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Geotechnical
Environmental
Resources
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DRAFT
Specific Site Assessment for Coal Combustion Waste Impoundments at Reid Gardner Generating Station

NV Energy
Moapa, Nevada

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

Submitted by:
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Project 092885

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Acronym List

CCW	coal combustion waste
NDWR	Nevada Division of Water Resources
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FS	factors of safety
GEI	GEI Consultants, Inc.
HDPE	high density polyethylene
IDF	inflow design flood
MW	megawatts
NDEP	Nevada Division of Environmental Protection
NDWR	State of Nevada, Division of Water Resources
NOAA	National Oceanic and Atmospheric Administration
PMF	probable maximum flood
PVC	polyvinyl chloride
RGGS	Reid Gardner Generating Station
SNHD	Southern Nevada Health District
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 Reid Gardner Generating Station (RGGS) in Clark County, near Moapa, Nevada. The RGGS Units 1, 2, and 3 are owned and operated by NV Energy. Unit 4 is co-owned by NV Energy and the California Department of Water Resources, and is operated by NV Energy. The CCW impoundments are the Ponds: B1, B2, B3, C1, C2, E1, E2, and F. The specific site assessment was performed on February 15, 2011.

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 NV Energy.
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-B11S-00011 between EPA and GEI, dated January 25, 2011.

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
Amber L. Misgen	Project Engineer
Michael Woodward	Staff 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 B1, B2, B3, C1, C2, E1, E2, and F at Reid Gardner Generating Station, in Clark County, near Moapa, Nevada. 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 warrantees, 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 NAD83, Nevada State Plane East Zone, and the elevations are based on NAVD88 as noted on the drawings titled "Evaporation Ponds C-1 & C-2 Horizontal Control Plan", Drawing Number C-1 dated February 2005, and "Ponds D & E Reconstruction Existing Site Plan", Drawing Number C-3 dated March 2002, prepared by NV Energy.

1.7 Prior Inspections

Inspections for the CCW impoundments are performed at least every three years by a State of Nevada, Division of Water Resources inspector. The State of Nevada Division of Water Resources (NDWR) representative was previously on site on April 22, 2008. Quarterly informal visual inspections are conducted by RGGS environmental technicians.

2.0 Description of Project Facilities

2.1 General

RGGS includes a nominal 557-megawatt (MW) coal-fueled, steam-electric generating plant with four operating units. The power plant is located approximately 54 miles northeast of Las Vegas in Clark County, Nevada (see Figure 1). Unit 1 went online in 1965, Unit 2 went online in 1968, Unit 3 went online in 1976, and Unit 4 went online in 1983.

RGGS uses raw water from off-site groundwater wells and off-site surface water withdrawals from the Muddy River. This water is combined and stored in the Raw Water Storage Ponds to the north of the Site. Low quality water from the generating station, collected stormwater, and scrubber effluent are combined and discharged to Pond F. RGGS does not discharge wastewater to surface waters.

There are two ash by-products of the coal combustion process at RGGS, bottom ash and fly ash. Bottom ash is slurried from the boilers to dewatering bins where the bottom ash is drained and decanted until it passes the “paint filter test”. Once passing the “paint filter test” the bottom ash is loaded onto haul trucks and transported to the on-site landfill, which is located in the “mesa” area. Drained bottom ash water is recirculated through this process. Excess drained bottom ash water can be transferred to the evaporation ponds. There are dewatering and recirculation facilities located at each unit.

The fly ash is contained by baghouse systems for each unit. Fly ash collected in the baghouses is transported by vacuum to one of two silos in which water is added to the ash until a water-ash mixture of approximately 12 to 20 percent water is achieved. Water is added to minimize dust while hauling to the permitted ash landfill. The fly ash must also pass the “paint filter test” to be transported to the landfill. The landfill receives fly ash, bottom ash, and dredged solid material from decant and evaporation ponds The on-site landfill is regulated by the Southern Nevada Health District (SNHD) and is routinely inspected.

The CCW impoundments are located west and slightly south of the power plant. The CCW impoundments include Ponds B1, B2, B3, C1, C2, E1, E2, and F. Wastewater is pumped to Pond F, and from there it is pumped to any of the other ponds based on water levels within the individual ponds. Ponds C1 and C2 currently do not receive water, were nearly empty of free water at the time of the site visit, and are in the process of being closed. Design records and construction drawings of the impoundments were available for review during the preparation of this report.

2.2 CCW Impoundment Dams and Reservoirs

The embankment dams of the CCW impoundments have been assigned a "Significant" Hazard potential by the NDWR. Hazard potential classifications for the impoundments are described in Section 4.0 of this report. The basic dimensions and geometry of the impoundments are summarized in Table 2-1.

Pond F is used to hold wastewater from the station for settling while Ponds B1, B2, B3, C1, C2, E1, and E2 hold wastewater pumped from Pond F for evaporation. Solids that precipitate are periodically removed and disposed in the on-site landfill. The ponds were originally constructed with a clay liner. Between 2006 and 2008, the ponds were refurbished with a dual geosynthetic liner system with leak detection and interstitial drain. The design included high density polyethylene (HDPE) liners (80-mil upper and 40-mil lower liner thicknesses) to minimize seepage from the basins. Water collected in the interstitial drain is returned to the pond.

B Series Ponds: Pond B1 has a surface area of 14.1 acres and has a nominal capacity of 192.9 acre-feet. The perimeter embankment is approximately 3,500 linear feet long, with a minimum crest width of 20 feet and 3H:1V upstream side slopes according to the design documents. The downstream side slope appears to vary from 1.9H:1V to 2.6H:1V based on slope stability analyses (Stanley, 2008. Pond B2 has a surface area of 13.2 acres and has a nominal capacity of 148.3 acre-feet. The perimeter embankment is approximately 3,200 linear feet long, with a minimum crest width of 18 feet and 3H:1V side slopes. Pond B3 has a surface area of 8.5 acres and has a nominal capacity of 90 acre-feet. The perimeter embankment is approximately 2,500 linear feet long, with a minimum crest width of 18 feet and 3H:1V side slopes.

C Series Ponds: Pond C1 has a surface area of 16.9 acres and has a nominal capacity of 114.8 acre-feet. The perimeter embankment is approximately 3,600 linear feet long, with a minimum crest width of 12 feet and 3H:1V upstream slope and a 2H:1V downstream slope. Pond C2 has a surface area of 17.3 acres and has a nominal capacity of 173.1 acre-feet. The perimeter embankment is approximately 3,800 linear feet long, with a minimum crest width of 12 feet and 3H:1V upstream slopes and 2H:1V downstream slopes.

E Series Ponds: Pond E1 has a surface area of 8.5 acres and has a nominal capacity of 114.8 acre-feet. The perimeter embankment is approximately 2,900 linear feet long, with a minimum crest width of 16 feet and 3H:1V upstream slopes and 2.5H:1V downstream slopes. Pond E2 has a surface area of 17 acres and has a nominal capacity of 164.6 acre-feet. The perimeter embankment is approximately 3,700 linear feet long, with a minimum crest width of 15 feet and 3H:1V upstream slopes and 2.5H:1V downstream slopes.

Pond F has a surface area of 4.1 acres and has a nominal capacity of 36.8 acre-feet. The perimeter embankment is approximately 2,000 linear feet long, with a minimum crest width of 15 feet and 3H:1V side slopes. The exterior embankment slopes are either exposed earth or covered with sparse vegetation.

Table 2-1: Summary Information for CCW Impoundment Dam Parameters

Parameter	CCW Impoundment							
Dam	B1	B2	B3	C1	C2	E1	E2	F
Estimated Maximum Height (ft)	15[4]	8[8]	8[10]	10[11]	12[11]	9[12]	12[12]	11[13]
Estimated Perimeter Length[1] (ft)	3,500	3,200	2,500	3,600	3,800	2,900	3,700	2,000
Minimum Crest Width (ft)	18[5]	18[9]	18[10]	12[11]	12[11]	16[12]	16[12]	15[13]
Lowest Berm Elevation[3] (ft)	1608.5	1609.8	1611.5	1607	1607	1595.2	1595.2	1593.6
Design Side Slopes Upstream/Downstream (H:V)	3.3:1[6] / 2.2:1[7]	3:1 / 3:1[9]	3:1 / 3:1[10]	3:1 / 2:1[11]	3:1 / 2:1[11]	3:1 / 2:5[12]	3:1 / 2:5[12]	3:1 / 3:1[13]
Estimated Freeboard (ft) at time of site visit[3]	2.4	2.0	5.4	4	7	2.7	2.7	6.3
Storage Capacity[2] (ac-ft)	192.9	148.3	90.0	114.8	173.1	114.8	164.6	36.8
Surface Area[2] (acres)	14.1	13.2	8.5	16.9	17.3	8.5	17	4.1

1 Estimated from Aerial Photographs.

2 Surface area and capacity based on CERCLA 104(e) Request for Information prepared by NV Energy at the request of the EPA, dated September 29, 2010.

3 Data provided by NV Energy in response to assessment questions via email dated 22 February 2011 from T. Garcia.

4 Based on drawing "Pond B1 Civil Cross Sections", Drawing Number C03, Section A-C03, prepared by Stanley Consultants, dated December 20, 2006, originally created by Arthur B. Chidester.

5 Based on drawing "Ponds B1 & B2 Civil Cross Sections", Drawing Number C06, Section E-C06, prepared by Stanley Consultants, dated December 20, 2006, originally created by Arthur B. Chidester.

6 Based on As-Built Slope Stability Model for Pond B1, by Stanley Consultants, dated June 13, 2007. Three As-Built cross sections vary in upstream slope from 3.3H:1V to 3.5H:1V.

7 Based on As-Built Slope Stability Model for Pond B1, by Stanley Consultants, dated June 13, 2007. Three As-Built cross sections vary in downstream slope from 1.9H:1V to 2.6H:1V. The average slope angle of 2.2H:1V is reported in this table.

8 Based on drawing "Pond B2 Civil Cross Sections", Drawing Number C04, Section A-C04, prepared by Stanley Consultants, dated December 20, 2006, originally created by Arthur B. Chidester.

9 Based on drawing "Ponds B1 & B2 Civil Cross Sections", Drawing Number C06, Section D-C06, prepared by Stanley Consultants, dated December 20, 2006, originally created by Arthur B. Chidester.

10 Based on drawing "Pond B3 Civil Cross Sections", Drawing Number C02, Section C-C02, prepared by Stanley Consultants, dated December 20, 2006, originally created by Arthur B. Chidester.

11 Based on drawing "Evaporation Ponds C-1 and C-2 Site Plan", Drawing Number C-1 and C-2, prepared by Kennedy/Jenks Consultants, dated February 9, 2005, included in Stanley Consultants, report on Ponds C-1 and C-2, dated June 2008.

12 Based on drawing "Ponds D & E Reconstruction Cross Sections", Drawing Number C-6, Section C-C, prepared by Kennedy/Jenks Consultants, dated March 2002, included in Stanley Consultants, report on Ponds E-1 and E-2, dated June 2008.

13 Based on drawing "Ponds F & G Civil Cross Sections", Drawing Number C06, Section C-C06, prepared by Stanley Consultants, dated August 24, 2006, originally created by Arthur B. Chidester

2.3 Spillways

None of the impoundments have spillways.

2.4 Intakes and Outlet Works

The RGGS is a zero discharge wastewater treatment system. Effluent from coal-fired Units 1-4 is conveyed to Pond F to allow suspended solids to settle and the decant water is pumped to the evaporation ponds by the pump house, which is located between ponds E1 and F. According to RGGS personnel, the total inflow pump capacity to Pond F is 650 gallons per minute (gpm). The discharge capacity from Pond F consists of three 215 gpm pumps for a total of 645 gpm. RGGS also utilizes a portable pump system to move water out of Pond F at 1525 gpm to the evaporation ponds, as necessary.

RGGS uses a combination of overland and buried inter-connection pipelines to move water between impoundments. Ponds B1, B2, and B3 contain inter-connection pipes that enable transfers by gravity flow between ponds. The pipes are 14 inches in diameter and are C-900 polyvinyl chloride (PVC). An inter-connection pipe is also provided between Ponds E1 and E2.

2.5 Vicinity Map

RGGS is located in Clark County approximately 52 miles northeast of Las Vegas, Nevada, and two miles west of Interstate 15 (I-15) Hidden Valley exit as shown on Figure 1. The CCW impoundments are located west and slightly south of the generating station, as shown on Figure 2.

2.6 Plan and Section Drawings

Engineering drawings for the reconstruction of the CCW impoundments were provided by NV Energy and were prepared as part of a design package by Stanley Consultants. Construction record drawings from the original construction project were not available.

2.7 Standard Operational Procedures

RGGS is a coal-fired power plant producing a total combined capacity of 557 MW. Coal is delivered to the power plant by train to one of three separate stockpile areas at the generation facility where it is then combusted to power the steam turbines.

Waste materials include fly ash, flue gas emissions, bottom ash, boiler slag and other process materials. Fly ash in Units 1, 2, and 3 is removed by mechanical collectors and wet scrubbers. Fly ash is collected dry and is moistened for hauling to the landfill. Fly ash in Unit 4 is removed by a fabric filter baghouse collector recently added in 2008. Bottom ash leaves the boilers through bottom ash hoppers to be hydraulically transported to dewatering bins. Sulfur dioxide contained in the flue gas is removed by the wet scrubbers producing a sodium sulfate waste stream. All fluids used in the coal burning process are contained in engineered facilities with zero discharge. Cooling water is continuously recycled and eventually added to the flue gas scrubber make-up water. The waste water is eventually conveyed by pipes to permitted lined decant and evaporation ponds.

The wastewater from the blowdown scrubber at the plant initially enters Pond F for settling solids and decanting water. The solids in the blowdown waste, primarily sodium sulfate, settle out in Pond F and the clarified water is then discharged to a series of evaporation ponds (Ponds B1, B2, B3, E1, and E2) in which dissolved solids are precipitated out and the water evaporates. Hydrogen peroxide is added to the evaporation ponds to reduce hydrogen sulfide odors. All active treatment ponds have HDPE double liner systems. The solids from the evaporation ponds are eventually dredged and hauled by truck to the RGGS on-site solid waste landfill.

SNHD inspects the RGGS landfill which currently maintains full compliance with all regulations. Also, according to NV Energy personnel, quarterly informal visual inspections are conducted by environmental technicians.

3.0 Summary of Construction History and Operation

Unit 1 at the NV Energy Reid Gardner Station went into service in 1965, Unit 2 in 1968, Unit 3 in 1976, and Unit 4 in 1983. The CCW impoundments were originally constructed with a clay liner to restrict contaminant migration and were reconstructed in 2006 and improved with a dual HDPE liner system.

The CCW impoundments Ponds D and E were originally constructed in 1974 and Ponds B and C in the early 1980s. In 1984, renovations were made to Pond D and E to flatten the slopes from 1.5H:1V to 2.5H:1V to increase slope stability and reduce seepage. In the late 1980s portions of the Pond D and E clay slurry walls were replaced with a soil-bentonite-slurry cut off wall to reduce seepage as well. Pond F was constructed with a clay slurry wall on its north and south dikes. In 2001, Pond D was taken out of service and the closure approved by Nevada Division of Environmental Protection (NDEP). Pond G was taken out of service in 2008 and closure was approved by NDEP in 2009. Removal of solids in Ponds D and G has since been completed. There are plans to close all C ponds. Water has not been discharged to Ponds C1 and C2 since late 2008. Pond 4A was taken out of service in 1999 and removal of the remaining solids is to commence in the near future.

Some of the embankments are exterior dikes (similar to typical embankment dams) and some of the embankments are interior dikes (designed to separate one pond from another pond). The two originally constructed CCW impoundments, Ponds B and C, were constructed adjacent to each other such that a common interior embankment separates the ponds. Pond B was divided with interior dikes into Ponds B1, B2, and B3. Pond C was divided by an interior dike creating Ponds C1 and C2. Pond E was divided by an interior dike creating Ponds E1 and E2.

Drawings of the original design and construction of the CCW facilities were not available for review. Select drawings of the recent design and reconstruction of the CCW facilities were available for review. Numerous site-specific geotechnical studies for the plant site and impoundments were available for review. NV Energy personnel indicated that the impoundment embankments were constructed of on-site, natural soils.

The Geotechnical Investigations completed by Converse Consultants in 2005 recommend foundation preparations that include removal of sludge or salt precipitate from the foundation areas prior to the 2006 embankment reconstruction project.

Reconstruction of the original impoundments was based on the design recommendations of Stanley Consultants. Construction of the redesigned embankments was done on a pond-by-pond basis to build homogeneous embankments and properly installed liner systems. As a result, the embankments were not constructed in a patchwork manner.

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. CCW 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 CCW Impoundments

The RGGS evaporation ponds perimeter dikes, with heights and storage capacities summarized in Table 4-1, would be considered a "Small" sized dam in accordance with the USACE Recommended Guidelines for Safety Inspection of Dams ER 1110-2-106 criteria.

Table 4-1: Reid Gardner Generating Station – Summary of Pond Parameters

Pond Name	Height (ft)	Storage (ac-ft)	Surface Area (acres)
Pond B-1	20	192.9	14.1
Pond B-2	8	148.3	13.2
Pond B-3	8	90.0	8.5
Pond C-1	10	114.8	16.9
Pond C-2	12	173.1	17.3
Pond E-1	9	114.8	8.5
Pond E-2	12	164.6	17.0
Pond F	11	36.8	4.1

An uncontrolled release of the evaporation ponds content due to failure or misoperation is not considered to cause loss of human life with the economic damages being relatively low and environmental damages being relatively extensive based on our review. A release from the CCW impoundments would cause local flooding around the power station and potentially enter the Muddy River and flow downstream to the town of Glendale. Based on the potential for environmental impacts to the plant property, Muddy River, and the town of Glendale and consistent with the Federal Guidelines for Dam Safety, we recommend the CCW impoundments be classified as a "Significant" hazard structure.

5.0 Hydrology and Hydraulics

5.1 Floods of Record

Floods of record have not been evaluated and documented for the eight CCW impoundments at the Reid Gardner Generating Station.

5.2 Inflow Design Floods

Currently the CCW impoundments at the Reid Gardner Station are classified as "Significant" hazard structures according to the NDWR. Based on observations during the field inspection and the available data, we concur with the eight CCW impoundments being classified as "Significant" hazard structures (Section 4.0). Based on the hazard classification, the NDWR specifies "Significant" hazard dams to be capable of passing the greater of 50 percent probable maximum flood (PMF) or 500-year flood storm events. The USACE Recommended Guidelines for Safety Inspection of Dams (ER 1110-2-106) recommends a small size "Significant" hazard dam be capable of passing floods ranging from the 100-year to 50 percent probable maximum flood (PMF) without overtopping the dam. Considering the "Significant" 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 and conservative to select the 100-year storm event as the inflow design storm for the small sized CCW impoundments. The 24-hour 100-year precipitation at the RGGS is about 2.75 inches based on National Oceanic and Atmospheric Administration (NOAA) Atlas 14 precipitation data.

5.2.1 CCW Impoundments

The contributing drainage area to the CCW impoundments is limited to the surface area (Table 2-1) because the surrounding dikes eliminate the potential for surface run-on from adjacent land. Therefore, the total contributing drainage area to the impoundments is approximately 100 acres. The impoundments currently have freeboards that range from 2.0 feet to 7.0 feet. Assuming all ponds have 2 feet of freeboard at the time of the storm event, an available combined storage capacity of approximately 840 acre-feet is provided. Based on the 24-hour 100-year precipitation event, the impoundments would collectively receive approximately 21.4 acre-feet of stormwater assuming no losses. Based on this result, the CCW impoundments are expected to meet the regulatory requirements for storing or passing the 24-hour 100-year precipitation inflow design flood.

5.2.2 Determination of the PMF

Not applicable.

5.2.3 Freeboard Adequacy

Based on a very simplified evaluation using conservative assumptions, the freeboard in the CCW impoundments appears to be adequate.

5.2.4 Dam Break Analysis

Dam break analyses have been performed for the eight CCW impoundments at the RGGS (Stanley, 2010). The dam-break analyses and inundation maps were provided as reference information and were used to evaluate the areal extent of inundation and flow direction.

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 RGGS 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 NV Energy that were provided at the time of the inspection. The following geologic and seismic information is based on the geotechnical investigation performed by Converse Consultants for NV Energy provided at the time of inspection and part of the Dam Safety Permits prepared by Stanley Consultants (2008). The Nevada Energy site is near the central portion of the Muddy River Valley within the Basin and Range Physiographic Province. The valley area is bounded by the North Muddy Mountains to the east, the Arrow Canyon Range to the west, the Meadow Valley Mountains and Mormon Mountains to the north, and the Muddy Mountains and Dry Lake Range to the south. The primary drainage for the valley is to the southeast along the Muddy River, a tributary to Lake Mead and the Colorado River System (Stanley Consultants, 2008).

The site is located on the Muddy River floodplain which consists of primarily fine-grained overbank deposits. These deposits were formed as a result of past floods overflowing the river channel, depositing clay, clayey sand, silty sand, and sand. The deposit extends to approximately 75 feet below ground surface near the Muddy River. The underlying Tertiary Muddy Creek Formation is composed of fine-grained sandstone, siltstone, and clay and is exposed at the surface throughout the valley.

A detailed investigation and evaluation of groundwater conditions including depths, elevations, and direction of flow is available in the hydrogeologic assessment of the property prepared by Kleinfelder, 1998, which was not provided or reviewed as part of this assessment.

The closest mapped fault with evidence of recent displacement is the California Wash Fault. The fault is classified as a Late Quaternary fault indicating displacement in the past 15,000 years (Anderson, 1999). It consists of a series of north to northeast striking faults approximately 2 miles southwest of the site. According to the 2008, U.S. Geological Survey (USGS) Seismic Hazard Map of Nevada, the site has a regional probabilistic peak ground acceleration of approximately 0.3g 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 RGGS impoundments. Ground water monitoring wells are installed around the impoundments perimeter to monitor water quality and for leak detection. Regulated by the NDEP, groundwater monitoring wells are sampled and measured quarterly by RGGS.

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 CCW impoundments and are read manually.

7.3 Evaluation

Staff gauges and groundwater monitoring wells are the only instruments installed at the RGGS CCW impoundments. A high water level alarm should also be considered to reduce the risk of overtopping the embankments. Surveyed benchmarks and embankment settlement monuments to measure and record movement of the dikes should also be considered. With the addition of the above mentioned monitoring instrumentation, a formalized procedure should be established for the data collection process including a standard instrument reading method, schedule, and specified RGGS personnel to collect the readings.

8.0 Field Assessment

8.1 General

On February 15, 2011 a site visit to assess the condition of the CCW impoundments at the RGGS was performed by:

Stephen G. Brown, P.E.	Project Manager/Task Leader, GEI Consultants, Inc.
Amber L. Misgen	Project Engineer, GEI Consultants, Inc.
John Schofield	Enforcement Officer, Environmental Protection Agency
Robert K. Martinez, P.E.	Division of Water Resources, State of Nevada
Joseph Maez, P.E.	Division of Environmental Protection, State of Nevada
David Sharp, P.E.	Plant Director, NV Energy
Thomas C. Woodworth	Assistant General Counsel, NV Energy
Michael Rojo	Environmental Engineer, NV Energy

The weather during the site visit (February 15, 2011) was cloudy, with temperatures around 60 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 CCW impoundments appeared to be in good condition. No signs of cracking, settlement, movement, or deterioration were observed during the assessment. Some minor signs of erosion due to surface runoff and tire rutting were observed at Ponds B1, C1, C2, E1, and E2. The dam crest surface is generally composed of gravel road base material.

8.2.2 Upstream Slope

The CCW impoundments, including the upstream slopes, are protected by a double HDPE liner system consisting of a 60 mil top layer and 40 mil bottom layer. The HDPE liner was recently added as part of the reconstruction from 2006 to 2008. The 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. Some minor damage was observed on the HDPE liner at Ponds B1, B3, C1, and E1 including unsealed penetrations, a tear at the crest at B3, and a bulge midslope at C1. Slightly oversteepened downstream slopes were observed on the north berm of Pond C1 and on the north end of the west berm of C2.

8.2.3 Downstream Slope

The downstream slopes of the CCW impoundments showed no signs of scarps, sloughs, depressions or other indications of slope instability during the inspection. The downstream slopes of the CCW impoundments are sparsely covered with vegetation except at Pond F, where the slope is protected by soil cement. The downstream slopes showed no signs of significant erosion. Minor erosion was observed at Ponds B1, C1, C2, E1, and E2. The Muddy River is located near the Pond F dike northeast toe.

8.3 Seepage and Stability

No evidence of ongoing seepage, or potential seepage, was observed at the CCW impoundments.

8.4 Appurtenant Structures

8.4.1 Outlet Structures

The effluent piping that conveys water to Pond F from Units 1-4 and to the evaporation ponds from the Pond F pumping station appeared to be in working condition. The inter-connection pipes between Ponds B1, B2, and B3, and Ponds E1 and E2 appeared to be in working condition as well.

Inter-connection pipes that are no longer used to transfer water to or between ponds were observed to be capped. Inter-connection pipes that are no longer used to transfer water to, or between, ponds were observed to be capped where located above the present water level, and were reported as being capped by RGGS personnel where submerged. HDPE caps are fusion welded to the pipes and the HDPE pipes are sealed to the HDPE lining. The few inter-connection pipes that still function are used to balance water levels between the ponds.

8.4.2 Pump Structures

The permanent pump system used to convey water between Pond F and the evaporation ponds, and the portable pump used to convey water between the evaporation ponds appeared to be working properly.

8.4.3 Emergency Spillway

There are no emergency spillways at the CCW impoundments, which is consistent with the lack of potential for surface water run-on to the diked impoundments.

8.4.4 Water Surface Elevations and Reservoir Discharge

The water levels in the CCW impoundments are presented in Table 8-1. Also presented are Lowest Berm Elevation and the freeboard.

Water level measurement data was provided by RGGS for a three-year period, from January 2008 to February 2011. The data from June 2010 to February 2011 for each pond is shown on Figure 3. The data was reported as the water level measured in relation to a 2 feet freeboard, therefore a reading of zero feet indicates a water level 2 feet below the top of the berm. During 2009 RGGS developed a new method for tracking pond levels, which included measuring water surface elevations that were tied to known elevations from the 2009 aerial survey. RGGS began reporting water level data using the new method in January of 2010. In the past three years, there have been few water levels that have encroached upon the 2-foot freeboard and only for short durations. No water levels have encroached upon the 2-foot freeboard for Ponds B1, B3, C1, and C2. Pond E2 reached 0.30 feet above freeboard from February 9 to February 17, 2010 and dropped below freeboard 0.30 feet by February 24, 2010. Pond E2 reached 0.10 feet above freeboard on November 23, 2010 and dropped to 0.30 feet below freeboard by December 3, 2010.

To observe temporal fluctuations in the water level recordings, data recorded from January 2010 to February 2011 was compared by date and by pond. Data collected prior to January 2010 consists of data collected by numerous individuals, and also includes many events in which ponds were out of service for repairs. Current water levels appear to be consistent and maintained. Ponds E1 and E2 follow similar trends, fluctuating together near the 2-foot freeboard level. Ponds B1, B2, and B3 also follow similar trends in fluctuating water levels but not rising to the 2-foot freeboard level.

Table 8-1: Impoundment Water Levels

Pond	Water/Solids Elevations (ft)	Lowest Berm Elevation (ft)	Observed Freeboard (ft)
B1	1606.1	1608.5	2.4
B2	1607.8	1609.8	2.0
B3	1606.1	1611.5	5.4
C1	1603.0*	1607.0	4.0
C2	1600.0	1607.0	7.0
E1	1592.5	1595.2	2.7
E2	1592.5	1595.2	2.7
F	1587.3	1593.6	6.3

* Pond C1 solids elevation is from an aerial photograph dated January 2, 2009. The surface of the pond was entirely solids and no water has been placed in the pond since that date.

- Water levels measured on date of inspection, February 15, 2011.

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 February 15, 2011 site assessment.

9.2 Field Investigations

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

- Drilling, sampling, and laboratory tests were performed as part of a geotechnical investigation by Converse Consultants at eight CCW impoundments (Converse Consultants, 2005).

9.3 Methods of Analysis

Slope stability analyses for the RGGS were performed by Stanley Consultants for Ponds B1, B2, B3, and F, and Converse Consultants for Ponds C1, C2, E1, and E2 (Stanley Consultants, 2008 and 2009). The stability analysis reports are provided in Appendix C.3 of the Dam Safety Permits.

The description of the analyses indicates that typical sections of the embankment slopes were developed and evaluated for four loading conditions. The typical sections for Pond B1 were developed from an as-built survey performed subsequent to reconstruction of the embankments. All other analyses were performed using typical profiles developed from the design. The analyses considered the loading conditions End of Construction, Steady Seepage, Seismic End of Construction, and Seismic Steady Seepage loading conditions. The soil parameters used in the analyses were developed based on classifications from soil borings, SPT values, laboratory results, and NAVFACS DM-7.1 (Stanley Consultants, 2008). The stability analyses were performed using the computer software STABL. The software utilized the Modified Janbu, Modified Bishop's and Spencer's methods for circular slip surfaces to determine the minimum factor of safety. A horizontal acceleration of 0.15g was used in the pseudo-static analyses by Stanley Consultants: Seismic End of Construction and Seismic Steady Seepage. A horizontal acceleration of 0.08g was used in the pseudo-static analyses by Converse Consultants.

9.4 Discussion of Stability Analysis and Results

Results of the stability analyses are included as part of the Dam Safety Permits prepared by Stanley Consultants for the majority of the pond embankments with the exception of Ponds

C1, C2, E1, and E2, which were performed by Converse Consultants. The analyses are based on soil parameters obtained from geotechnical investigations performed by Converse Consultants and embankment dimensions from the design or as-built survey.

It is typical to apply a seismic coefficient equal to one-half of the peak acceleration on the stability analyses. The peak horizontal ground acceleration for an earthquake with an approximate return period of 2,500 years is 0.30g as described in Section 6.0. Therefore, the seismic coefficient of 0.15g used by Stanley Consultants to analyze the stability is considered equivalent to an earthquake with an approximate return period of 2,500 years, which is within the appropriate range for application to Significant hazard classification CCW impoundments.

However, the geotechnical data reports prepared by Converse Consultants and associated stability analyses recommend seismic coefficients of 0.08g based on one-half the peak acceleration of 0.10g to 0.15g from a regional map published by Algermissen and Perkins in 1976 for the Muddy River Valley showing values with a 10 percent chance of being exceeded in a 50-year period. A seismic coefficient of 0.08g is not considered adequate for the seismic analysis of Ponds C1, C2, E1, and E2.

GEI reviewed the computed factors of safety for the completed embankment stability analyses, and we compared the reported calculated factors of safety (FS) to minimum required FS as provided in EM-1110-2-1902. End of Construction analyses are no longer relevant since construction has been completed and were not reviewed. Table 9-1 presents the calculated FS and the minimum required FS. Calculated FS indicated in bold did not meet the minimum required FS. All of the values reported in Table 9-1 involve analyses performed for exterior or downstream embankment slopes.

Table 9-1: Stability Factors of Safety and Guidance

	Pond	B1			B2	B3	C1/C2	E1/E2	F
	Location	**North[1]**			**East**	**South**	**Typical**	**Typical**	**Typical**
	Profile	**A**	**B**	**C**					
Loading Condition	Min. Required FS	Min. Calculated FS	Min. Calculated FS	Min. Calculated FS	Min. Calculated FS	Min. Calculated FS	Min. Calculated FS	Min. Calculated FS	Min Calculated FS
Steady Seepage	1.50	1.51	**1.13**	1.54	2.00	1.80	2.50	2.2	**1.20**
Seismic - Steady Seepage	1.00	1.06	**0.79**	1.00	1.00	1.20	1.90[2]	1.5[2]	2.70

Notes:

- All minimum FS values reported involve exterior embankment slopes and slopes not adjacent to other ponds. FS values shown in **bold** are less than the minimum required FS value for the given loading condition.

1 FS values calculated from As-Built survey results after embankment was constructed with slopes steeper than the designed 3H:1V, Stanley Consultants, June 2007, As Built Slope Stability Analysis.

2 Seismic stability was modeled with 0.08g horizontal ground acceleration by Converse Consultants.

As indicated in Table 9-1, calculated FS are greater than the minimum required FS for all cases with the exception of the calculated values for Pond B1-Profile B and Pond F. Both steady seepage and seismic loading conditions for Pond B1-Profile B resulted in calculated FS less than the required minimum FS values.

As a part of the Stanley Consultants 2007 As Built Stability Analyses, Pond B1-Profile B was modeled with a slope of 2.5H:1V with, and without, a 20-foot berm. This slope is steeper than the 3H:1V shown on the design drawings (Stanley, 2008). The steady seepage with 20-foot berm analysis yields a FS of 1.52, and the seismic steady seepage yields a FS of 1.14. The steady seepage without berm does not meet the minimum required FS. The design drawings included in Stanley, 2008 indicate the slope is 3H:1V. We would agree, based on our field observations, that the slope is steeper than 3H:1V, however it is not readily evident from the observed slope conditions that a slope of 2.5H:1V with a 20-foot berm was constructed on the north slope of B1.

The slope stability analyses completed by Stanley Consultants in 2005 for the design of Pond F show the steady seepage condition is not met when appropriate effective stress, cohesion equal to zero, strength parameters are used.

While the FS values obtained for the Ponds C1, C2, E1, and E2 meet minimum required FS, they were analyzed with a reduced seismic coefficient of 0.08g instead of 0.15g, which is considered appropriate for a significant hazard classification impoundment.

9.5 Seismic Stability – Liquefaction Potential

The liquefaction potential at the eight CCW impoundments was not previously evaluated based on review of the available documents. Certain conditions are necessary for liquefaction, including saturated, loose, granular soils and an earthquake of sufficient magnitude and duration to cause significant strength loss in the soil. The water table is relatively shallow based on information from borings completed within the footprints of the CCW impoundments. The HDPE liner is assumed to prevent the development of a phreatic surface within the embankments, therefore limiting the potential for saturation within the embankments.

Descriptions of the subsurface materials at all ponds are provided as part of the Geotechnical Data Report prepared by Converse Consultants (Stanley, 2008). The borings in the vicinity of Ponds B1, B2 and B3 encountered granular soil units including Silty Sands (SM), Poorly Graded Sands (SP), Well Graded Sands (SW), and Well Graded Gravels (GW). These soils ranged in density from very loose to medium dense with SPT N-values as low as 1. The units ranged in depth from 13 to 45 feet and consequently some are located within the groundwater. All granular soil units were described in the boring logs as being wet.

The borings performed in the vicinity of Ponds C1 and C2 encountered granular soil units including Clayey Sands (SC), Poorly Graded Sands (SP), and Well Graded Sands (SW). These soil ranged in density from loose to medium dense with SPT N-values as low as 7. The units ranged in depth from 13 to 30 feet and were all described as wet.

The borings performed in the vicinity of Ponds E1 and E2 encountered granular soil units including Clayey Sands (SC) and Silty Sands (SM). These soil ranged in density from very loose to medium dense with SPT N-values as low as 2. The units ranged in depth from 7 to 51 feet and were all described as wet. The borings recovered in the vicinity of Pond F encountered granular soil units including Poorly Graded Sands (SP) and Well Graded Sands (SW). These soils ranged in density from very loose to dense. The units ranged in depth from 5 to 45 feet and were all described as wet.

The loose to very loose, saturated, granular foundation soils may be susceptible to liquefaction. However, the unsaturated clayey soil used to construct the dikes is not expected to be susceptible to significant strength loss during strong shaking.

10.0 Maintenance and Methods of Operation

10.1 Procedures

Informal visual inspections of the CCW impoundments are conducted quarterly by RGGS environmental technicians under the guidance of engineers and managers. Maintenance repairs of the HDPE liner are performed by RGGS staff or specialty subcontractors. In accordance with the State of Nevada, Division of Water Resources (NDWR), a Significant hazard dam should be inspected once in every three years.

10.2 Surveillance

RGGS 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

No visual signs of instability, movement or seepage were observed for the embankments and associated facilities at RGGS. Issues of potential concern for the eight CCW impoundments were identified from our field assessment as follows:

- Embankment slopes of the impoundments showed minor signs of erosion from surface runoff and tire rutting on Ponds B1, C1, C2, E1, and E2.
- Minor damages to the HDPE liner system involving small, localized, unsealed connections, tears, and bulging, at Ponds B1, B3, C1, and E1.
- Portions of downstream slopes on the north berm of Pond C1 and on the north end of the west berm of C2 appear to be slightly oversteepened.
- The 16-inch gravity pipe adjacent, and parallel, to the toe of the Pond F dike provides a potential seepage and erosion pathway that should be monitored.
- The proximity of the Muddy River to the toe of the Pond F dike at the northeast extent of the dike increases the potential for bank erosion that could reduce the stability, or undermine, the dike.
- Future removal of the Pond G dike should be planned to not adversely affect the performance of the Pond F dike slurry wall.

11.1.2 Adequacy of Structural Stability

Records of a structural stability evaluation of the impoundments were provided at the time of inspection by the RGGS personnel.

The northern dike of Pond B1-Profile B and the Pond F typical section did not achieve minimum FS values required by EM-1110-2-1902. The discussion of the reconstructed geometry and adjustment of soil strength parameters were not clear and may not be justified, therefore the analyses were judged to be incomplete.

A static steady seepage FS of 1.13 and a seismic steady seepage FS of 0.79 does not meet requirements when calculated based on the as-built slope conditions of Pond B1-Profile B and indicates a potential stability issue. Analysis has indicated the addition of a 20-foot berm would result in minimum FS values exceeding the required values; however it is not clear that this configuration was constructed. If the 20-foot berm was not constructed, then consideration should be given to improving the stability of the northern, exterior dike of CCW impoundment Pond B1.

While the FS of 1.42, that was achieved using an appropriate effective stress (c'=0) strength parameter for a typical cross section of Pond F, does not meet requirements, it does not indicate impending instability.

Based on the stability analyses included in the provided Dam Safety Permits and Dam Safety Permits-Proof of Completion Reports (Stanley, 2008 and 2009) the seismic stability analyses completed on Ponds C1, C2, E1, and E2 by Converse Consultants used a horizontal seismic coefficient of 0.08g instead of 0.15g, which is considered appropriate for a Significant hazard classification impoundment.

Also, a liquefaction analysis has not been performed. The dike foundations include loose, saturated, granular soil, which may be susceptible to significant strength loss or settlement under the anticipated earthquake loading.

11.1.3 Adequacy of Hydrologic/Hydraulic Safety

The eight CCW impoundments at the RGGS 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 impoundments have staff gauges and groundwater monitoring wells. Surveyed benchmarks, embankment settlement monuments to measure and record movement of the dikes should be considered. A high water level alarm should be considered.

11.1.5 Adequacy of Maintenance and Surveillance

The impoundments at the RGGS have adequate maintenance and surveillance programs. The facilities are generally well maintained and routine surveillance is performed by RGGS staff. Dam safety-inspections for the impoundments are performed every three years by a NDWR 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

- Provide clearly presented information documenting the Pond B1 exterior dike constructed slope, surveyed slope sections, the applicable analyses, and conformance with FS for stability analyses per EM-1110-2-1902.

- Provide information on location of typical slope analyzed for Pond F and locations of any critical slopes that need to be analyzed. Provide stability analysis for these sections and present any corrective measures needed to improve FS to meet minimum required FS per EM-1110-2-1902.

- Update all seismic stability analyses to the approximate 2,500 year return period 1/2 peak ground acceleration of 0.15g.

- Perform a liquefaction potential analysis for the impoundments.

- Clear vegetation from the bank of the Muddy River, if possible, and monitor the bank for erosion, to assess the potential for encroachment of the river on the toe of the Pond F dike at the northeast extent of Pond F.

- Prepare a plan to protect the integrity of the Pond F dike slurry wall after the removal of the adjacent Pond G dike.

- Monitor the 16-inch gravity pipe adjacent to the toe of Pond F dike for visual signs of erosion or seepage because of its critical location adjacent to the toe of the embankments.

- Perform repairs to the HDPE lining to seal the interstitial liner drainage system.

12.2 Corrective Measures Required for Instrumentation and Monitoring Procedures

Daily water levels of the impoundments should be monitored by plant staff and recorded monthly. We recommend a more thorough instrumentation and monitoring program be developed and implemented that would include consideration for addition of settlement monuments on the perimeter dikes of the impoundments. We recommend that uniform dike crest elevations be established in order to help identify settlement visually and to avoid the potential for concentrated flow if impoundments should overtop. We recommend the installation of a high level alarm. We recommend a standardized monitoring program be established that includes all monitoring instrumentation and documents the methods used for data collection.

12.3 Corrective Measures Required for Maintenance and Surveillance Procedures

We recommend NV Energy 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 RGGS personnel and that a written record is maintained for the monthly inspections being conducted by NV Energy personnel. Also, continue efforts to repair minor erosion, oversteepened banks, and damage to the HDPE liner system as necessary.

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 RGGS.

- The dikes at the CCW impoundments are Significant-Hazard structures based on federal and state classifications.
- The impoundments were generally observed to be in good condition in the field assessment.
- The downstream slope of a portion of Pond B1 does not meet stability requirements. The stability analysis lacks clarity with respect to the constructed configuration of the slope and may not be representative. The provided slope stability analysis may indicate a slope stability issue for steady seepage and seismic loading conditions.
- The stability analyses used to model the exterior slopes of Pond F did not meet the minimum required FS for a steady seepage loading condition using fully-drained effective stress strength parameters.
- Liquefaction analyses have not been performed and are warranted based on loose, saturated, granular foundation soil that appears to be present in the dike foundations across the site and the seismicity of the area.
- There is no instrumentation provided to enable accurate monitoring of perimeter dike performance for potential movement or settlement.
- 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 February 15, 2011

Signature: ___________________________

List of Participants:

Stephen G. Brown, P.E.	Project Manager, GEI Consultants, Inc.
Amber L. Misgen	Project Engineer, GEI Consultants, Inc.
Robert K. Martinez, P.E.	Division of Water Resources, State of Nevada
Joseph Maez, P.E.	Division of Environmental Protection, State of Nevada
David Sharp, P.E.	Plant Director, NV Energy
Thomas C. Woodworth	Assistant General Counsel, NV Energy
Michael Rojo	Environmental Engineer, NV Energy

13.0 References

Anderson, R. Ernest, compiler, 1999, Fault number 1118, California Wash Fault, in Quaternary Fault and Fold Database of the United States: U.S. Geological Survey website, http://earthquake.usgs.gov/regional/qfaults

Converse Consultants, Inc. (2000). "Geotechnical Investigation, Retrofit of 4B and 4C Ponds, Nevada Power Company, Reid Gardner Station, Clark, Nevada", prepared for Kennedy/Jenks Consulting Engineers, September 2000.

Converse Consultants, Inc. (2002). "Geotechnical Investigation, Retrofit of Ponds D & E, Nevada Power Company, Reid Gardner Station, Clark, Nevada", prepared for Kennedy/Jenks Consulting Engineers, May 2002.

Converse Consultants, Inc. (2005). "Geotechnical Data Report, Ponds 4B-2 & 4B-3, Nevada Power Company, Reid Gardner Power Station, Moapa, Nevada", prepared for Stanley Consultants, Inc., December 2005.

Converse Consultants, Inc. (2005). "Geotechnical Data Report, Ponds F & G, Nevada Power Company, Reid Gardner Power Station, Moapa, Nevada", prepared for Stanley Consultants, Inc., July 2005.

Federal Emergency Management Agency (FEMA) (2004) Federal Guidelines for Dam Safety: Emergency Action Planning for Dam Owners, prepared by the Interagency Committee on Dam Safety, April.

Kleinfelder, 1998, *Hydrogeologic Assessment Reid Gardner Station*, Moapa, Nevada.

National Oceanic and Atmospheric Administration, National Weather Service, U.S. Department of Commerce (NOAA) (2004). NOAA Atlas No. 14 Precipitation Frequency Atlas of the Western United States, Volume 1, Version 4.0: Semiarid Southwest, Silver Springs, Maryland.

Nevada Division of Water Resources (DNWR) "Dam Safety – Spillway Design".

NV Energy (2010). "CERCLA 104(e) Request for Information Response," prepared for U.S. Environmental Protection Agency, September 2010.

Stanley Consultants. Inc. (2008). "Dam Safety Permit, Pond B-1, Nevada Power Company, Reid Gardner Stations", prepared for Nevada Power Company, June 2008.

Stanley Consultants. Inc. (2008). "Dam Safety Permit, Pond B-2, Nevada Power Company, Reid Gardner Stations", prepared for Nevada Power Company, June 2008.

Stanley Consultants. Inc. (2008). "Dam Safety Permit, Pond B-3, Nevada Power Company, Reid Gardner Stations", prepared for Nevada Power Company, June 2008.

Stanley Consultants. Inc. (2008). “Dam Safety Permit, Pond C-1 & C-2, Nevada Power Company, Reid Gardner Stations”, prepared for Nevada Power Company, June 2008.

Stanley Consultants. Inc. (2008). “Dam Safety Permit, Pond E-1 & E-2, Nevada Power Company, Reid Gardner Stations”, prepared for Nevada Power Company, June 2008.

Stanley Consultants. Inc. (2008). “Dam Safety Permit, Pond F & G, Nevada Power Company, Reid Gardner Stations”, prepared for Nevada Power Company, June 2008.

Stanley Consultants. Inc. (2009). “Dam Safety Permit, Proof of Completion, Pond B-1 and B-2, Nevada Power Company, Reid Gardner Stations”, prepared for Nevada Power Company, February 2009.

Stanley Consultants. Inc. (2009). “Dam Safety Permit, Proof of Completion, Pond B-3, Nevada Power Company, Reid Gardner Stations”, prepared for Nevada Power Company, February 2009.

Stanley Consultants. Inc. (2009). “Dam Safety Permit, Proof of Completion, Pond C-1 and C-2, Nevada Power Company, Reid Gardner Stations”, prepared for Nevada Power Company, February 2009.

Stanley Consultants. Inc. (2009). “Dam Safety Permit, Proof of Completion, Pond F, Nevada Power Company, Reid Gardner Stations”, prepared for Nevada Power Company, February 2009.

Stanley Consultants. Inc. (2010). “Emergency Action Plan, Reid Gardner Stations”, prepared for NV Energy, September 2010.

U.S. Army Corps of Engineers (USACE) (1979). “Recommended Guidelines for Safety Inspections of Dams. (ER 1110-2-106).” September 26.

U.S. Army Corps of Engineers (USACE) (2003). “Engineering and Design- Slope Stability”. (EM 1110-2-1902).” October 31.

Figures

NOT TO SCALE

NOTES:
1. AERIAL PHOTO OBTAINED FROM BING UNKNOWN DATE.

Assessment of Dam Safety of Coal Combustion Waste Impoundments at Reid Gardner Generating Station	GEI Consultants	SITE VICINITY MAP
Environmental Protection Agency Washington, D.C.	Project 092885	April 2011 Figure 1

P:\092885 - NV Energy\Figures\ Figure 1 - Site Vicinity Map.dwg Apr 2011

NOTES:

1. AERIAL PHOTO OBTAINED FROM GOOGLE EARTH DATED 2010.

NOT TO SCALE

Assessment of Dam Safety of Coal Combustion Waste Impoundments at Reid Gardner Generating Station

Environmental Protection Agency
Washington, D.C.

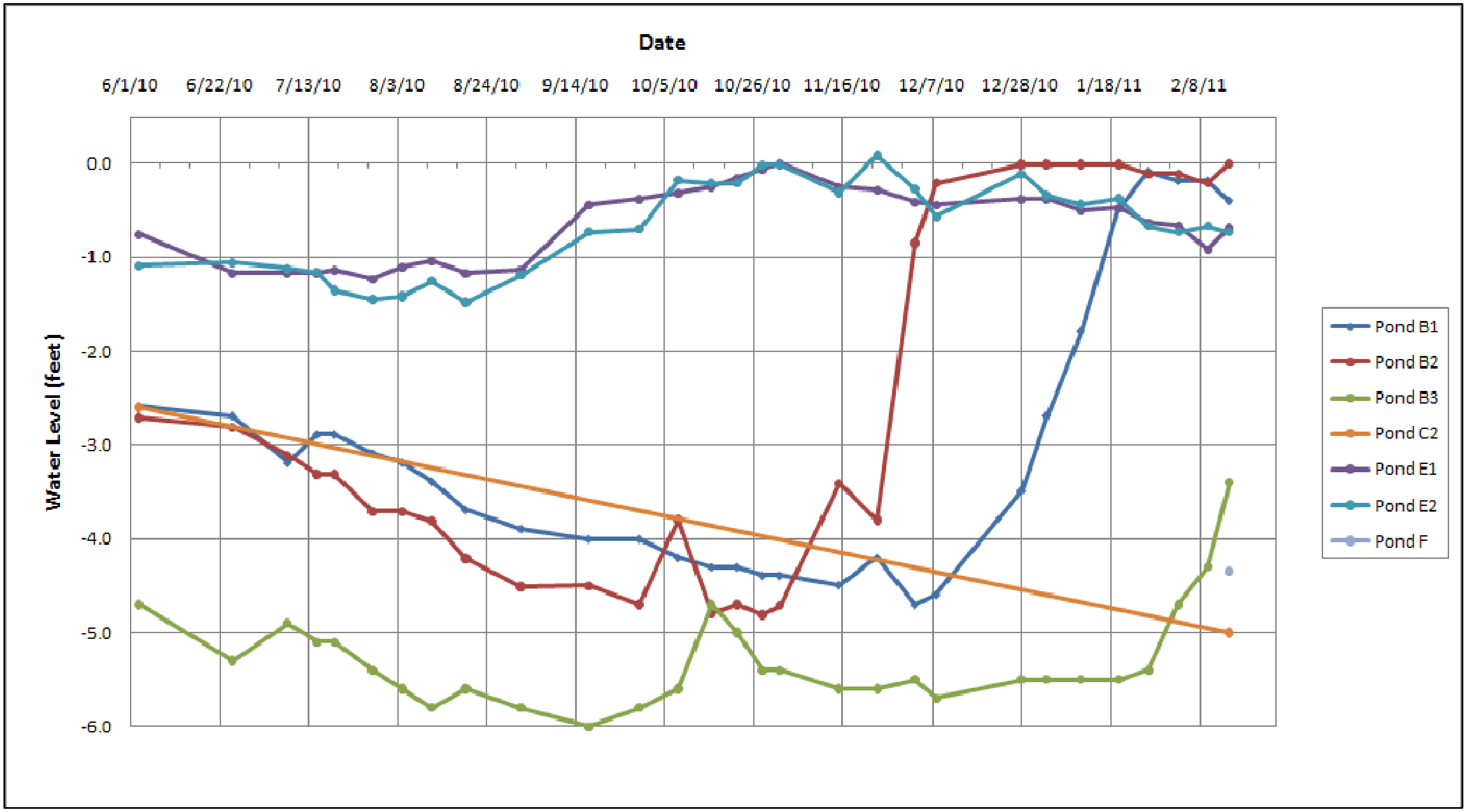
GEI Consultants

Project 092885

PLAN OF ASH IMPOUNDMENTS

April 2011 | Figure 2

P:\092885 - NV Energy\Figures\ Figure 2 - Plan of Ash Impoundments.dwg Apr 2011

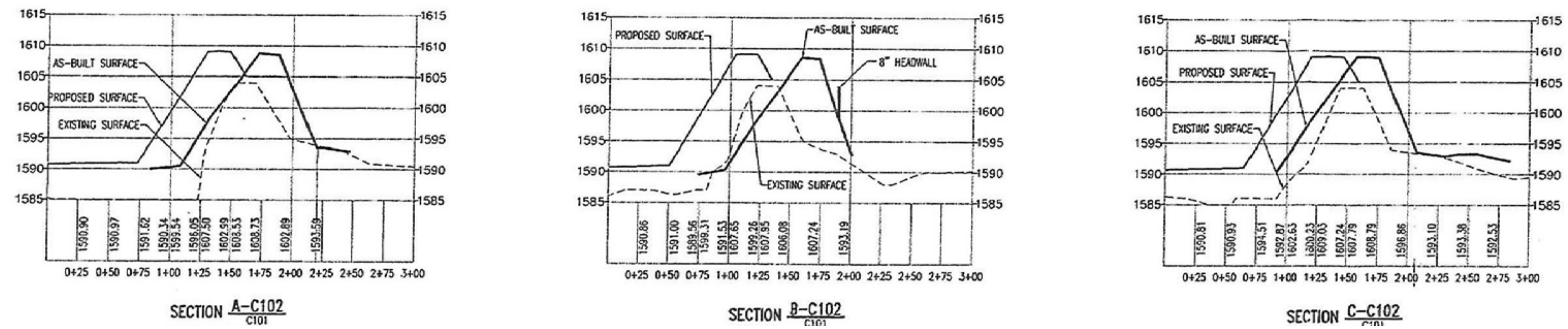


NOTES:
1. WATER LEVELS ARE REPORTED AS FEET BELOW FREEBOARD LEVEL (2 FEET BELOW THE CREST ELEVATION).
2. WATER LEVELS WERE NOT PROVIDED FOR THE DATES MARCH 1, 2010 THROUGH JUNE 3, 2010.
3. WATER LEVELS FOR POND C2 WERE PROVIDED FOR JUNE 3, 2010 AND FEBRUARY 15, 2011 ONLY AND FOR POND F ON FEBRUARY 15, 2011 ONLY.

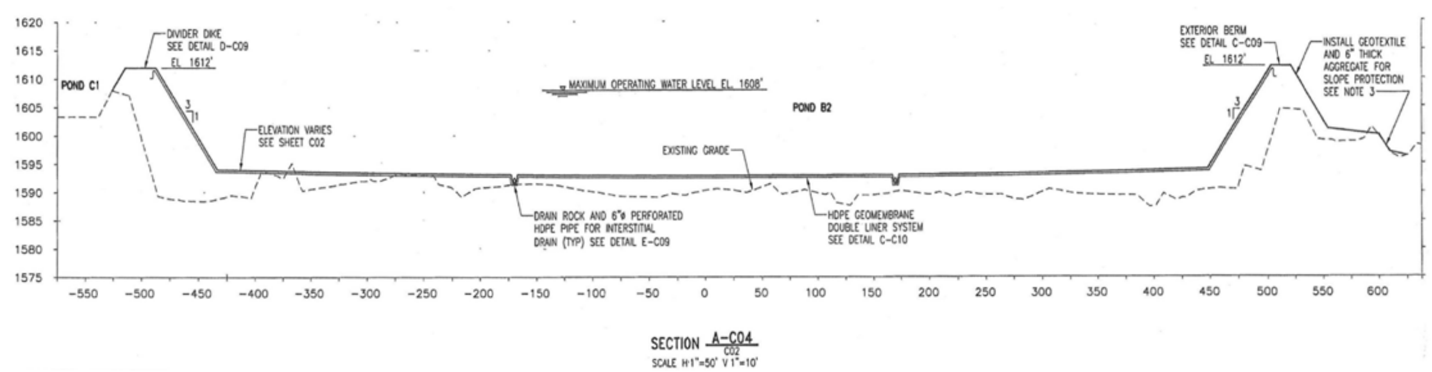
N

Assessment of Dam Safety of Coal Combustion Waste Impoundments at Reid Gardner Generating Station	GEI Consultants	IMPOUNDMENT WATER LEVEL MEASUREMENTS
Environmental Protection Agency Washington, D.C.	Project 092885	April 2011 Figure 3

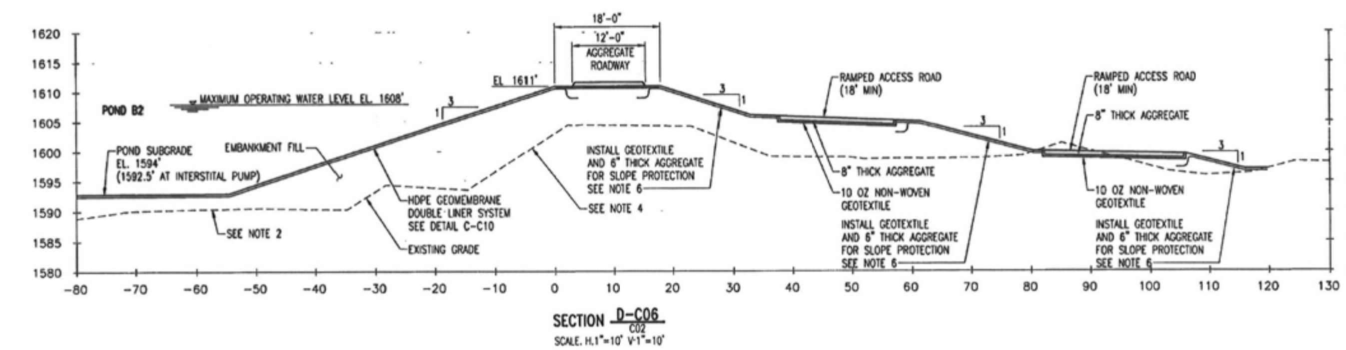
P:\092885 - NV Energy\Figures\ Figure 3 - Pond Level Measurements.dwg Apr 2011



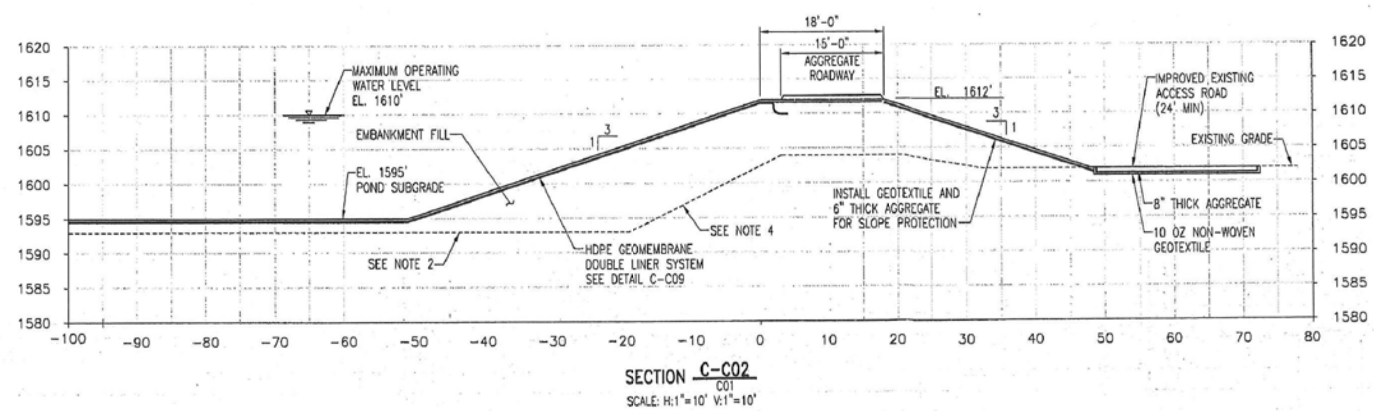
POND B1, DRAWING C102, AS-BUILT SURVEY (3 SECTIONS)



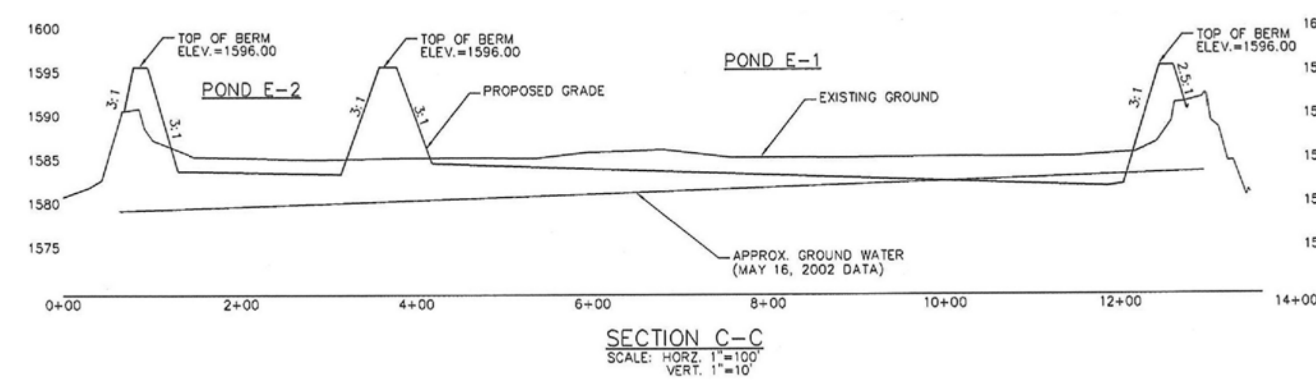
POND B2, DRAWING C04



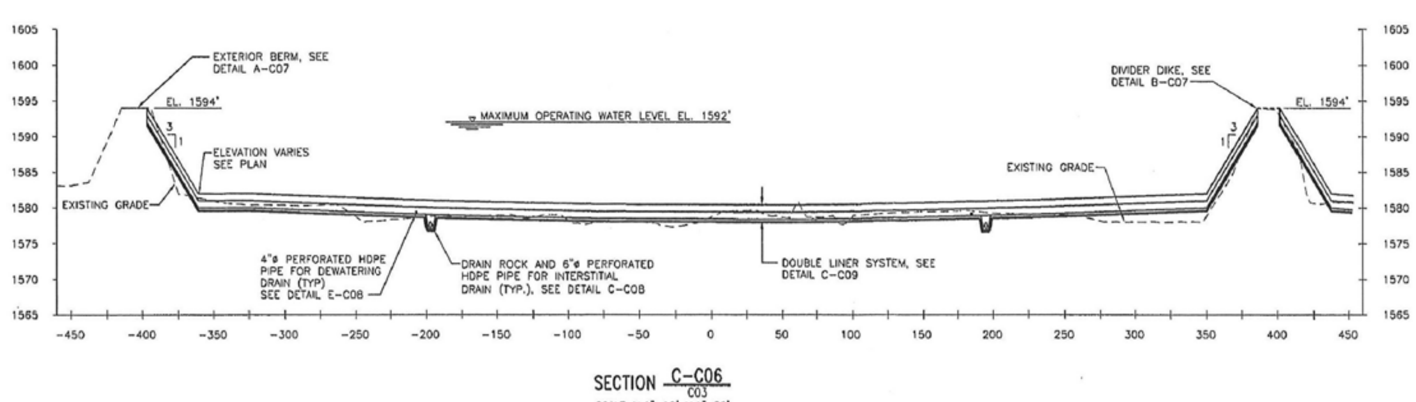
POND B2, DRAWING C06



POND E1 AND E2, DRAWING C6



POND E1 AND E2, DRAWING C6



POND F, DRAWING C06

NOTES:

1. ALL EMBANKMENT SECTIONS FROM STANLEY CONSULTANTS, 2008.
2. EMBANKMENT SECTIONS FOR PONDS C1 AND C2 ARE NOT PROVIDED IN STANLEY CONSULTANTS, 2008.

NOT TO SCALE

Assessment of Dam Safety of Coal Combustion Waste Impoundments at Reid Gardner Generating Station	GEI Consultants	Typical Sections of Dam Embankments
Environmental Protection Agency Washington, D.C.	Project 092885	April 2011 Figure 4

P:\092885 - NV Energy\Figures\ Figure 4 - Impoundment Sections.dwg Apr 2011

Appendix A

Inspection Checklists

February 15, 2011

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Reid Gardner Generating Station	Date:	02/15/11
Unit Name:	Pond B1	Operator's Name:	NV Energy
Unit I.D.:	NV10732 / J-613	Hazard Potential Classification:	High Significant ✓ Low
Inspector's Name:	Steve Brown, P.E. GEI Consultants, Inc.		

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?	Quarterly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	1606.1		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		N/A
5. Lowest dam crest elevation (operator records)?	1608.5		Is water exiting outlet, but not entering inlet?		N/A
6. If instrumentation is present, are readings recorded (operator records)?	✓		Is water exiting outlet flowing clear?		N/A
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?		N/A	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

#1 Quarterly informal visual inspections conducted by environmental technicians.

#6 Interstitial drain system, staff gage.

#17 • HDPE lining is not sealed at valve riser near NW corner of Pond

• minor erosion gullies

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment ~~NPDES~~ NDEP Permit # NEV91022 NVR050000 INSPECTOR Steve Brown
Date 2/15/11

Impoundment Name Reid Gardner Generating Station
Impoundment Company NV Energy
EPA Region 9
State Agency (Field Office) Addresss 901 S. Stewart St stes 2002 + 4001 Carson City NV 89701
NVWR/NVDEP
Name of Impoundment B1
(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: Effluent Evaporation Pond (low grade water, storm water, scrubber effluent)

Nearest Downstream Town : Name Glendale, NV
Distance from the impoundment 5 miles downstream
Impoundment
Location: Longitude 114 Degrees 38 Minutes 48.47 Seconds
Latitude 36 Degrees 39 Minutes 21.58 Seconds
State NV County Clark

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

If So Which State Agency? NV Division of Environmental Protection
NV Division of Water Resources

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.

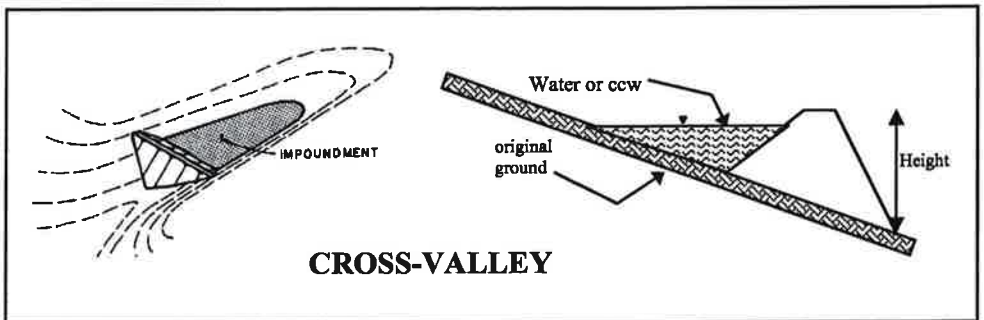
__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

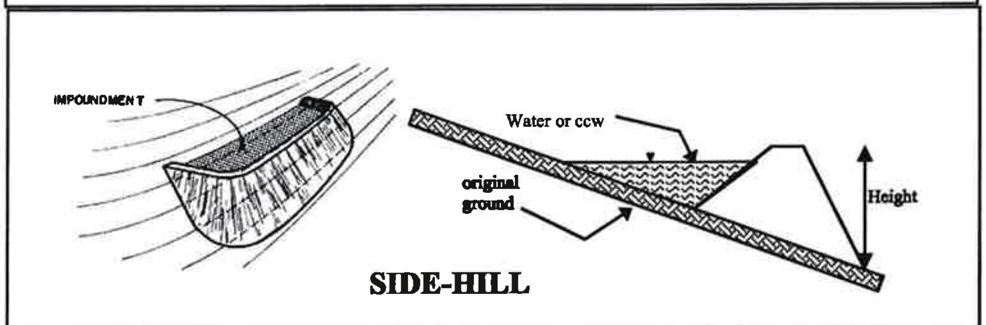
______ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

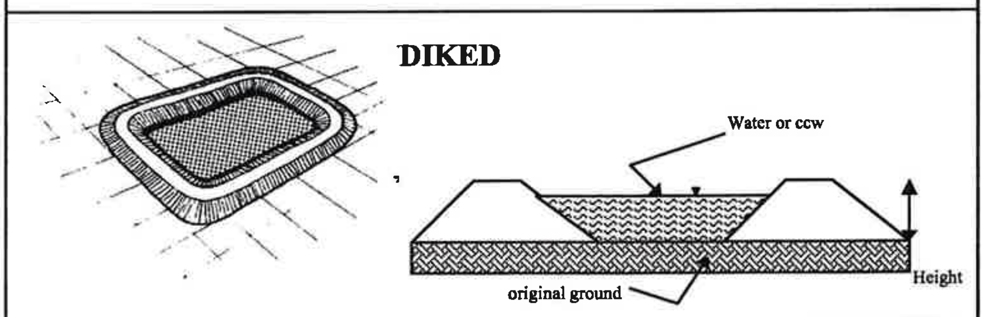
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

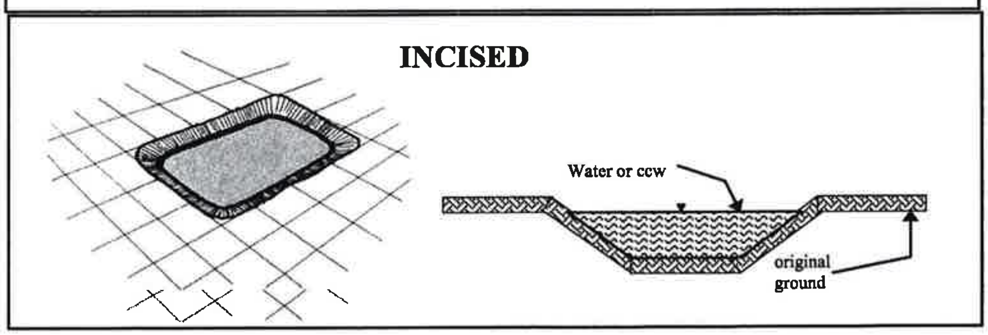
Release will cause local flooding around power plant and will enter muddy river and flow downstream to town of glendale.
Potential for extensive environmental damages.

CONFIGURATION:









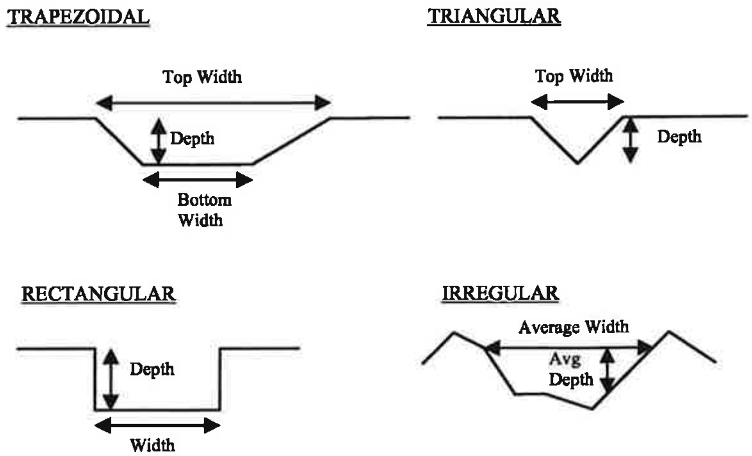
_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height __14__ feet Embankment Material __SM, SP, CL__
Pool Area __13.4__ acres Liner __60 mil HDPE (top) 40 mil HDPE (bottom)__
Current Freeboard __2.4__ feet Liner Permeability __≤1x10^-8 cm/s__

TYPE OF OUTLET (Mark all that apply)

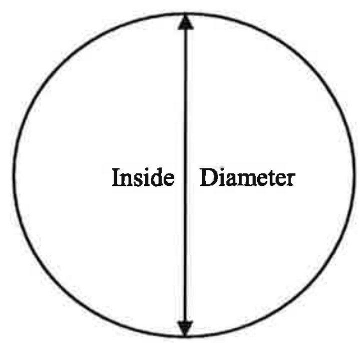
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

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



_____ **Outlet**

_____ inside diameter



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

_____
Is water flowing through the outlet? YES _______ NO _______

_X_ **No Outlet**

_____

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

The Impoundment was Designed By Stanley Consultants
____

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? Historic

IF So Please Describe: Ponds were reconstructed in 2006-2008. Before the ponds were rebuilt with the current double HDPE lining & Interstitial drain, they were built with a clay liner.

Seepage that occurred from the clay lined ponds was not a dam safety issure. The seepage was the result of vertical gradients through the clay lining.

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 X

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

If so Please Describe :

Monitoring wells were installed to monitor ground water quality

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Reid Gardner Generating Station	Date:	02/15/11
Unit Name:	Pond B2	Operator's Name:	NV Energy
Unit I.D.:	NV10733 / J-614	Hazard Potential Classification:	High Significant ✓ Low
Inspector's Name:	Steve Brown, P.E. GEI Consultants, Inc.		

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?	Quarterly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	1607.8		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		N/A
5. Lowest dam crest elevation (operator records)?	1609.8		Is water exiting outlet, but not entering inlet?		N/A
6. If instrumentation is present, are readings recorded (operator records)?	✓		Is water exiting outlet flowing clear?		N/A
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?		N/A	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

#1 Quarterly informal visual inspections conducted by environmental technicians.

#6 Interstitial drain system, staff gage

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment ~~NPDES~~ NDEP Permit # NEV91022 NVR050000 INSPECTOR Steve Brown
Date 2/15/11

Impoundment Name Reid Gardner Generating Station
Impoundment Company NV Energy
EPA Region 9
State Agency (Field Office) Addresss 901 S. Stewart St stes 2002 + 4001
NVWR/NVDEP Carson City NV 89701
Name of Impoundment B-2
(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: Effluent Evaporation Pond (low grade water, storm water, scrubber effluent)

Nearest Downstream Town : Name Glendale, NV
Distance from the impoundment 5 miles down stream
Impoundment
Location: Longitude 114 Degrees 38 Minutes 53.77 Seconds
Latitude 36 Degrees 39 Minutes 17.50 Seconds
State NV County Clark

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

If So Which State Agency? NV Division of Environmental Protection
NV Division of Water Resources

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.

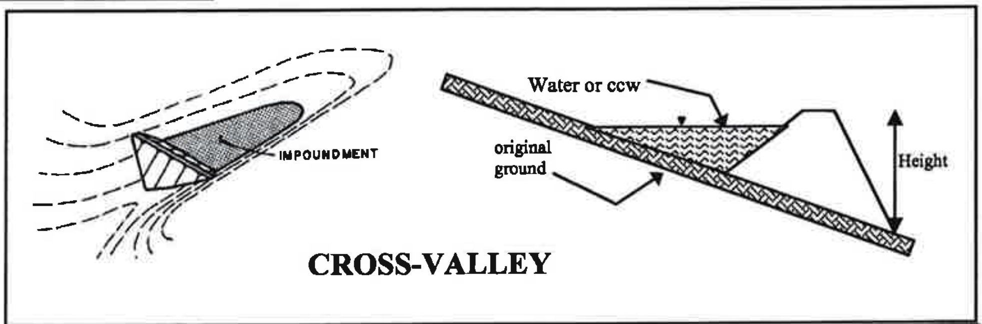
__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

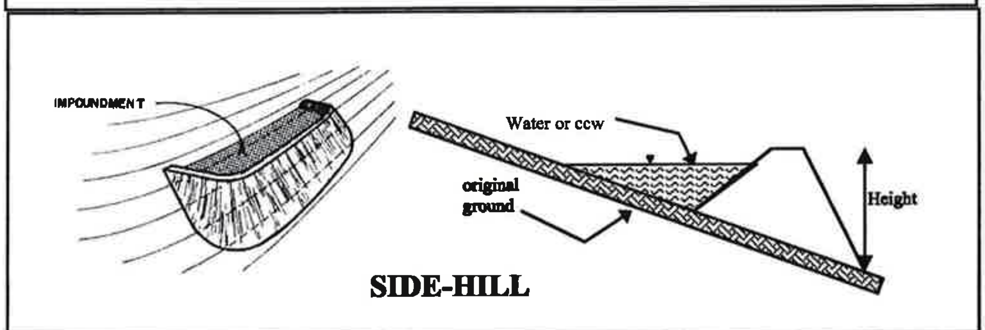
______ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

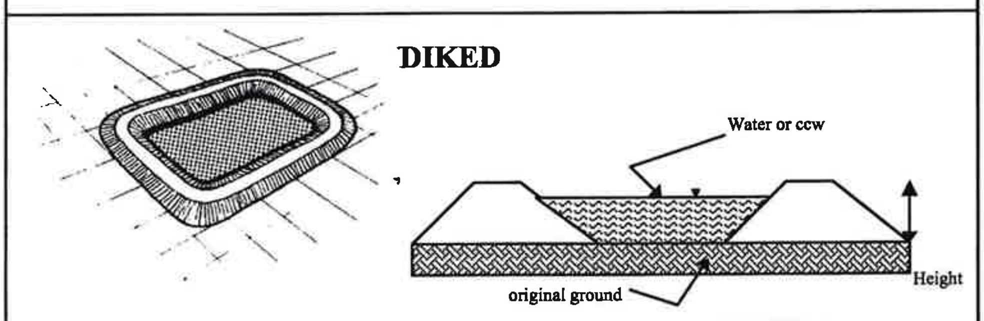
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

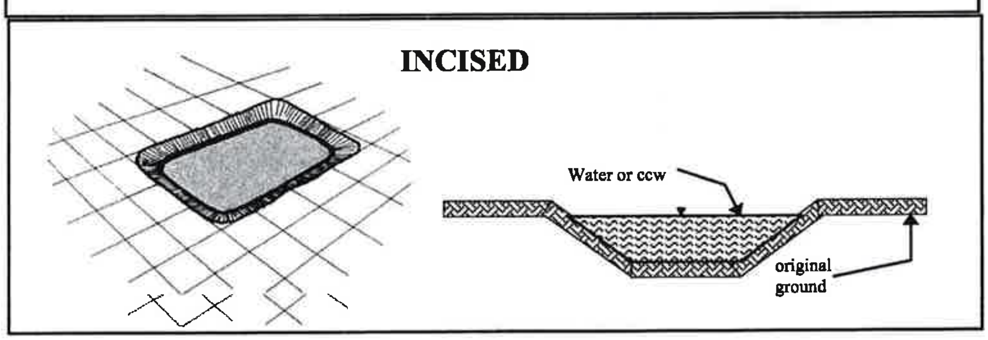
Release will cause local flooding around power plant and will enter muddy river and flow downstream to town of glendale. Potential for extensive environmental damages.

CONFIGURATION:









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

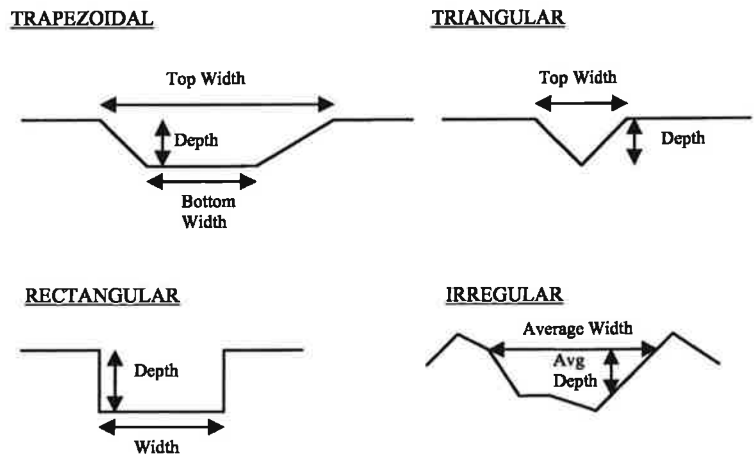
Embankment Height ~~18~~ 16 feet
Pool Area 12.4 acres
Current Freeboard 2 feet

Embankment Material SM/SP/CL
Liner 60 mil (top) 40 mil (bottom) HDPE
Liner Permeability $<1 \times 10^{-8}$ cm/s

TYPE OF OUTLET (Mark all that apply)

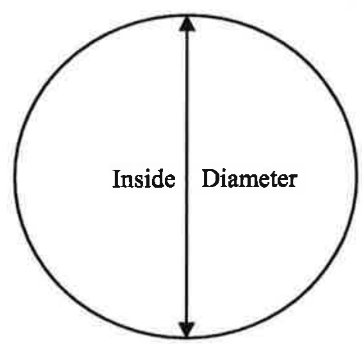
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

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



_____ **Outlet**

_____ inside diameter



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

_____

Is water flowing through the outlet? YES _______ NO _______

__X__ **No Outlet**

_____

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

The Impoundment was Designed By Stanley Consultants
____

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? Historic

IF So Please Describe: Ponds were reconstructed in 2006-2008
Before the ponds were rebuilt with the current double HDPE lining & Interstitial drain, they were built with a clay liner.

Seepage that occurred from the clay lined ponds was not a dam safety issue. The seepage was the result of vertical gradients through the clay lining.

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 X

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

If so Please Describe :

Monitoring wells were installed to monitor ground water quality

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Reid Gardner Generating Station	Date:	02/15/11
Unit Name:	Pond B3	Operator's Name:	NV Energy
Unit I.D.:	NV10734 / J-615	Hazard Potential Classification:	High Significant ✓ Low
Inspector's Name:	Steve Brown, P.E. GEI Consultants, Inc.		

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?	Quarterly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	1606.1		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		N/A
5. Lowest dam crest elevation (operator records)?	1611.5		Is water exiting outlet, but not entering inlet?		N/A
6. If instrumentation is present, are readings recorded (operator records)?	✓		Is water exiting outlet flowing clear?		N/A
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?		N/A	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
#1	Quarterly informal visual inspections conducted by environmental technicians.
	Tear/rip in HDPE liner at SW corner
#6	Interstitial Liner/Drainage System + staff gage

EPA FORM -XXXX

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment ~~NPDES~~ NDEP Permit # NEV91022, NVR050000 INSPECTOR Steve Brown

Date 2/15/11

Impoundment Name Reid Gardner Generating Station
Impoundment Company NV Energy
EPA Region 9
State Agency (Field Office) Addresss 901 S. Stewart St stes 2002+4001
NVWR/NVDEP Carson City NV 89701
Name of Impoundment B3
(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: Effluent Evaporation Pond (low grade water, storm water, scrubber effluent)

Nearest Downstream Town : Name Glendale, NV
Distance from the impoundment 5 miles downstream
Impoundment
Location: Longitude 114 Degrees 38 Minutes 57.21 Seconds
Latitude 36 Degrees 39 Minutes 12.83 Seconds
State NV County Clark

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

If So Which State Agency? NV Division of Environmental Protection
NV Division of Water Resources

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.

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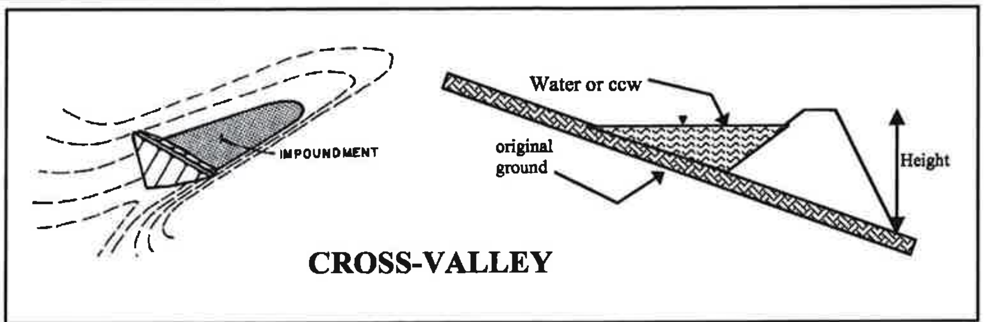
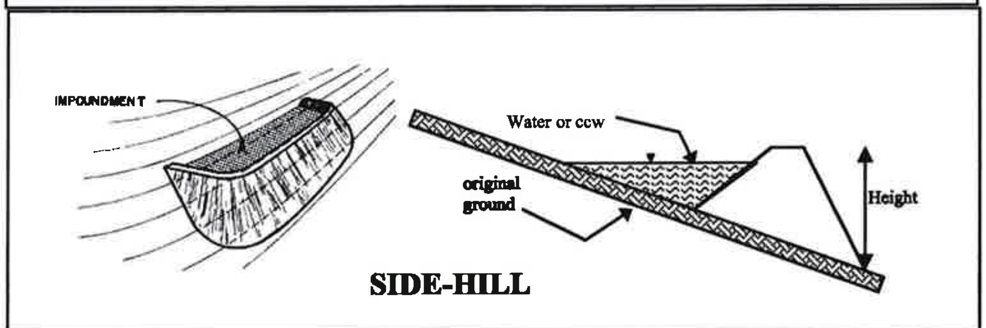
______ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

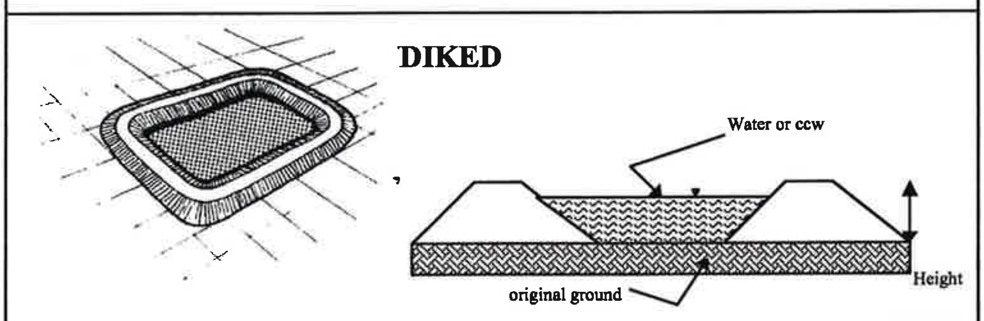
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

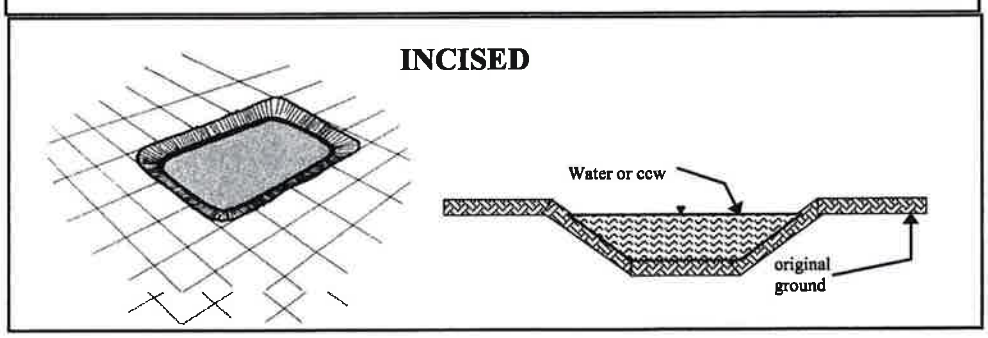
Release will cause local flooding around power plant and will enter muddy river and flow downstream to town of glendale.
Potential for extensive environmental damages.

CONFIGURATION:









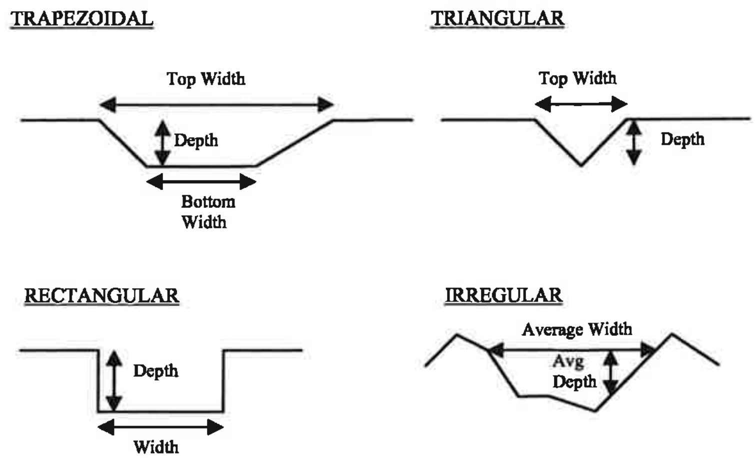
_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height 12 to 16 feet — Embankment Material SM/SP/CL
Pool Area 8.1 acres — Liner 60 mil (top) + 40 mil (bottom) HDPE
Current Freeboard 5.4 feet — Liner Permeability < 1x10-8 cm/s

TYPE OF OUTLET (Mark all that apply)

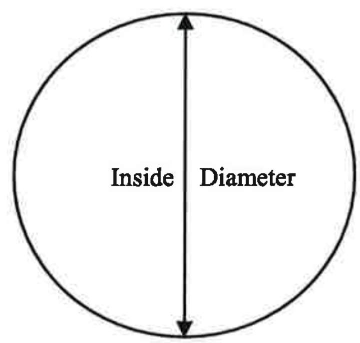
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

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



_____ **Outlet**

_____ inside diameter



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

_____
Is water flowing through the outlet? YES _______ NO _______

_X_ **No Outlet**

_____

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

The Impoundment was Designed By Stanley Consultants
____

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? Historic

IF So Please Describe: Ponds were reconstructed in 2006-2008
Before the ponds were rebuilt with the current double HDPE lining & Interstitial drain, they were built with a clay liner.

Seepage that occurred from the clay lined ponds was not a dam safety issue. The seepage was the result of vertical gradients through the clay lining.

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 X

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

If so Please Describe :

Monitoring wells were installed to monitor ground water quality

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Reid Gardner Generating Station	**Date:**	02/15/11
Unit Name:	Pond C1	**Operator's Name:**	NV Energy
Unit I.D.:	NV10735 / J-616	**Hazard Potential Classification:**	High Significant ✓ Low
Inspector's Name:	Steve Brown, P.E. GEI Consultants, Inc.		

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?	Quarterly		18. Sloughing or bulging on slopes?	✓	
2. Pool elevation (operator records)?	1603		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		N/A
5. Lowest dam crest elevation (operator records)?	1607		Is water exiting outlet, but not entering inlet?		N/A
6. If instrumentation is present, are readings recorded (operator records)?	✓		Is water exiting outlet flowing clear?		N/A
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?		N/A	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

#1 Quarterly informal visual inspections conducted by environmental technicians.

Bank on North berm appears to be oversteepened.

South end of divider berm (C1/C2) has heavy tire rutting.

#18 HDPE liner bulge at the water/solids level, North bank, near station 26+00, approximately 3 feet long.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW) Impoundment Inspection

Impoundment ~~NPDES~~ NDEP Permit # NEV91022 NVR05D000 INSPECTOR Steve Brown
Date 2/15/11

Impoundment Name Reid Gardner Generating Station
Impoundment Company NV Energy
EPA Region 9
State Agency (Field Office) Addresss 901 S. Stewart St stes 2002+4001
NVWR/NVDEP Carson City NV 89701
Name of Impoundment C1 - out of service in 2007
(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: Effluent Evaporation Pond (low grade water, storm water, scrubber effluent)

Nearest Downstream Town : Name Glendale, NV
Distance from the impoundment 5 miles down stream
Impoundment
Location: Longitude 114 Degrees 38 Minutes 59.19 Seconds
Latitude 36 Degrees 39 Minutes 25.24 Seconds
State NV County Clark

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

If So Which State Agency? NV Division of Environmental Protection
NV Division of Water Resources

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.

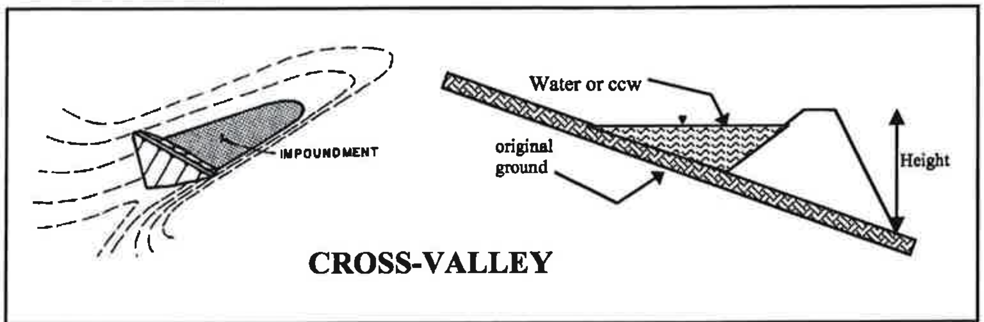
__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

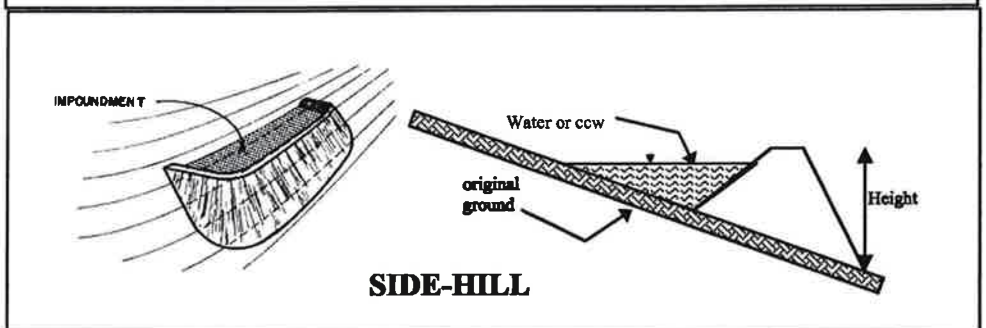
______ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

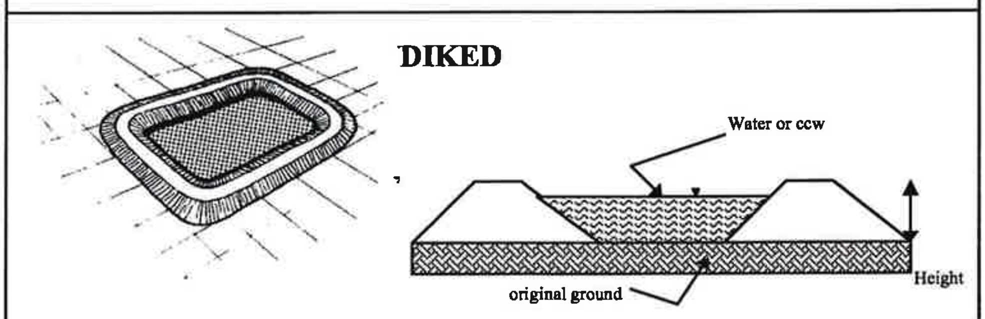
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

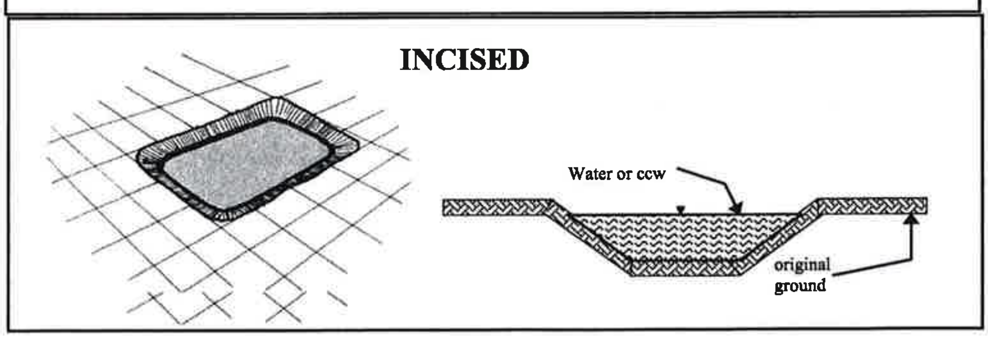
Release will cause local flooding around power plant and will enter muddy river and flow downstream to town of glendale.
Potential for extensive environmental damages.

CONFIGURATION:









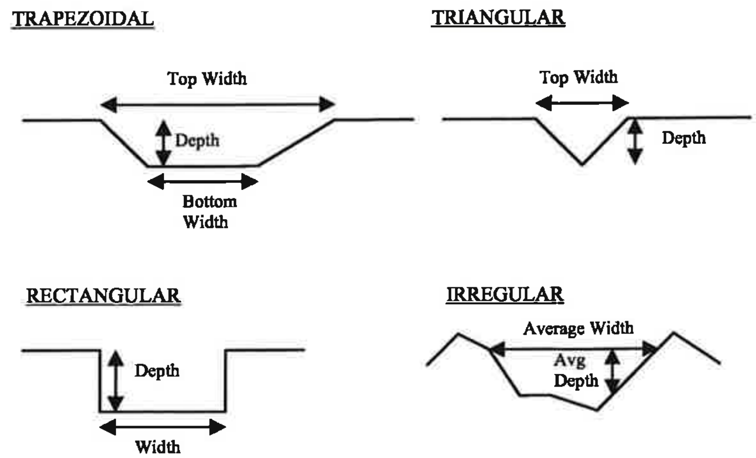
_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height ~15 feet Embankment Material SM, SP, CL
Pool Area ~14 acres Liner HDPE 60mil top, 40mil bottom
Current Freeboard 4 feet Liner Permeability <1x10^-8 cm/s

TYPE OF OUTLET (Mark all that apply)

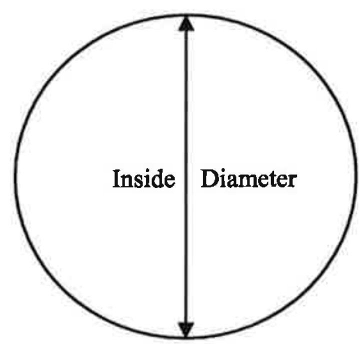
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

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



_____ **Outlet**

_____ inside diameter



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

_____
Is water flowing through the outlet? YES _______ NO _______

_X_ **No Outlet**

_____

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

The Impoundment was Designed By Kennedy/Jenks Consultants
____

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? Historic

IF So Please Describe: Ponds were reconstructed in 2002, 2005
Before the ponds were rebuilt with the current double HDPE lining & Interstitial drain, they were built with a clay liner.

Seepage that occurred from the clay lined ponds was not a dam safety issure. The seepage was the result of vertical gradients through the clay lining.

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 X

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

If so Please Describe :

Monitoring wells were installed to monitor ground water quality

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Reid Gardner Generating Station	Date:	02/15/11
Unit Name:	Pond C2	Operator's Name:	NV Energy
Unit I.D.:	NV10736 / J-617	Hazard Potential Classification:	High Significant ✓ Low
Inspector's Name:	Steve Brown, P.E. GEI Consultants, Inc.		

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?	Quarterly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	1600		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		N/A
5. Lowest dam crest elevation (operator records)?	1607		Is water exiting outlet, but not entering inlet?		N/A
6. If instrumentation is present, are readings recorded (operator records)?	✓		Is water exiting outlet flowing clear?		N/A
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?		N/A	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

#1 Quarterly informal visual inspections conducted by environmental technicians

#9 Single multitrunk shrub ≤ 1" diameter.

South end of divider berm (C1/C2) heavy tire rutting

North end of west berm - Bank appears over-steepened, with irregular erosion, area's with compound slope.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment ~~NPDES~~ NDEP Permit # NEV91622 NVR050000 INSPECTOR Steve Brown
Date 2/15/11

Impoundment Name Reid Gardner Generating Station
Impoundment Company NV Energy
EPA Region 9
State Agency (Field Office) Addresss 901 S. Stewart St stes 2002+4001
NVWR/NVDEP Carson City NV 89701
Name of Impoundment C2 - out of service in 2008
(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: Effluent Evaporation Pond (low grade water, storm water, scrubber effluent)

Nearest Downstream Town : Name Glendale, NV
Distance from the impoundment 5 miles downstream
Impoundment
Location: Longitude 114 Degrees 39 Minutes 03.89 Seconds
Latitude 36 Degrees 39 Minutes 31.90 Seconds
State NV County Clark

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

If So Which State Agency? NV Division of Environmental Protection
NV Division of Water Resources

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.

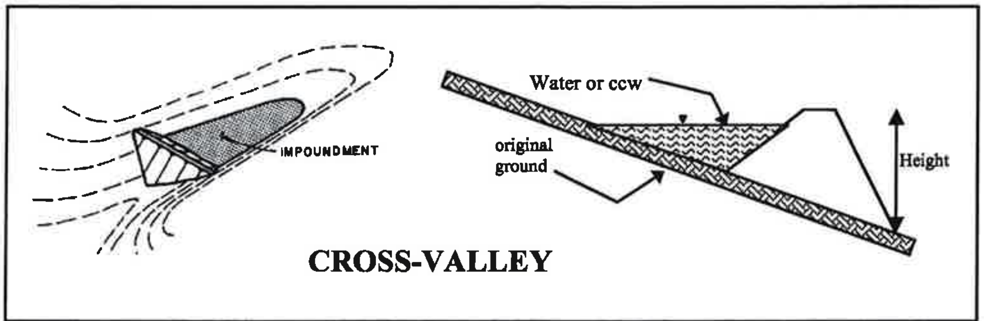
__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

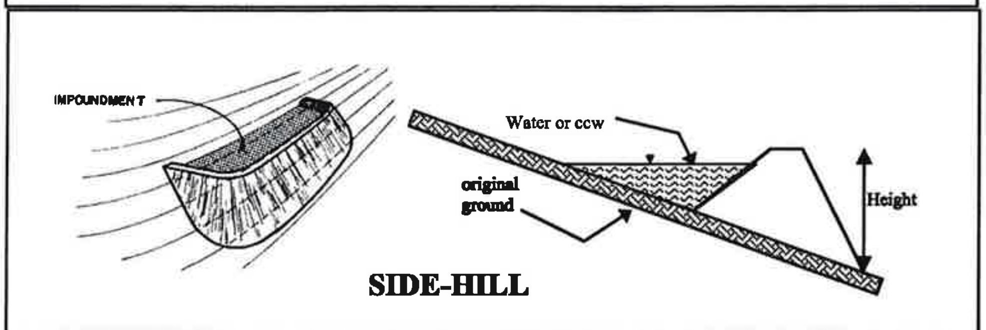
______ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

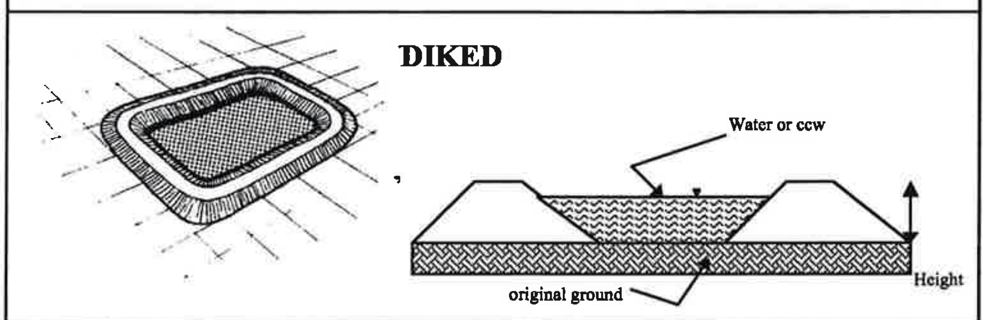
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

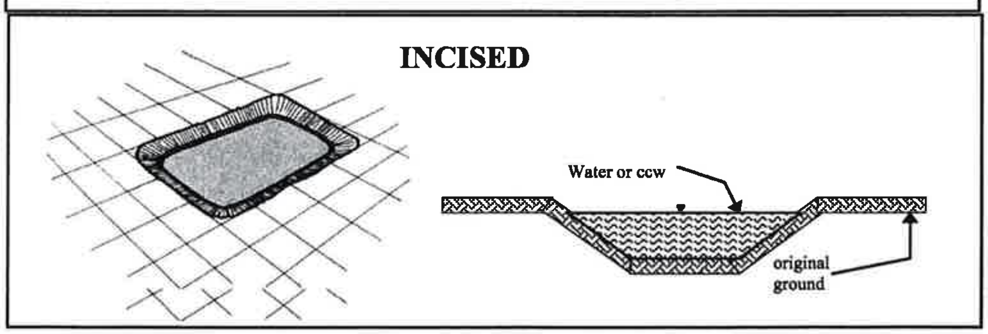
Release will cause local flooding around power plant and will enter muddy river and flow downstream to town of glendale.
Potential for extensive environmental damages.

CONFIGURATION:









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

Embankment Height ~15 feet
Pool Area ~85 acres
Current Freeboard ~7 feet

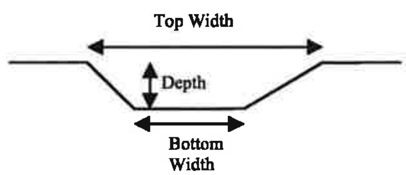
Embankment Material SM, SP, CL
Liner HDPE 60mil top + 40mil bottom
Liner Permeability <1x10^{-8} cm/s

TYPE OF OUTLET (Mark all that apply)

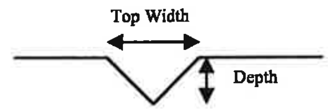
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

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

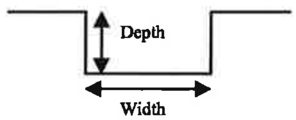
TRAPEZOIDAL



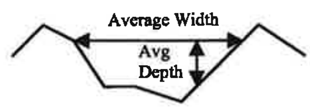
TRIANGULAR



RECTANGULAR

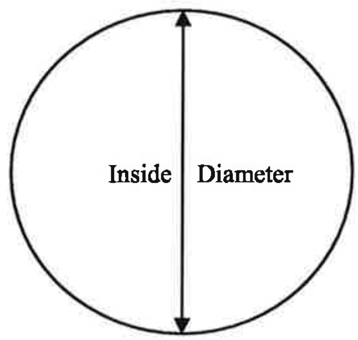


IRREGULAR



_____ **Outlet**

_____ inside diameter



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

_____
Is water flowing through the outlet? YES _______ NO _______

_X_ **No Outlet**

_____

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

The Impoundment was Designed By Kennedy/Jenks Consultants
____

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? Historic

IF So Please Describe: Ponds were reconstructed in 2002, 2005. Before the ponds were rebuilt with the current double HDPE lining & interstitial drain, they were built with a clay liner.

Seepage that occurred from the clay lined ponds was not a dam safety issue. The seepage was the result of vertical gradients through the clay lining.

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 _X_____

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

If so Please Describe : ____________________
Monitoring wells were installed to monitor ground water quality

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Reid Gardner Generating Station	**Date:**	02/15/11
Unit Name:	Pond E1	**Operator's Name:**	NV Energy
Unit I.D.:	NV10737 / J-618	**Hazard Potential Classification:** High Significant ✓ Low	
Inspector's Name:	Steve Brown, P.E. GEI Consultants, Inc.		

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?	Quarterly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	1592.5		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		N/A
5. Lowest dam crest elevation (operator records)?	1595.2		Is water exiting outlet, but not entering inlet?		N/A
6. If instrumentation is present, are readings recorded (operator records)?	✓		Is water exiting outlet flowing clear?		N/A
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?		N/A	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

#1 Quarterly informal visual inspections conducted by environmental ~~the~~ technicians.

#19 South Berm - erosion rills

E1/E2 divider dike - HDPE lining is not sealed at value riser pipe

Interstitial drains have water

Interstitial drain + staff gage

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment ~~NPDES~~ NDEP Permit # NEV 91022 NVR050000 INSPECTOR Steve Brown
Date 2/15/11

Impoundment Name Reid Gardner Generating Station
Impoundment Company NV Energy
EPA Region 9
State Agency (Field Office) Addresss 901 S. Stewart St stes 2002+4001
NVWR/NVDEP Carson City NV 89701
Name of Impoundment E1
(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: Effluent Evaporation Pond (low grade water, storm water, scrubber effluent)

Nearest Downstream Town : Name Glendale, NV
Distance from the impoundment 5 miles downstream
Impoundment
Location: Longitude 114 Degrees 38 Minutes 19.25 Seconds
Latitude 36 Degrees 39 Minutes 11.44 Seconds
State NV County Clark

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

If So Which State Agency? NV Division of Environmental Protection
NV Division of Water Resources

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.

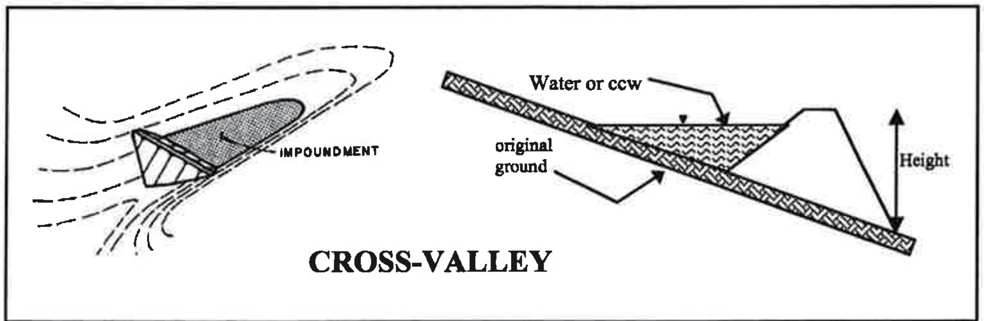
__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

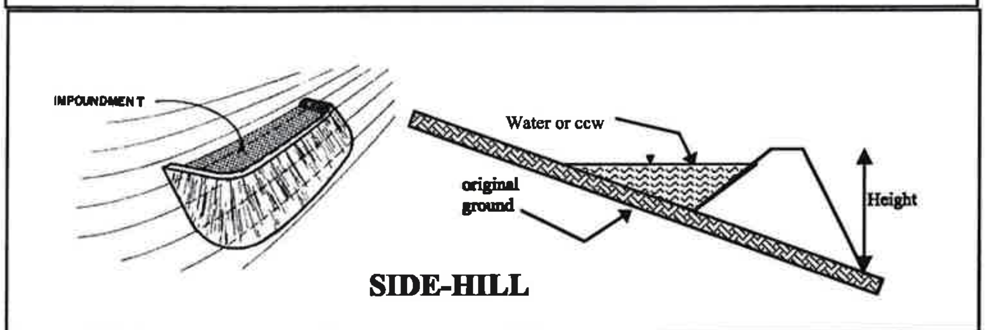
______ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

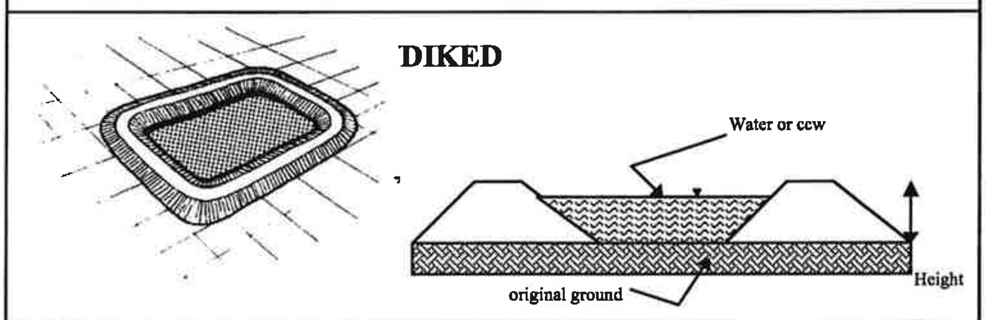
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

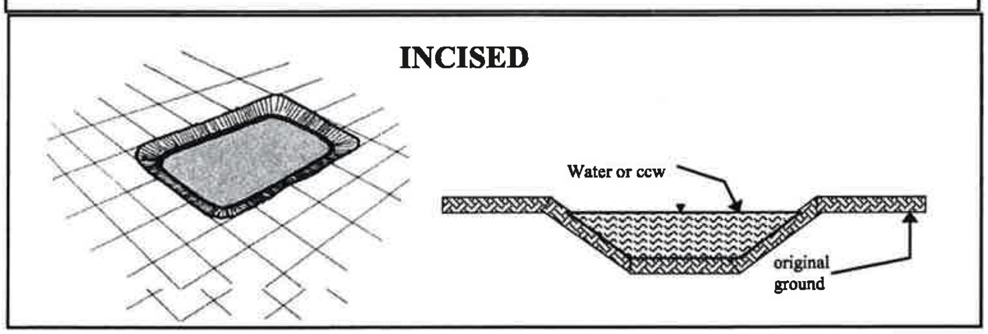
Release will cause local flooding around power plant and will enter muddy river and flow downstream to town of glendale.
Potential for extensive environmental damages.

CONFIGURATION:









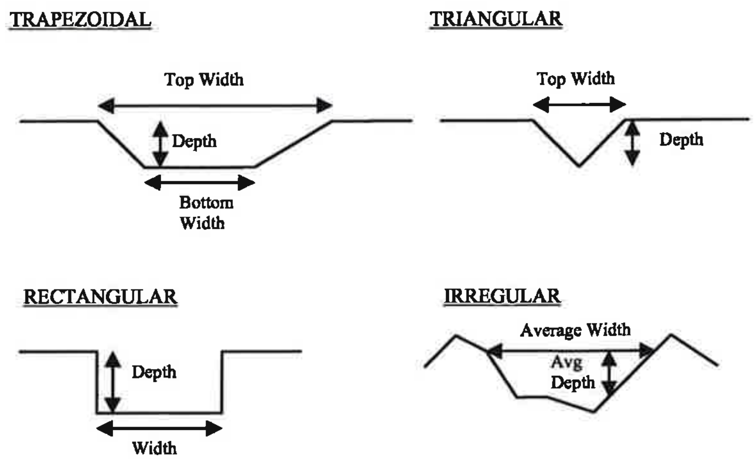
_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height __18__ feet   Embankment Material __sand with silt+gravel__
Pool Area __5.9__ acres   Liner __HDPE 60mil top, 40mil bottom__
Current Freeboard __2.7__ feet   Liner Permeability __$<1\times10^{-8}$ cm/s__

TYPE OF OUTLET (Mark all that apply)

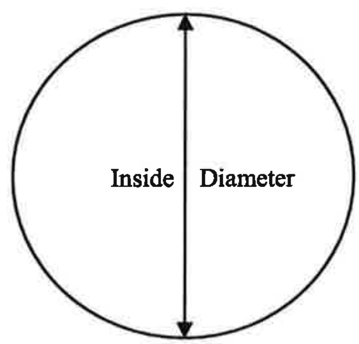
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

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



_____ **Outlet**

_____ inside diameter



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

_____
Is water flowing through the outlet? YES _______ NO _______

X **No Outlet**

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

The Impoundment was Designed By Kennedy / Jenks Consultants

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? Historic

IF So Please Describe: Ponds were reconstructed in 2002. Before the ponds were rebuilt with the current double HDPE lining & interstitial drain, they were built with a clay liner.

Seepage that occurred from the clay lined ponds was not a dam safety issure. The seepage was the result of vertical gradients through the clay lining.

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 X

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

If so Please Describe :

Monitoring wells were installed to monitor ground water quality

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Reid Gardner Generating Station	**Date:**	02/15/11
Unit Name:	Pond E2	**Operator's Name:**	NV Energy
Unit I.D.:	NV10738 / J-619	**Hazard Potential Classification:**	High Significant ✓ Low
Inspector's Name:	Steve Brown, P.E. GEI Consultants, Inc.		

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?	Quarterly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	1592.5		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		N/A
5. Lowest dam crest elevation (operator records)?	1595.2		Is water exiting outlet, but not entering inlet?		N/A
6. If instrumentation is present, are readings recorded (operator records)?			Is water exiting outlet flowing clear?		N/A
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?		N/A	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

#1 Quarterly informal visual inspections conducted by environmental technicians.

North + West berms - tire ruts on crest

Gravel over build from grader work on crest onto land side of berm

Minor erosion gullies

Interstitial drain + staff gage

EPA FORM -XXXX

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW) Impoundment Inspection

Impoundment ~~NPDES~~ NDEP Permit # NEV 91022 NVR050000 INSPECTOR Steve Brown

Date 2/15/11

Impoundment Name Reid Gardner Generating Station

Impoundment Company NV Energy

EPA Region 9

State Agency (Field Office) Addresss 901 S. Stewart St Ste 2002 4001
NV WR / NVDEP Carson City NV 89701

Name of Impoundment E2

(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: Effluent Evaporation Pond (low grade water, storm water, scrubber effluent)

Nearest Downstream Town : Name Glendale, NV

Distance from the impoundment 5 mile downstream

Impoundment

Location: Longitude 114 Degrees 38 Minutes 25.23 Seconds
Latitude 36 Degrees 39 Minutes 15.62 Seconds
State NV County Clark

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

If So Which State Agency? NV Division of Environmental Protection
NV Division of Water Resources

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.

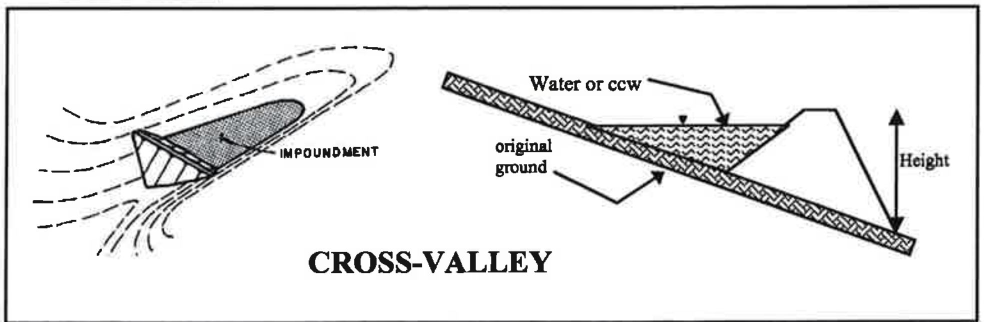
__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

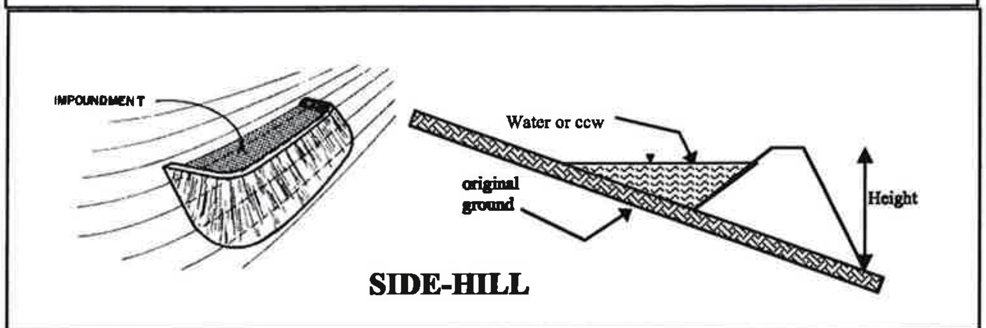
______ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

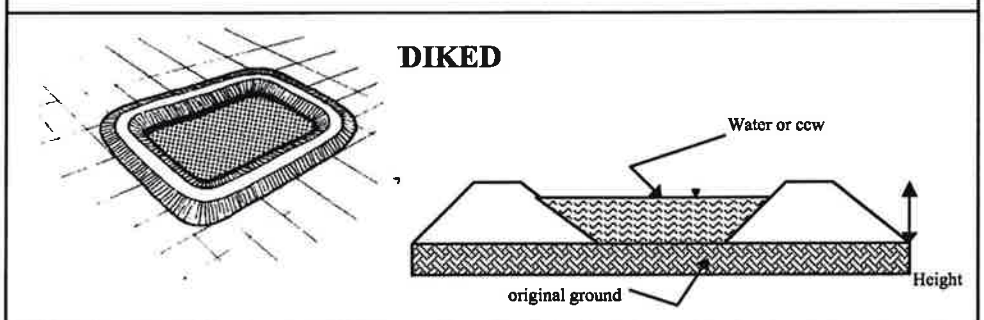
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

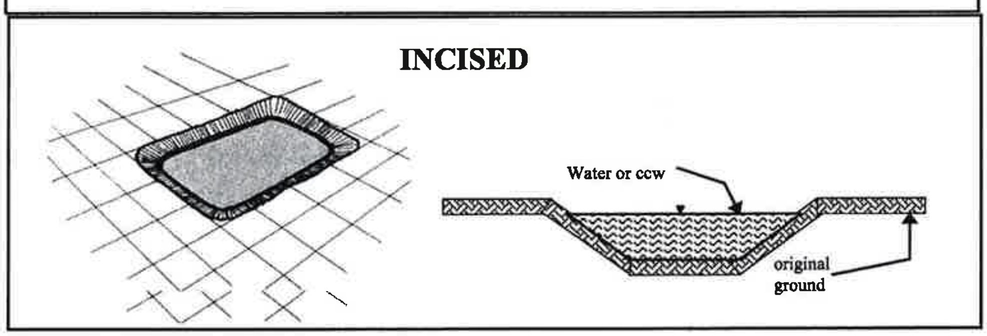
Release will cause local flooding around power plant and will enter muddy river and flow downstream to town of glendale. Potential for extensive environmental damages.

CONFIGURATION:









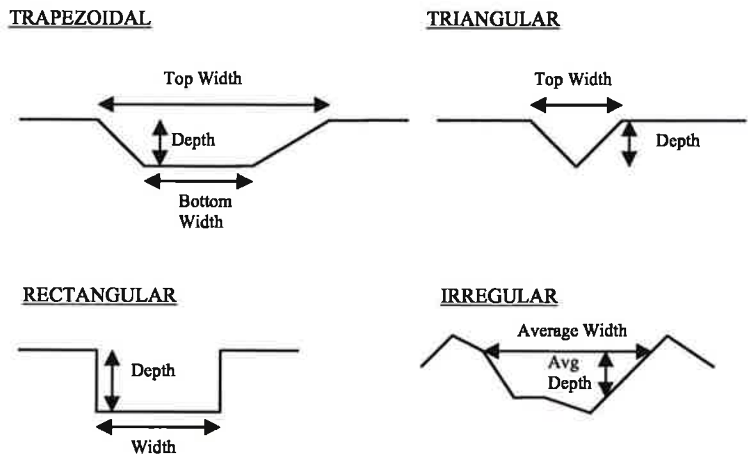
_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height ___18___ feet Embankment Material ___Sand with silt + gravel___
Pool Area ___14.4___ acres Liner ___HDPE 60mil (top), 40mil (bottom)___
Current Freeboard ___2.7___ feet Liner Permeability ___$<1 \times 10^{-8}$ cm/s___

TYPE OF OUTLET (Mark all that apply)

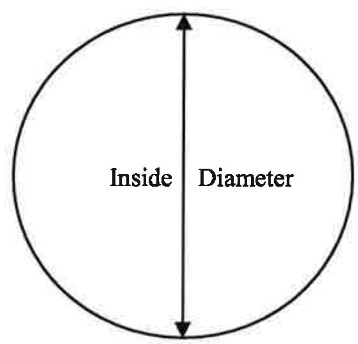
______ **Open Channel Spillway**
______ Trapezoidal
______ Triangular
______ Rectangular
______ Irregular

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



______ **Outlet**

______ inside diameter



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

______

Is water flowing through the outlet? YES ______ NO ______

X **No Outlet**

______

______ **Other Type of Outlet** (specify) ____________________

The Impoundment was Designed By Kennedy/Jenks Consultants

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? Historic

IF So Please Describe: Ponds were reconstructed in 2002. Before the ponds were rebuilt with the current double HDPE lining & Interstitial drain, they were built with a clay liner.

Seepage that occurred from the clay lined ponds was not a dam safety issure. The seepage was the result of vertical gradients through the clay lining.

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 X

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

If so Please Describe :

Monitoring wells were installed to monitor ground water quality

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Reid Gardner Generating Station	Date:	02/15/11
Unit Name:	Pond F	Operator's Name:	NV Energy
Unit I.D.:	NV10739 / J-620	Hazard Potential Classification:	High Significant ✓ Low
Inspector's Name:	Steve Brown, P.E. GEI Consultants, Inc.		

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?	Quarterly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	1587.3		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		N/A
5. Lowest dam crest elevation (operator records)?	1593.6		Is water exiting outlet, but not entering inlet?		N/A
6. If instrumentation is present, are readings recorded (operator records)?	✓		Is water exiting outlet flowing clear?		N/A
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?		N/A	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
#1	Quarterly informal visual inspections conducted by environmental technicians.
#3	Water is removed from Pond F by pumping to ponds E1, E2, B1, B2, B3
#6	Interstitial drain system, staff gage.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment ~~NPDES~~ NDEP Permit # NEV 91022 NVR050000 INSPECTOR Steve Brown
Date 2/15/11

Impoundment Name Reid Gardner Generating Station
Impoundment Company NV Energy
EPA Region 9
State Agency (Field Office) Addresss NVWR/NVDEP 901 S. Stewart St stes 2002 + 4001 Carson City NV 89701
Name of Impoundment F
(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: Effluent Evaporation Pond (lowgrade water, storm water, scrubber effluent)

Nearest Downstream Town : Name Glendale, NV
Distance from the impoundment 5 miles downstream
Impoundment
Location: Longitude 114 Degrees 38 Minutes 15.72 Seconds
Latitude 36 Degrees 39 Minutes 17.22 Seconds
State NV County Clark

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

If So Which State Agency? NV Division of Environmental Protection
NV Division of Water Resources

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.

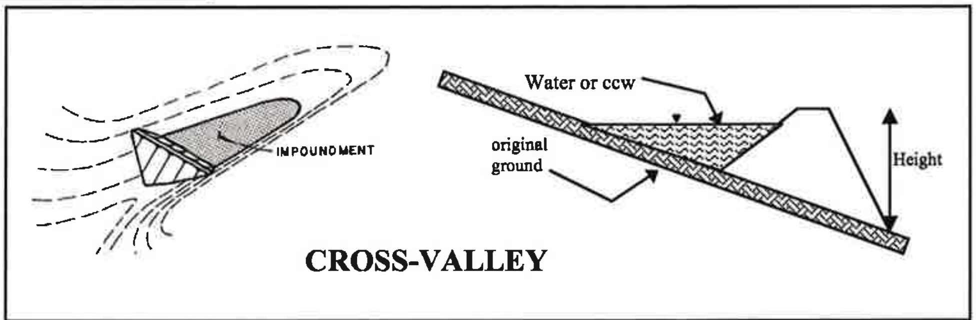
__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

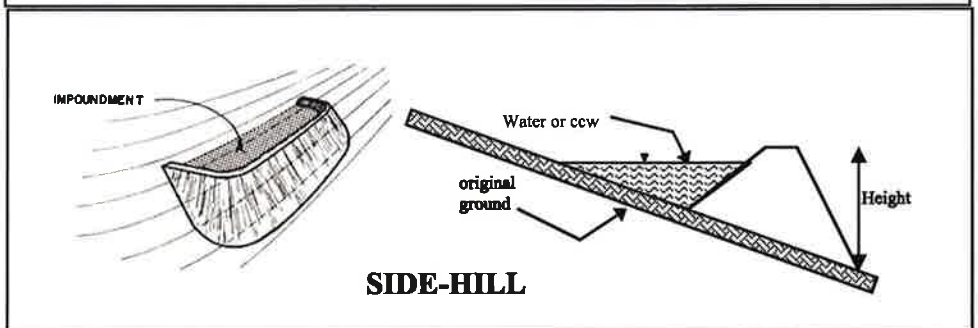
______ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

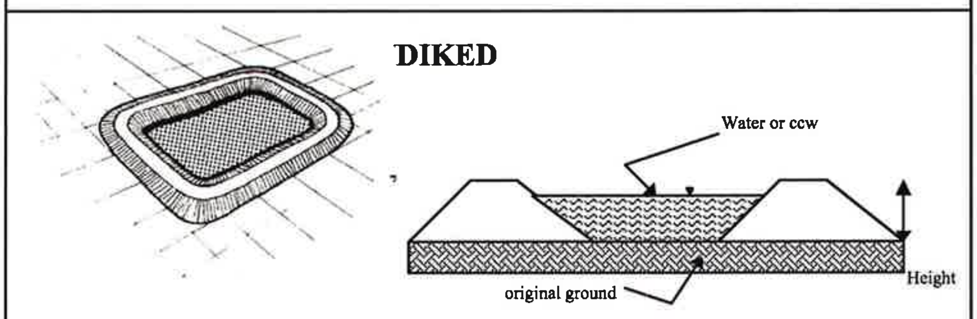
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

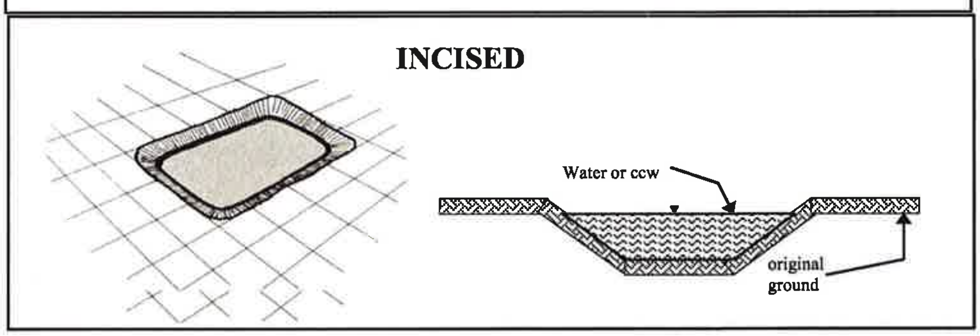
Release will cause local flooding around power plant and will enter muddy river and flow downstream to town of glendale. Potential for extensive environmental damages.

CONFIGURATION:









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

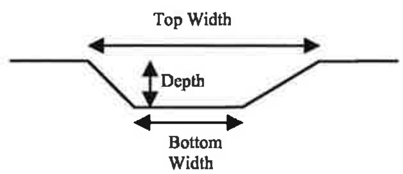
Embankment Height ___15___ feet   Embankment Material ___SP, CL, CH,___
Pool Area ___~4___ acres   Liner ___HDPE 60mil (top) - 40 mil (bottom)___
Current Freeboard ___6.3___ feet   Liner Permeability ___<1x10^{-8} cm/s___

TYPE OF OUTLET (Mark all that apply)

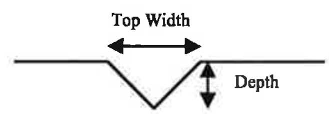
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

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

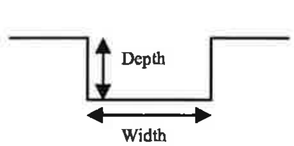
TRAPEZOIDAL



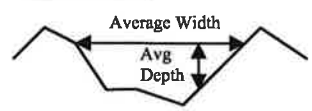
TRIANGULAR



RECTANGULAR

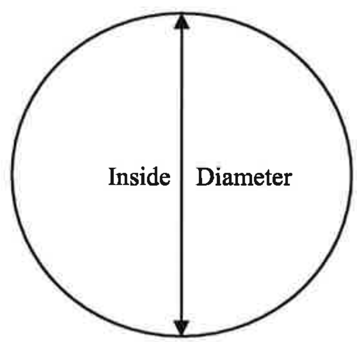


IRREGULAR



_X_ **Outlet** (pumped)

<10" inside diameter



Material
_____ corrugated metal
_____ welded steel
_____ concrete
_X_ 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 Stanley Consultants

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? Historic

IF So Please Describe: Ponds were reconstructed in 2006-2008 Before the ponds were rebuilt with the current double HDPE lining & Interstitial drain, they were built with a clay liner.

Seepage that occurred from the clay lined ponds was not a dam safety issue. The seepage was the result of vertical gradients through the clay lining.

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 X

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

If so Please Describe :

Monitoring wells were installed to monitor ground water quality

Appendix B

Inspection Photographs

February 15, 2011

Photo 1: Site overview from Mesa Landfill Area. Looking northeast. Reid Gardner Generating Station in background. From right to left Pond E1 – E2 – former pond D.

Photo 2: Site overview from Mesa Landfill Area. Looking north. From right to left, Pond E2 – Former pond D with stormwater ponds – B1 – B2.

Photo 3: Site overview from Mesa Landfill Area. Looking northwest. From right to left, Pond B1 – B2 – B3. Ponds C1 and C2 in the background – white solids.

Photo 4: Site overview from Mesa Landfill Area. Looking west. From right to left, Pond B1 – B2 – B3. Ponds C1 and C2 in the background – white solids.

Photo 5: Looking northwest. North dike of Pond F. Muddy River drainage at right.

Photo 6: Looking southwest. Pond F on right. Former Pond G on left.

Photo 7: Looking northwest. Pond F from divider dike. Inlet on left.

Photo 8: Looking northeast. Pond F on left. Former pond G on right.

Photo 9: Looking west. Pond F in foreground. Overland outlet pipe to pumphouse at left. Pond E2 in the background at left.

Photo 10: Looking south. Former Pond G. Riprap slope protection and partially removed dike. North dike of Pond E1 at right.

Photo 11: Looking east. From south dike of Pond F. Pumphouse at left and pipes to Ponds E1 and E2. The only pipes in service are the cream colored set in the background near the ground.

Photo 12: Looking north. Western end of Pond F.

Photo 13: Looking southeast. North dike of Pond F. Typical soil cement slope protection. Muddy River located at left.

Photo 14: Pond F. Typical cracking and vegetation located along edge of crest and slope.

Photo 15: Pond F. Typical erosion of aggregate road base overbuild on top of soil cement slope protection.

Photo 16: Looking northeast. Piping from Reid Gardner Station to Pond F.

Photo 17: Looking southwest. Abandoned pipe penetrations through north dike of Pond F, near the northeast corner of the Pond.

Photo 18: Looking west. Northeast corner of Pond E2.

Photo 19: Typical retaining wall to protect air release valve. Looking west at east dike of Pond E2.

Photo 20: Looking east. Pond E1 in background. Pond E2 with outlet pipe in foreground.

Photo 21: Looking east. Pond E1 south dike - HDPE liner and staff gage.

Photo 22: Looking east. Pond E1 south dike.

Photo 23: Looking northwest. Pond E1 east dike. Former Pond G on right with partially removed dike and rip rap slope protection on former divider dike with Pond F. Pipes connecting Pond F with Pond E1 in the center-background.

Photo 24: Looking north. Pond E2 west dike. Pond E2 on right. Former Pond D on left.

Photo 25: Looking east. Pond E2 north dike near northeast corner. Muddy River on right.

Photo 26: Looking southeast. Pond E2 east dike. Pond F on left.

Photo 27: Looking southeast. Pond E2 east dike.

Photo 28: Looking northwest. Pond B1 north dike. Muddy River at right.

Photo 29: Looking southwest. Divider dike. Pond B1 on left. Pond C1 on right.

Photo 30: Looking northeast. Pond B1 east dike.

Photo 31: Typical interstitial drain.

Photo 32: Looking southwest. Pond B2 east dike. Riprap at toe.

Photo 33: Looking north. Pond B3 west dike.

Photo 34: Looking east. Pond B3 west dike. Interstitial drain with HDPE liner in need of repair.

Photo 35: Looking northwest. Pond C1 HDPE liner north dike. Pond C2 in background. Muddy River at right.

Photo 36: Looking northwest. Pond C1 south dike. Pond C2 in background at the right.

Photo 37: Looking north. Pond C2 west dike. Muddy River at left.

Photo 38: Looking southeast. Pond C2 north dike. Shrub growing on slope near toe.

Photo 39: Looking southeast. Pond C2 north dike. HDPE with abandoned penetration.

Photo 40: Looking southeast. Pond C1 north dike.

Photo 41: Bulge in HDPE liner on Pond C1 north dike.

Photo 42: Looking southeast. Pond C1 north dike.

Appendix C

Reply to Request for Information Under Section 104(e)

NVEnergy

September 29, 2010

Mr. Craig Dufficy
US Environmental Protection Agency
Two Potomac Yard
2733 S. Crystal Dr., 5th Floor; N-5831
Arlington, VA 22202 2733

RE: Request for Information under Section 104 (e) of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. 9604(e) – Reid Gardner Generating Station

Dear Mr. Dufficy,

Enclosed with this letter are the NV Energy ("NVE") responses to the United States Environmental Protection Agency's ("EPA") Request to Provide Information Pursuant to the authority granted to it under Section 104 (e) of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. 9604(e) with regard to the Reid Gardner Generating Station.

Also enclosed is the requested certification signed by an authorized representative of the Reid Gardner Generating Station.

The specific request was for information regarding surface impoundments or similar diked or bermed management unit(s) or management units designated as landfills which receive liquid-borne material from a surface impoundment used for the storage or disposal of residuals or byproducts from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals.

NVE's Reid Gardner Generating Station has eight "units" relevant to this inquiry. Accordingly, responses to each of the individual questions with respect to each "unit" have been provided.

NVE reserves the right to amend or supplement these responses if warranted by any subsequently discovered information or changed circumstances. NVE objects to the scope and breadth of the Information Request, and has limited its efforts to identify and produce responsive, non-privileged information to a good faith, duly diligent search for the information requested.

If you have any questions regarding this submission, please contact Mr. Tony Garcia, NVE Environmental Manager, at (702) 402-5767.

Sincerely,

Kevin Geraghty
Vice President, Power Generation
NV Energy

Enclosure

Cc: D. Sharp
T. Garcia
M. Rojo
T. Woodworth

CERTIFICATION STATEMENT
NV ENERGY
REID GARDNER GENERATING STATION

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 on 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.

Signature: ______________________
Name: Kevin Geraghty
Title: Vice President, Power Generation

Enclosure A

Please provide the information requested below for each surface impoundment or similar diked or bermed management unit(s) or management units designated as landfills which receive liquid borne material for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals. This includes units that no longer receive coal combustion residues or by-products, but still contain free liquids.

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.***

   NV Energy Response:

Management Unit	National Inventory of Dam Number	Nevada State Identification Number	Hazard Rating
B1	NV10732	J-613	Significant
B2	NV10733	J-614	Significant
B3	NV10734	J-615	Significant
C1	NV10735	J-616	Significant
C2	NV10736	J-617	Significant
E1	NV10737	J-618	Significant
E2	NV10738	J-619	Significant
F	NV10739	J-620	Significant

The State of Nevada, Department of Conservation and Natural Resources, Division of Water Resources regulates the Dam Safety program. The basis of the hazard ratings was determined in accordance with the State of Nevada NAC 535.140 (Hazard Classification).

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

NV Energy Response:

Management Unit	Year Unit Commissioned	Year Unit Expanded
4B1	1992	N/A
4B2	1992	2008*
4B3	1992	N/A
4C1	1992	N/A
4C2	2001	2002**
E1	2003	N/A
E2	2003	N/A
F	1986	N/A

**In 2008, the dry pond solids were removed and a new HDPE liner system was installed in Ponds B1 and B2. Pond B2 was expanded while Pond B1 was reduced. Overall the combined surface area and volumes of the two ponds did not change significantly.*

***In 2002, former ponds 4C2 and 4C3 were closed. After the dry FGD solids were removed, a new pond (named 4C2) was constructed in the same area of the former 4C2 and 4C3 ponds. The 4C2 pond has the same approximate dimensions that the previous 4C2 and 4C3 ponds had together.*

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).***

NV Energy Response*:*

Flue gas emission control residuals and small amounts of fly ash "*carry-over*" are temporarily contained in the management units. Accumulated dry residuals are removed and disposed in a permitted onsite solid waste landfill. NV Energy completed installation of bag houses on generating units 1, 2 and 3 in 2008 and 2009 to capture fly ash prior to entering the wastewater stream, reducing the potential for fly ash to accumulate in the wastewater and in the management units. No flue gas emission control residuals solids or fly ash are permanently stored in the management units.

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?***

NV Energy Response:

Management Unit	PE Designed	PE Supervision During Construction	Inspection/ monitoring under PE Supervision*
4B1	Yes	Yes	No
4B2	Yes	Yes	No
4B3	Yes	Yes	No
4C1	Yes	**	No
4C2	Yes	**	No
E1	Yes	**	No
E2	Yes	**	No
F	Yes	Yes	No

*No formal inspection program under PE supervision is in place for these management units. Informal inspections under a PE (Civil) are discussed in the answer to question 5 below.

**The management units were designed by a PE; however, historical documentation does not confirm whether or not a PE supervised construction. NVE can confirm the construction was completed under the supervision of a NVE project engineer.

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?***

NV Energy Response:

No formal structural integrity testing has been completed on the management units since their construction. Plant personnel tour the ponds routinely under the supervision of a PE (Civil) and would be able to identify any obvious structural deficiencies; additionally, pond levels are recorded to ensure freeboard is maintained.

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.***

   <u>NV Energy Response</u>:

   On April 22, 2008, Staff from the State of Nevada, Division of Water Resources inspected the above mentioned ponds at the Reid Gardner Station. The final report documents that the overall inspection condition of the management units was good. NVE has complied with and/or will comply with the corrective actions specified in the report by the required deadlines. NV Energy is not aware of any future state or federal inspections that are planned at this time. A copy of the final inspection report is enclosed as Attachment "A".

7. ***Have assessments or evaluations, or inspections conducted by State or Federal regulatory officials conducted within the past 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.***

   <u>NV Energy Response</u>:

   There have been no inspections conducted by the state or federal regulatory officials in the last year.

8. ***What is the surface area (acres) and total storage capacity of each of the management units? What is the volume of material 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 of the management unit(s). The basis for determining maximum height is explained later in this Enclosure.***

   <u>NV Energy Response</u>:

   The surface areas, total storage capacities, volume of material currently stored and maximum heights were determined per the figure provided in Enclosure A of the information request.

Management Unit	Surface Area (Acres)	Total Storage Capacity (CY)	Volume of Material Currently Stored (CY)	Date Volume Measured (CY)	Maximum Height (ft)
4B1	14.1	311,200	181,800	9/29/2010	16
4B2	13.2	239,200	102,844	9/29/2010	13
4B3	8.5	145,200	44,000	9/29/2010	12
4C1	16.9	185,200	104,700	1/2/2009	15
4C2	17.3	279,400	141,700	6/3/2010	13
E1	8.5	185,200	144,200	9/29/2010	17
E2	17	265,600	205,700	9/29/2010	12
F	4.1	59,400	35,000	9/30/2010	12

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 or 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).***

NV Energy Response:

There have been no known spills or unpermitted releases to surface water or to the land within the last ten years from the management units identified above in Questions #4 and #8.

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

NV Energy Response:

Reid Gardner Units #1, #2 and #3 are Owned and Operated by NV Energy

Reid Garner Unit #4 is co-owned by NV Energy and the California Department of Water Resources. NV Energy is the Operator of Unit #4.

ATTACHMENT "A"

(Copy of April 22, 2008 Dam Safety Inspection Report)

JIM GIBBONS
Governor

STATE OF NEVADA

ALLEN BIAGGI
Director

TRACY TAYLOR, P.E.
State Engineer

DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF WATER RESOURCES
901 S. Stewart Street, Suite 2002
Carson City, Nevada 89701
(775) 684-2800 • Fax (775) 684-2811
water.nv.gov

September 10, 2008

Forrest Hawman
Nevada Power
P.O. Box 279
501 Wally Kay Way
Moapa, NV 89025

Re: Reid Gardner Power Plant Inspection
Low Hazard
Pond 4A: Not in Service – no permit
Pond D: Not in Service – no permit
Cooling Tower Blow Down Pond – In Service – no permit
Significant Hazard
Pond 4B-1: J-613
Pond 4B-2: J-614
Pond 4B-3: J-615
Pond 4C-1: J-616
Pond 4C-2: J-617
Pond E-1: J-618
Pond E-2: J-619
Pond F: J-620
Pond G: J-621
High Hazard
Three (3) Raw Water Ponds – In Service – no permit

Dear Mr. Hawman:

On April 22, 2008, Robert K. Martinez and Hamilton Reed inspected the above-described impoundment. The purpose of the inspection was to determine the condition of the structure with respect to dam safety. Reid Gardner Ring Dikes are classified as shown above.

The overall inspection condition was good. Based on the above inspection and related information, the following corrective actions should be taken.

IMMEDIATE

No conditions were observed that required immediate attention at this time.

SHORT TERM (1 YEAR)

1. Pond's 4B&C: Repair precipitation erosion runnels on exterior embankments.
2. Pond's 4B&C: Raise elevation and grade ring dike roads so precipitation does not puddle and degrade road bed or create erosion runnels on exterior embankments.
3. Raw Water Ponds: Submit Dam Safety Application.
4. Raw Water Ponds: Remove vegetation and repair erosions runnels on exterior embankments.

LONG TERM (3 YEARS)

1. Raw Water Ponds: maintain minimum 2 feet of freeboard.

If you have any questions, please call Robert K. Martinez, P.E. or myself at 775-684-2800.

Sincerely,

Wm. Hamilton Reed, R.P.G., P.E.
Staff Engineer

WHR/sg