be classified as a "Low" hazard structure.

CONFIGURATION:



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

Embankment Height 46 feet Embankment Material Earth

Pool Area 35 acres Liner HDPE Liner

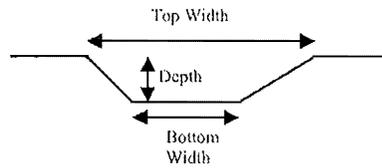
Current Freeboard 33.9 feet Liner Permeability 1x10⁻⁸ cm/sec for intact HDPE

TYPE OF OUTLET (Mark all that apply)

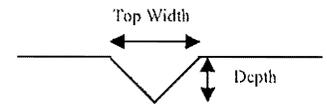
None Open Channel Spillway

- Trapezoidal
- Triangular
- Triangular
- Depth
- Bottom (or average) width
- Top width

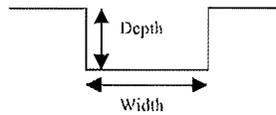
TRAPEZOIDAL



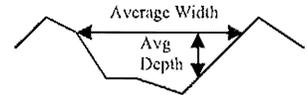
TRIANGULAR



RECTANGULAR



IRREGULAR

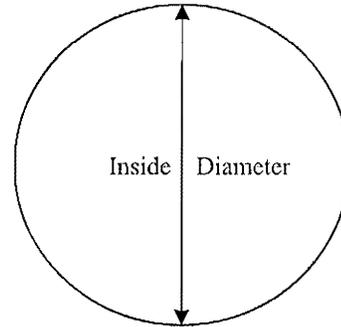


Outlet

~~24 in~~ inside diameter

Material

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



Is water flowing through the outlet? YES NO

No Outlet

Other Type of Outlet (Specify) _____

The Impoundment was Designed By Black & Veatch Consulting Engineers



Coal Combustion Waste (CCW) Impoundment Inspection

Impoundment NPDES Permit # Utah Ground Water Permit UGW270004 INSPECTOR Steve Brown / Nick Miller

Date October 26, 2010

Impoundment Name Wastewater Holding Pond

Impoundment Company Intermountain Power Service Corp.

EPA Region 8

State Agency (Field Office) Address 1595 Wynkoop St
Denver, CO 80202

Name of Impoundment Wastewater Holding Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New _____ Update _____

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

IMPOUNDMENT FUNCTION: Storage of Flue Gas, boiler slag, bottom ash and other process water

Nearest Downstream Town: Name Delta, UT (impoundment is not located on a stream or drainage)
Distance from the impoundment 11 miles

Impoundment

Location: Longitude 112 Degrees 36 Minutes 0.8 Seconds
Latitude 39 Degrees 30 Minutes 28.7 Seconds
State UT County Millard

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

If So Which Sate Agency? Utah Department of Natural Resources, Div. of Water Quality.

US EPA ARCHIVE DOCUMENT

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.

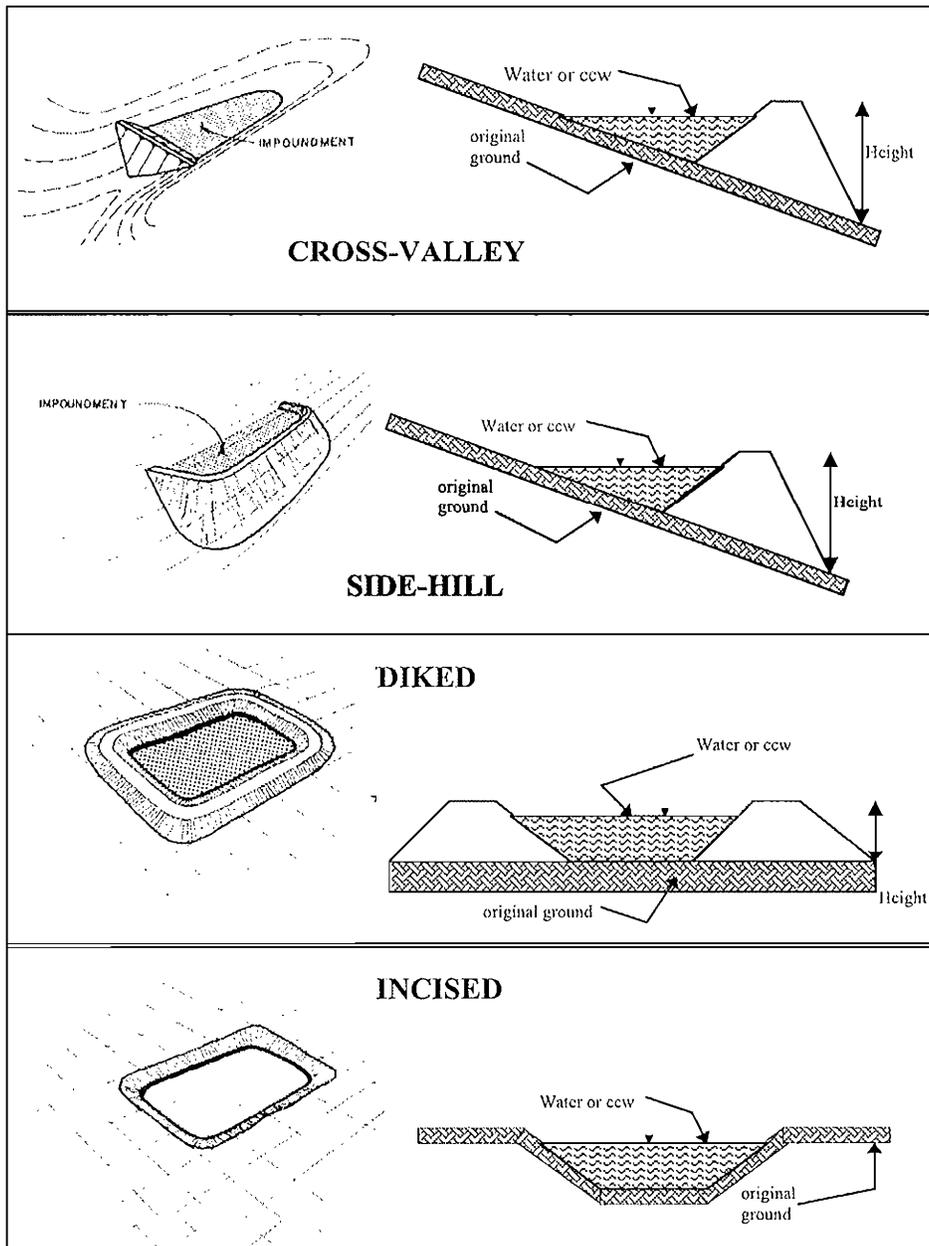
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. 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.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

An uncontrolled release of the structure's contents due to a failure or misoperation is not considered to cause loss of human life and the economic and environmental damages would be relatively low. The flood extent would be limited by the very flat surrounding topography. Flood waters would likely be widespread with shallow depths. Based on the pond height and volume, the inundation area would be primarily limited to Company property. Consistent with the Federal Guidelines for Dam Safety, the dam should be classified as a "Low" hazard structure.

CONFIGURATION:



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

Embankment Height 15 feet Embankment Material Earth

Pool Area 53 acres Liner HDPE Liner

Current Freeboard 5.9 feet Liner Permeability 1x10⁻⁸ cm/sec for intact HDPE

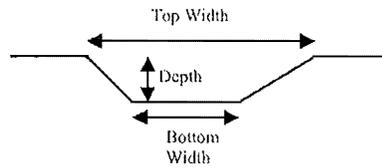
TYPE OF OUTLET (Mark all that apply)

None Open Channel Spillway

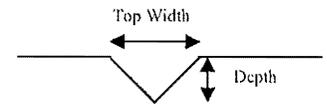
- Trapezoidal
- Triangular
- Triangular

- Depth
- Bottom (or average) width
- Top width

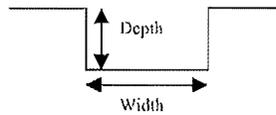
TRAPEZOIDAL



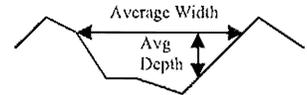
TRIANGULAR



RECTANGULAR



IRREGULAR

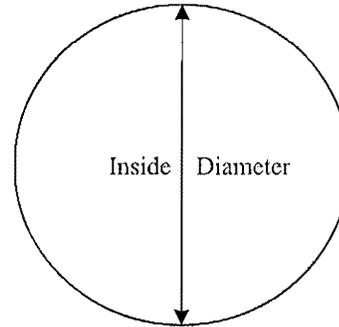


Outlet

~~24 in~~ inside diameter

Material

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



Is water flowing through the outlet? YES NO

No Outlet

Other Type of Outlet (Specify) _____

The Impoundment was Designed By Black & Veatch Consulting Engineers

Appendix B

Inspection Photographs

October 26, 2010



Photo 1: Wastewater Holding Pond, looking south from north dike.



Photo 2: Wastewater Holding Pond, looking west at north dike upstream slope.



Photo 3: Wastewater Holding Pond, looking west at north dike crest and downstream slope.



Photo 4: Wastewater Holding Pond, looking south at intake structure from north dike.



Photo 5: Wastewater Holding Pond, looking south at reservoir area from intake structure.



Photo 6: Wastewater Holding Pond, intake structure steel stop logs.



Photo 7: Wastewater Holding Pond, looking west at reservoir area and west dike from intake.



Photo 8: Wastewater Holding Pond, Intake structure platform and removable grate.



Photo 9: Wastewater Holding Pond, looking west at north dike liner.



Photo 10: Wastewater Holding Pond, looking east at east dike and liner.



Photo 11: Wastewater Holding Pond, looking south from west dike at crest and entrance ramp.



Photo 12: Wastewater Holding Pond, looking south at west dike downstream slope.



Photo 13: Wastewater Holding Pond, looking south at west dike entrance ramp, note ramp gage.



Photo 14: Wastewater Holding Pond, looking at groundwater well along west dike.



Photo 15: Wastewater Holding Pond, looking east at reservoir area and east dike from west dike.



Photo 16: Wastewater Holding Pond, looking east at reservoir area and east dike from west dike.



Photo 17: Wastewater Holding Pond, looking east at south dike crest.



Photo 18: Wastewater Holding Pond, looking east at south dike upstream slope and liner.



Photo 19: Bottom Ash Basin #3, looking at intake and south dike upstream slope and liner.



Photo 20: Bottom Ash Basin #3, looking north at west dike crest, upstream slope and liner



Photo 21: Bottom Ash Basin #3, looking northeast from west dike at reservoir area and east inner dike



Photo 22: Bottom Ash Basin #3, looking north at west dike downstream slope.



Photo 23: Settling Basin, looking east from BA#3 south dike at settling basin reservoir area.



Photo 24: Bottom Ash Basin #1-3, looking east at south dike crest and downstream slope.



Photo 25: Bottom Ash Basin #3, looking north at intake structure.



Photo 26: Bottom Ash Basin #3, looking northeast at BA#2/#3 inner dike and liner.



Photo 27: Bottom Ash Basin #2, looking south from south dike at Settling basin slopes and reservoir area.



Photo 28: Evaporation Ponds, looking northwest from BA#3 west dike at evaporation ponds.



Photo 29: Bottom Ash Basin #1-3, looking east at north dike crest and downstream slope.



Photo 30: Bottom Ash Basin #3, looking at inlet pipeline discharging into rundown structure.



Photo 31: Bottom Ash Basin #3, looking at discharge through rundown structure.



Photo 32: Bottom Ash Basin #3, looking south from north bank at inlet area and reservoir slopes.



Photo 33: Bottom Ash Basin #1, looking south at intake and inner dike upstream slope and liner.



Photo 34: Bottom Ash Basin #2, looking south at intake and inner dike upstream slope and liner.



Photo 35: Bottom Ash Basin #2, looking northwest from inner dike at inlet and reservoir area.



Photo 36: Bottom Ash Basin #1, looking northeast from inner dike at inlet and reservoir area.



Photo 37: Bottom Ash Basin #1, looking north at east dike downstream slope.



Photo 38: Bottom Ash Basin #1, looking north at east dike downstream toe.



Photo 39: Bottom Ash Basin #1, looking north at east dike crest.



Photo 40: Bottom Ash Basin #1, looking south east dike upstream slope and liner.



Photo 41: Evaporation Pond #5, looking south at reservoir area and upstream liner.



Photo 42: Evaporation Pond #6, looking south at reservoir area and upstream liner.



Photo 43: Evaporation Pond #6, looking southeast at reservoir area and inner dikes.



Photo 44: Evaporation Pond #2, looking east at reservoir area and upstream liner, note considerable salt accumulation.

Appendix C

Reply to Request for Information Under Section 104(e)



ANTONIO R. VILLARAIGOSA
Mayor

Commission
LEE KANON ALPERT, *President*
EDITH RAMIREZ, *Vice President*
WALLY KNOX
FORESCEE HOGAN-ROWLES
JONATHAN PARFREY
BARBARA E. MOSCHOS, *Secretary*

H. DAVID NAHAI,
Chief Executive Officer and General Manager

March 23, 2009

Mr. Richard Kinch
US Environmental Protection Agency
Two Potomac Yard
2733 South Crystal Drive
5th Floor; N-5783
Arlington, VA 22202 2733

Dear Mr. Kinch,

Subject: Response to CERCLA §104(e) Information Collection Request
Intermountain Power Project, Delta, UT

As Operating Agent of Intermountain Power Project (IPP), located in Delta, Utah, the Los Angeles Department of Water & Power (LADWP) is herein providing required information in response to Environmental Protection Agency's (EPA) Information Collection Request (ICR) on impounded management units used for coal combustion byproducts. Your CERCLA §104(e) ICR of March 9, 2009, was received by the IPP on March 13, 2009.

There are thirteen management units at the IPP to which this ICR is applicable:

<u>Management Unit(s)</u>	<u>Type</u>
Settling Basin (one)	Intermediate storage
Bottom Ash Basins (three)	Permanent ash disposal and intermediate water storage
Ash Water Recycle Basin (one)	Intermediate storage
Wastewater Holding Basin (one)	Intermediate storage
Evaporation Ponds (six)	Permanent disposal
Landfill Run-Off Basin (one)	Permanent disposal

The information requested was compiled by the Intermountain Power Service Corporation (IPSC), which operates the plant. Answers to the specific questions contained within the request are in Enclosure 1. Documentation specifically requested to support Question No. 6 is provided in Enclosure 2. Other supporting documentation

Water and Power Conservation ... a way of life

111 North Hope Street, Los Angeles, California 90012-2607 Mailing address: Box 51111, Los Angeles 90051-5700
Telephone: (213) 367-4211 Cable address: DEWAPOLA

US EPA ARCHIVE DOCUMENT

Mr. Richard Kinch
Page 2
March 23, 2009

can be found at <http://nrwrt1.nr.state.ut.us/cgi-bin/damview.exe>, by clicking "List by Dam Name", and choosing each applicable management unit under "Intermountain Power."

For clarifications to this submittal, please contact Mr. George W. Cross, IPSC President and Chief Operations Officer, at (435) 864-4414, or george-c@ipsc.com.

I am the Director of Generation for the LADWP, the Operating Agent for the IPP, and therefore have the authority to make the following certification as authorized representative for the IPP as required by the ICR:

I certify that the information contained in this response to EPA's request for information and the accompanying documents is true, accurate, and complete. As to the identified portions of this response for which I cannot personally verify their accuracy, I certify under penalty of law that this response and all attachments were prepared in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person or persons who manage the system, those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Signed: 

Name: Eric J. Tharp

Title: Director of Generation

DQ/RJC:sg

Enclosures

By Federal Express

c/enc: Mr. George W. Cross – IPSC

Mr. Blaine Ipson – IPSC

Mr. Rand Crafts – IPSC

US EPA ARCHIVE DOCUMENT



State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WATER RIGHTS

ENCLOSURE 2

Michael O. Leavitt
Governor
Robert L. Morgan
Executive Director
Jerry D. Olds
State Engineer

1594 West North Temple, Suite 220
PO Box 146300
Salt Lake City, Utah 84114-6300
(801) 538-7240 telephone
(801) 538-7467 fax
www.nr.utah.gov

April 20, 2004

GEORGE W. CROSS, CHIEF OPERATIONS OFFICER
INTERMOUNTAIN POWER SERVICE CORPORATION
850 WEST BRUSH WELLMAN ROAD
DELTA, UT 84624

Re: INTERMOUNTAIN POWER - BOTTOM ASH BASINS/UT00463
INTERMOUNTAIN POWER - BOTTOM ASH RECYCLE/UT00464
INTERMOUNTAIN POWER - EVAPORATION PONDS/UT00465
INTERMOUNTAIN POWER - SETTLING BASIN/UT00466
INTERMOUNTAIN POWER - STORAGE BASIN/UT00467
INTERMOUNTAIN POWER - WASTEWATER/UT00468

A field inspection of the above-referenced dams was completed on April 14, 2004, with the following in attendance:

<u>NAME</u>	<u>REPRESENTING</u>
Terry Monroe	Division of Water Rights
Blain Ipson	Owner's Representative

Based on our visual observation of the dam and appurtenant facilities, we have observed some items which need attention to ensure the satisfactory long-term operation of the facilities:

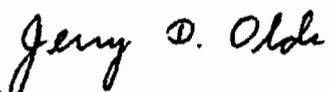
1. Several burrowing rodents were observed on the Wastewater embankment. These rodents should be eradicated.
2. Erosion gullies have formed on several areas of the downstream face of the embankments. The most notable area is at the southwest corner of the evaporation ponds. It appears that this is a result of the crest being graded to drain to the downstream side in these areas. The crest of the embankments should be graded with a slight slope so that they drain to the upstream side into the basin.

Utah!
Where ideas connect

Page 2
Intermountain Power
April 20, 2004

Your cooperation is appreciated. If you have any questions, please feel free to contact Kirk Forbush at (435) 896-4429.

Sincerely,



Jerry D. Olds, P.E.
State Engineer

JDO/tm

pc: Kirk Forbush - Water Rights Regional Engineer
Director Millard County Emergency Services

QUESTION #1

1. Relative to the National Inventory of Dams criteria for High, Significant, Low, or Less-than-Low, Please provide the potential hazard rating for each management unit and indicate who established the rating, what the basis of the rating is, and what federal or state agency regulates the unit(s). If the unit(s) does not have a rating, please note that fact.

ICR Question	Settling Basin	Bottom Ash Basins	Ash Water Recycle Basin	Wastewater Holding Basin	Evaporation Ponds	Landfill Run-off Basin
1.a. Please provide the potential hazard rating for each management unit	LOW	LOW	LOW	LOW	LOW	Not Rated
1.b. Indicate who established the rating	Utah Department of Natural Resources	n/a				
1.c. Basis for the rating	No potential for probable loss of human life, high economic loss, or environmental loss	No potential for probable loss of human life, high economic loss, or environmental loss	No potential for probable loss of human life, high economic loss, or environmental loss	No potential for probable loss of human life, high economic loss, or environmental loss	No potential for probable loss of human life, high economic loss, or environmental loss	Does not exceed 25 feet in height, does not exceed 50 acre feet (af)
1.d. Agency regulating the unit	Utah Department of Natural Resources	Utah Department of Natural Resources				

NOTE: For additional information for these IPP ponds, please refer to <http://nrcert1.or.state.ut.us/cgi-bin/damview.exe>, and click "List by Dam Name", and choose each unit under "Intermountain Power."

QUESTION #2

2. What year was each management unit commissioned and expanded?

ICR Question	Settling Basin	Bottom Ash Basins	Ash Water Recycle Basin	Wastewater Holding Basin	Evaporation Ponds	Landfill Run-off Basin
2. What year was each management unit commissioned and expanded?	1983	1986	1986	1986	1986	1986

QUESTION #3

3. What materials are temporarily or permanently contained in the unit? Use the following categories to respond to this question: (1) fly ash; (2) bottom ash; (3) boiler slag; (4) flue gas emission control residuals; (5) other. If the management unit contains more than one type of material, please identify all that apply. Also, if you identify "other," please specify the other types of materials that are temporarily or permanently contained in the unit(s).

ICR Question	Settling Basin	Bottom Ash Basins	Ash Water Recycle Basin	Wastewater Holding Basin	Evaporation Ponds	Landfill Run-off Basin
3. What materials are temporarily or permanently contained in the unit?	Flue gas emission control residuals; OTHER (incl. wash down, coal pile run-off, boiler blowdown, cooling tower blowdown, regenerant rinsate, stormwater collection, building/structure drains)	Bottom ash; boiler slag; OTHER (incl. pulverizer rejects, chemical clean residue)	OTHER (incl. leachate from bottom ash, boiler slag, pulverizer rejects)	Flue gas emission control residuals; OTHER (incl. all process waters separated for re-use: wash down, coal pile run-off, boiler blowdown, cooling tower blowdown, regenerant rinsate, leachate from bottom ash, boiler slag, pulverizer rejects)	OTHER (incl. all pond water sources as described for WW Holding Basin, and treated sewage plant effluent)	OTHER (incl. leachate and run-off from combustion by-products landfill which consists of fly ash, flue gas emission control residues, bottom ash, boiler slag, pulverizer rejects)

Intermountain Power Service Corporation Response to EPA March 9, 2009 Request for Information Under CERLCA §104(e)

QUESTION #4

4. Was the management unit(s) designed by a Professional Engineer? Is or was the construction of the waste management unit(s) under the supervision of a Professional Engineer? Is inspection and monitoring of the safety of the waste management unit(s) under the supervision of a Professional Engineer?

ICR Question	Settling Basin	Bottom Ash Basins	Ash Water Recycle Basin	Wastewater Holding Basin	Evaporation Ponds	Landfill Run-off Basin
4.a. Was the management unit(s) designed by a Professional Engineer?	YES	YES	YES	YES	YES	YES
4.b. Is or was the construction of the waste management unit(s) under the supervision of a Professional Engineer?	YES	YES	YES	YES	YES	YES
4.c. Is inspection and monitoring of the safety of the waste management unit(s) under the supervision of a Professional Engineer?	YES	YES	YES	YES	YES	YES

NOTE: For supporting documentation on these IPP ponds, please refer to <http://ncwrt1.or.state.ut.us/cgi-bin/damview.exe>, and click "List by Dam Name", and choose each unit under "Intermountain Power."

Intermountain Power Service Corporation Response to EPA March 9, 2009 Request for Information Under CERLCA §104(e)

QUESTION #5

5. When did the company last assess or evaluate the safety (i.e., structural integrity) of the management unit(s)? Briefly describe the credentials of those conducting the structural integrity assessments/evaluations. Identify actions taken or planned by facility personnel as a result of these assessments or evaluations. If corrective actions were taken, briefly describe the credentials of those performing the corrective actions, whether they were company employees or contractors. If the company plans an assessment or evaluation in the future, when is it expected to occur?

ICR Question	Settling Basin	Bottom Ash Basins	Ash Water Recycle Basin	Wastewater Holding Basin	Evaporation Ponds	Landfill Run-off Basin
5.a. When did the company last assess or evaluate the safety of the management unit(s)?	Spring, 2008					
5.b. Describe the credentials of those conducting the structural integrity assessments/evaluations	Environmental Engineer					
5.c. Describe the credentials of those performing the corrective actions	Plant Operations Supervisor, Plant Engineer (employees) HDPE Liner Repair Personnel (contractor)	Plant Operations Supervisor, Plant Engineer (employees) HDPE Liner Repair Personnel (contractor)	Plant Operations Supervisor, Plant Engineer (employees) HDPE Liner Repair Personnel (contractor)	Plant Operations Supervisor, Plant Engineer (employees) HDPE Liner Repair Personnel (contractor)	Plant Operations Supervisor, Plant Engineer (employees) HDPE Liner Repair Personnel (contractor)	Plant Operations Supervisor, Plant Engineer (employees) HDPE Liner Repair Personnel (contractor)
5.d. When is the next assessment expected to occur?	Spring, 2009					

Intermountain Power Service Corporation Response to EPA March 9, 2009 Request for Information Under CERLCA §104(e)

QUESTION #6

6. When did a State or a Federal regulatory official last inspect or evaluate the safety (structural integrity) of the management unit(s)? If you are aware of a planned state or federal inspection or evaluation in the future, when is it expected to occur? Please identify the Federal or State regulatory agency or department which conducted or is planning the inspection or evaluation. Please provide a copy of the most recent official inspection report or evaluation.

ICR Question	Settling Basin	Bottom Ash Basins	Ash Water Recycle Basin	Wastewater Holding Basin	Evaporation Ponds	Landfill Run-off Basin
6.a. When did a State or a Federal regulatory official last inspect or evaluate the safety of the management unit(s)?	April, 2004	Never				
6.b. If you are aware of a planned state or federal inspection or evaluation in the future, when is it expected to occur?	2009 (every 5 years)	Not expected				
6.c. Please identify the regulatory agency or department which conducted or is planning the inspection or evaluation.	State of Utah Department of Natural Resources, Utah Division of Water Rights	State of Utah Department of Natural Resources, Utah Division of Water Rights	State of Utah Department of Natural Resources, Utah Division of Water Rights	State of Utah Department of Natural Resources, Utah Division of Water Rights	State of Utah Department of Natural Resources, Utah Division of Water Rights	n/a
6.d. Please provide a copy of the most recent official inspection report or evaluation.	Enclosed (See DNR/DWR Inspection letter of April20, 2004)	Enclosed (See DNR/DWR Inspection letter of April20, 2004)	Enclosed (See DNR/DWR Inspection letter of April20, 2004)	Enclosed (See DNR/DWR Inspection letter of April20, 2004)	Enclosed (See DNR/DWR Inspection letter of April20, 2004)	n/a

NOTE: For additional information for these IPP ponds, please refer to <http://nrwrl1.nr.state.ut.us/cgi-bin/damview.exe>, and click "List by Dam Name", and choose each unit under "Intermountain Power."

QUESTION #7

7. Have assessments or evaluations, or inspections conducted by State or Regulatory officials conducted within the last year uncovered a safety issue(s) with the management unit(s), and if so, describe the actions that have been or are being taken to deal with the issue or issues. Please provide any documentation that you have for these actions.

ICR Question	Settling Basin	Bottom Ash Basins	Ash Water Recycle Basin	Wastewater Holding Basin	Evaporation Ponds	Landfill Run-off Basin
7.a. Have evaluations conducted within the last year uncovered a safety issue with the management unit(s)?	No safety issues	No safety issues; minor maintenance items only				
7.b. Describe the actions taken	n/a	Liner repair, embankment run-off erosion fill	Liner repair, embankment run-off erosion fill	Liner repair	Liner repair	Liner repair
7.c. Provide documentation	N/A – no safety issues	N/A – no safety issues	N/A – no safety issues	N/A – no safety issues	N/A – no safety issues	N/A – no safety issues

Intermountain Power Service Corporation Response to EPA March 9, 2009 Request for Information Under CERLCA §104(e)

QUESTION #8

8. What is the surface area (acres) and total storage capacity of each of the management unit(s)? What is the volume of materials currently stored in each of the management unit(s)? Please provide the date that the volume measurement(s) was taken. Please provide the maximum height is explained later in this Enclosure.

ICR Question	Settling Basin	Bottom Ash Basins	Ash Water Recycle Basin	Wastewater Holding Basin	Evaporation Ponds	Landfill Run-off Basin
8.a. What is the surface area (acres) of each of the management unit(s)?	14 acres	105 acres (three ponds at 35 acres each)	27 acres	53 acres	180 acres (Six ponds @ 30 acres each)	5 acres
8.b. What is the total storage capacity of each of the management unit(s)?	145 af	3000 af (three ponds at 1000 af each)	590 af	650 af	3225 af (Six ponds at approx. 540 af each, average)	30 af
8.c. What is the volume of materials currently stored in each of the management unit(s)?	103 af	1590 af	321 af	551 af	2077 af	Empty
8.d. Please provide the date that the volume measurement(s) was taken.	3/2/2009	3/2/2009	3/2/2009	3/2/2009	3/2/2009	3/13/09
8.e. Please provide the maximum height is explained later in this Enclosure.	7 ft	36 ft	27 ft	15 ft	23 ft	8 ft

NOTE: For construction drawings for these IPP ponds, please refer to <http://nrwtl.or.state.or.us/cgi-bin/damview.exe>, and click "List by Dam Name", and choose each unit under "Intermountain Power."

Intermountain Power Service Corporation Response to EPA March 9, 2009 Request for Information Under CERLCA §104(e)

QUESTION #9

9. Please provide a brief history of known spills or unpermitted releases from the unit within the last ten years, whether or not these were reported to State of Federal regulatory agencies. For purposes of this question, please include only releases to surface water or to the land (do not include releases to groundwater).

ICR Question	Settling Basin	Bottom Ash Basins	Ash Water Recycle Basin	Wastewater Holding Basin	Evaporation Ponds	Landfill Run-off Basin
9. Please provide a brief history of known spills or unpermitted releases from the unit within the last ten years	NONE	NONE	NONE	NONE	NONE	NONE

QUESTION #10

10. Please identify all current legal owner(s) and operator(s) at the facility.

Owner: Intermountain Power Agency
10653 S. River Front Parkway, Suite 120
South Jordan, UT 84095

Operating Agent: Los Angeles Department of Water & Power
111 Hope St
Los Angeles, CA 90012

Operating Company: Intermountain Power Service Corp
850 W. Brush Wellman Rd
Delta, UT 84624