NOTE

Subject: EPA Comments on NV Energy, Reid Gardner Generating Station, Moapa, NV
Round 9 Draft Assessment Report

To: File

Date: June 1, 2011

1. On page 3, section "2.1 General", paragraph 3, line 3, please define the "paint filter test" referenced. Language is somewhat ambiguous in the remainder of the bottom ash filtration explanation.

2. On page 8, Section 3.0 Summary of Construction History and Operation**,** the dates for the commission of each of the units differ from those of the survey response. Please rectify the discrepancy.

Management Unit	Survey Yr Unit Commissioned	Draft Assessment Report Yr Unit Commissioned
4B1	1992	early 1980's
4B2	1992	early 1980's
4B3	1992	early 1980's
4C1	1992	early 1980's
4C2	2001	early 1980's
E1	2003	1974
E2	2003	1974
F	1986	Late 1980's

3. On page 9, section "4.2 CCW Impoundments", paragraph 1, line 1, "ponds" should be changed to the possessive, "ponds'."

4. On page 11, section "5.2.3 Freeboard Adequacy", it may be advantageous to augment this section with a description of "very simplified evaluation using conservative assumptions." Elaborate on both the process of the evaluation and the assumptions being made in the evaluation.

5. On page 13, section "7.2.1 Flow Rates", "discharge" should be changed to the plural, "discharges."

6. On page 16, section "8.4.4 Water Surface Elevations and Reservoir Discharges", paragraph 2, the text refers to "a new method for tracking pond levels" developed by RGGS in 2009. No mention is made of this new method. Please elaborate further on this new method of measuring pond elevation (e.g., manual gauge reading, electronic reading)

7. On page 17, section "9.3 Methods of Analysis", paragraph 2, please include the basis of decision (if available from documentation) for the particular loading cases used in the geotechnical analysis of slip surfaces in the embankments (e.g. USACE code).

8. On page 19-20, section "9.4 Discussion of Stability Analysis and Results", it is evident from submitted reports prepared by Stanley Consultants that the minimum factors of safety as required by EM-1110-2-1902 **are not met** in Pond B1, Profile B for steady seepage or seismic steady seepage and **is not met** in Pond F for steady seepage. In Paragraph 6 please elaborate on the exact parameters modeled and the specific variations between input modeling parameters and as-built pond specifications. Please include a summary of all communication with NVE subsequent to June issuance of draft report concerning provision of additional information concerning insufficient factors of safety, along with other EPA comments, in final report

9. On page 27, under Section 12.6 Acknowledgement of Assessment, please provide a condition rating for each individual unit.

10. The following question was not addressed in report: "Is any part of the impoundment built over wet ash, slag, or other unsuitable materials (like TVA)?" Please include this and the response at the end of the field observation checklist.

NVEnergy

June 3, 2011

Stephen Hoffman
Office of Resource Conservation and Recovery
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW (5304P)
Washington, D.C. 20460

Subject: Response to Draft Specific Site Assessment for Coal Combustion Waste Impoundments at Reid Gardner Generating Station, April 2011

Dear Mr. Hoffman:

On February 15, 2011, EPA and their contractor, GEI Consultants, conducted a site assessment of the NV Energy (NVE) Reid Gardner Generating Station (Station) near Moapa, Nevada to evaluate the dam safety of onsite coal combustion waste (CCW) impoundments. Based on that field assessment and review of the documentation provided by NVE, GEI Consultants prepared a draft Specific Site Assessment for Coal Combustion Waste Impoundments at Reid Gardner Generating Station, dated April 2011. NVE appreciates the opportunity to review this draft report and our responses and recommended revisions to the draft report are attached.

Based on the information and technical clarifications contained in these responses to the draft report, NVE asks you to consider giving these management units a **Satisfactory** rating.

If you have any questions about our comments or should you require additional information, please contact Tony Garcia, Manager, Environmental Services at 702-402-5767.

Sincerely,

Kevin Geraghty
VP, Power Generation
NV Energy

NV Energy Comments Regarding:
Draft Specific Site Assessment for Coal Combustion Waste Impoundments at Reid Gardner Generating Station, April 2011

Comment 1. Section 2.1, page 3, first paragraph
GEI: *"The power plant is located approximately 54 miles northeast of Las Vegas..."*
NVE: The plant is approximately 52 miles northeast of Las Vegas (as you noted in Section 2.5).

Comment 2. Section 2.1, page 3, third paragraph
GEI: *"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 a haul truck and transported to the on-site landfill..."*
NVE: A "paint filter test" is not performed on every load before it is taken to the landfill. The section should read: "Bottom ash is slurried from the boilers to dewatering bins where the bottom ash is drained and decanted. Once it is sufficiently decanted, the bottom ash is loaded onto a haul truck and transported to the on-site landfill..."

Comment 3. Section 2.1, page 3, third paragraph
GEI: *"There are dewatering and recirculation facilities at each unit..."*
NVE: Units 1, 2 and 3 share dewatering and recirculation facilities while Unit 4 has its own system.

Comment 4. Section 2.1, page 3, fourth paragraph
GEI: *"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"*
NVE: These sentences should read: "The fly ash is collected 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 minimize dust when hauling to the permitted ash landfill."

Comment 5. Section 2.1, page 3, fourth paragraph
GEI: *"The landfill receives fly ash, bottom ash, and dredged solids material from decant and evaporation ponds."*
NVE: This sentence is missing one generated solid waste, reactivator solids from the water treatment plant. This sentence should read: The landfill receives fly ash, bottom ash, reactivator solids and dredged solids material from decant and evaporation ponds.

Comment 6. Section 2.1, page 3, fifth paragraph
GEI: *"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."*
NVE: Ponds C1 and C2 are currently out of service, but not currently in the process of being closed. Rather, NVE considers Ponds C1 and C2 as available to receive water anytime if necessary. Ponds C1 and C2 are scheduled to be closed in the future, but a firm schedule has

not been finalized. Therefore, NVE requests removal of the reference "in the process of being closed."

Comment 7. Section 2.2, page 4, second paragraph
GEI: *"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."*
NVE: Pond F is no longer used for ash settling since all four generating units now have baghouses for removing fly ash. This sentence should read: "Ponds B1, B2, B3, C1, C2, E1, and E2 hold wastewater pumped from Pond F for evaporation."

Comment 8. Section 2.2, page 4, second paragraph
GEI: *"Between 2006 and 2008, the ponds were refurbished with a dual geosynthetic liner system with leak detection and interstitial drain."*
NVE: The dates in this statement are incorrect. The following table shows the dates the impoundments were reconstructed with double HDPE liner systems:

Table 1 Pond Reconstruction Dates

Impoundment Unit	Date of Retrofit
B1	2008
B2	2008
B3	2007
C1	2002
C2	2002
E1	2003
E2	2003
F	2007

Comment 9. Section 2.2, page 4, second paragraph
GEI: *"The design included high density polyethylene (HDPE) liners (80-mil upper and 40-mil lower liner thicknesses) to minimize seepage from the basins."*
NVE: The upper layer of the liner systems on these impoundments has a thickness of 60 mil; not 80 mil.

Comment 10. Section 2.2, page 4, third paragraph, B Series Ponds
GEI: *"The perimeter embankment is approximately 3,500 linear feet long..."*
NVE: The Pond B1 perimeter embankment is 3,240 feet long (as shown in Table 2) per the Dam Safety Permit Applications that were submitted in May 2008 to the Nevada Department of Conservation and Natural Resources, Division of Water Resources (DWR). These documents were provided to EPA and GEI during the site visit on February 15, 2011. The perimeters, listed as the length of the crest in the permit applications, were measured in AutoCAD using the record drawings for each pond.

Table 2 Pond Perimeters

Impoundment Unit	Perimeter (Crest Length) in feet
B1	3,240
B2	3,110
B3	2,510
C1	3,520
C2	3,750
E1	2,920
E2	3,620
F	1,990

Comment 11. Section 2.2, page 4, third paragraph, B Series Ponds
GEI: *"... with a minimum crest width of 20 feet and 3H:1V upstream side slopes according to the design documents."*
NVE: The minimum crest width should be 18 feet, listed as 'thickness at top' in the Dam Safety Permit Applications that were submitted in May 2008 to the State of Nevada DWR.

Comment 12. Section 2.2, page 4, third paragraph, B Series Ponds
GEI: *"The downstream side slope appears to vary from 1.9H:1V to 2.6H:1V based on the slope stability analyses (Stanley, 2008."*
NVE: The exterior side slopes of Pond B1 are approximately 2.5H:1V on the northern embankment and 3H:1V on the eastern embankment. This is based on aerial topography taken in August 2009 and the slope stability analyses performed by Stanley Consultants (dated 12/21/2006 and 6/13/2007). The interior and exterior slopes were originally designed to be 3H:1V on Pond B1. The northern embankment of this pond was not built according to the design and later redesigned and reconstructed with 2.5H:1V exterior slopes and 3H:1V interior slopes. The eastern, western, and southern embankments were installed according to the original 3H:1V slope design.

Comment 13. Section 2.2, page 4, third paragraph, B Series Ponds
GEI: *"The perimeter embankment is approximately 3,200 linear feet long..."*
NVE: The Pond B2 perimeter embankment is 3,110 feet long as shown in Table 2, Comment 10, and as listed in the Dam Safety Permit Applications that were submitted in May 2008 to the State of Nevada DWR.

Comment 14. Section 2.2, page 4, fourth paragraph, C Series Ponds
GEI: *"The perimeter embankment is approximately 3,600 linear feet long..."*

NVE: The Pond C1 perimeter embankment is 3,520 feet long as shown in Table 2, Comment 10, and as listed in the Dam Safety Permit Applications that were submitted in May 2008 to the State of Nevada DWR.

Comment 15. Section 2.2, page 4, fifth paragraph, E Series Ponds,
GEI: *"The perimeter embankment is approximately 3,700 linear feet long...*
NVE: The Pond E2 perimeter embankment is 3,620 feet long as shown in Table 2, Comment 10, and as listed in the Dam Safety Permit Applications that were submitted in May 2008 to the State of Nevada DWR.

Comment 16. Section 2.2, page 5, Table 2-1: Summary Information for CCW Impoundment Dam Parameters

NVE: The table has been revised to show the correct information.

Parameter	**CCW Impoundment**							
Dam	B1	B2	B3	C1	C2	E1	E2	F
Estimated Maximum Height (ft)**	~~15~~ 16	~~8~~ 13	~~8~~ 12	~~10~~ 15	~~12~~ 13	~~9~~ 17	12	~~11~~ 12
Estimated Perimeter Length (ft)	~~3,500~~ 3,240	~~3,200~~ 3,110	~~2,500~~ 2,510	~~3,600~~ 3,520	~~3,800~~ 3,750	~~2,900~~ 2,920	~~3,700~~ 3,620	~~2,000~~ 1,990
Minimum Crest Width (ft)	18	18	18	12	12	16	16	15
Lowest Berm Elevation (ft)	1608.5	1609.8	1611.5	1607	1607	1595.2	1595.2	1593.6
Design Side Slopes Upstream/Downstream (H:V)	~~3.3:1/2.2:1~~ 3:1/3:1*	3:1/3:1	3:1/3:1	3:1/2:1	3:1/2:1	3:1/2:5	3:1/2:5	3:1/3:1
Estimated Freeboard (ft) at time of site visit	2.4	2.0	5.4	4	7	2.7	2.7	6.3
Storage Capacity (ac-ft)	192.9	148.3	90.0	114.8	~~173.1~~ 173.2	114.8	164.6	36.8
Surface Area (acres)	14.1	13.2	8.5	16.9	17.3	8.5	17	4.1

Grey highlighted cells donate corrections.
*2.5H:1V on exterior slope of the northern embankment.
**These values are based on the August 2009 aerial topography of the site. These are the same values listed in the CERCLA 104 (e)
Request for Information prepared by NV Energy at the request of the EPA, dated September 29, 2010.

Comment 17. Section 2.4, page 6

GEI: *"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)."*

NVE: The gravity transfer piping penetration through the liners was removed from Ponds B1 and B2. The transfer piping is still in place between Ponds B2 and B3, but the valve has been disabled and is no longer in use.

Comment 18. Section 2.7, page 6, last paragraph

GEI: *"Waste materials include fly ash, **flue gas emissions**, bottom ash, boiler slag and other process materials."*

NVE: For clarity NVE suggests the following wording change: "Waste materials include fly ash, flue gas desulfurization solids generated from the SO2 scrubbing systems, bottom ash, boiler slag and other process materials."

Comment 19. Section 2.7, page 6, last paragraph

GEI: *"Fly ash in Units 1, 2, and 3 is removed by mechanical collectors and wet scrubbers."*

NVE: The use of "mechanical collectors" to remove fly ash on Units 1, 2 and 3 was eliminated when a "fabric filter baghouse" was installed on each of the units. The respective fabric filter baghouses were installed as follows; Unit 1, December 2008, Unit 2, April 2009 and Unit 3, February 2009.

Comment 20. Section 2.7, page 6, last paragraph

GEI: *"Fly ash in Unit 4 is removed by a fabric filter baghouse collector recently added in 2008."*

NVE: This sentence is correct regarding the use of a fabric filter baghouse to remove fly ash from Unit 4; however, it was not installed in 2008. The fabric filter baghouse has been in place since the start up of Unit 4 in 1984.

Comment 21. Section 2.7, page 7, first paragraph

GEI: *"The waste water is eventually conveyed by pipes to permitted lined decant and evaporation ponds."*

NVE: This sentence should read: "The waste water is eventually conveyed by pipes to permitted, double-lined evaporation ponds."

Comment 22. Section 2.7, page 7, second paragraph

GEI: *"The waste water 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)..."*

NVE: None of the wastewater ponds function as decant ponds; Pond F was previously used for ash settling, but since all four generating units now have baghouses for removing fly ash this is no longer its function. These sentences should be revised as follows: "The waste water from the blowdown scrubber at the plant initially enters Pond F and can then be discharged to a series of evaporation ponds (Ponds B1, B2, B3, E1, E2 and potentially C1 and C2)..."

Comment 23. Section 2.7, page 7, second paragraph

GEI: *"All active treatment ponds have HDPE double liner systems..."*

NVE: Sentence should read: "All active evaporation ponds have HDPE double liner systems..."

Comment 24. Section 3.0, page 8, first paragraph

GEI: *"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."*

NVE: As noted in Comment 8 above, the reconstruction of the impoundments commenced in 2002 with double lined HDPE liner and interstitial leak detection.

Comment 25. Section 3.0, page 8, fifth paragraph

GEI: *"The Geotechnical Investigations completed by Converse Consultant in 2005 recommend...prior to the 2006 embankment reconstruction project."*

NVE: The Converse Consultants Geotechnical Data Report (December 2005) referenced here by GEI was for retrofitting the B Ponds. Separate geotechnical investigation reports were prepared by Converse Consultants for the C Ponds (September 2000), the E Ponds (May 2002), and Pond F (July 2005). This sentence should be revised to state "The Geotechnical Investigations of the B ponds by Converse Consultants in 2005 recommended..."

Comment 26. Section 3.0, page 8, sixth paragraph

GEI: *"Reconstruction of the original impoundments was based on the design recommendations of Stanley Consultants."*

NVE: Reconstruction of the impoundments was based on the design of different consultants as well as NVE. The Dam Safety Permit Applications submitted to the State of Nevada DWR in May 2008 list the engineering firms responsible for the retrofit design of each pond. This sentence should be revised as follows: "Reconstruction of the B Ponds and Pond F was based on the design recommendations of Stanley Consultants. Reconstruction of the C and E Ponds was based on the design recommendations of Kennedy/Jenks Consultants."

Comment 27. Section 4.2, page 9, Table 4-1

NVE: See Comment 16 for the correct embankment heights and capacities as listed in the CERCLA 104 (e) Request for Information prepared by NV Energy at the request of the EPA, dated September 29, 2010.

Comment 28. Section 7.2.1, page 13

GEI: *"Discharge through the outlet structures are not recorded at any of the CWW impoundments."*

NVE: There are no outlet structures on any of the impoundments since they are part of a zero discharge system.

Comment 29. Section 7.3, page 13

GEI: *"A high water level alarm should also be considered to reduce the risk of overtopping the embankments."*

NVE: High water level alarms are not needed for the impoundments since the water levels in the ponds are monitored on a daily basis and do not change quickly. Because the only stormwater that enters the ponds is rain that falls on them, the ponds would not be overtopped by floodwaters draining into them.

Comment 30. Section 7.3, page 13

GEI: *"Surveyed benchmarks and embankment settlement monuments to measure and record movement of the dikes should also be considered."*

NVE: At least one concrete pedestal will be measured regularly for settlement at each impoundment.

Comment 31. Section 8.1, page 14

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

NVE: Two additional people were present during the entire assessment on February 15, 2011, Tony Garcia, C.E.M., Manager, Environmental Services, NV Energy and Joseph Welter, P.E., Environmental Engineer, Stanley Consultants.

Comment 32. Section 8.2.2, page 14

GEI: *"The HDPE liner was recently added as part of the reconstruction from 2006 to 2008".*

NVE: Reconstruction of the impoundments, which included installation of the HDPE double liner, with interstitial leak detection system was completed from 2002 to 2008 according to the table in the response to Comment 8 above.

Comment 33. Section 8.2.2, page 15

GEI: *"Slightly oversteepened downstream slopes were observed on the north berm of Pond C1 and on the north end of the west berm of C2."*

NVE: Based on aerial topography taken in August 2009, the slopes of the north embankment of Pond C1 and the north end of the west embankment of Pond C2 are around 2H:1V. See Comment 47.

Comment 34. Section 8.4.1, page 15

GEI: *"The inter-connection pipes between Ponds B1, B2, and B3,…"*

NVE: See Comment 17.

Comment 35. Section 9.2, page 17

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

NVE: Separate geotechnical investigation reports were prepared by Converse Consultants for the C Ponds (September 2000), the E Ponds (May 2002), Pond F (July 2005), and the B Ponds (December 2005).

Comment 36. Section 9.3, page 17

GEI: *"The typical sections for Pond B1 were developed from an as-built survey performed subsequent to reconstruction of the embankments."*

NVE: The three sections shown in the June 13, 2007 Slope Stability Analysis by Stanley Consultants are not the typical sections for the entire Pond B1; they were for the northern embankment of Pond B1 only. This analysis replaced the previous analysis done for the original design (Stanley Consultants, December 20, 2006). The interior and exterior slopes of Pond B1 were originally designed to be 3H:1V. The northern embankment of this pond was not built according to this design and was redesigned and reconstructed with 2.5H:1V exterior slopes, a 20 foot wide bench at the toe of the slope, and 3H:1V interior slopes. The eastern, western, and southern embankments were installed according to the original 3H:1V slope design. The record drawings included in Appendix E of the Dam Safety Permit Proof of Completion Ponds B-1 & B-2 (Stanley Consultants, February 2009) show the current configuration of Pond B1.

Comment 37. Section 9.3, page 17

GEI: *"A horizontal acceleration of 0.08g was used in the pseudo-static analyses by Converse Consultants."*

NVE: The original Converse model was re-analyzed using Spencer's Method in SLOPE/W 2007 with the horizontal and vertical acceleration coefficient of 0.15g. The factors of safety calculated for Ponds C1, C2, E1, and E2 for the seismic conditions all exceed the required value of 1.0. No changes were made to the original model dimensions or soil parameters. The plates showing the reanalysis can be made available.

Comment 38. Section 9.4, page 18, third paragraph

GEI: *"A seismic coefficient of 0.08g is not considered adequate for the seismic analysis of Ponds C1, C2, E1, and E2."*

NVE: See Comment 37.

Comment 39. Section 9.4, page 19, Table 9-1, Stability Factors of Safety and Guidance

NVE: See Comment 36. The correct values for Pond B1 are listed below:

	Pond	**B1**		
	Location	**North**		
	Profile	**A**	**B**	**C**
Loading Condition	Min. Required FS	Min. Calculated FS	Min. Calculated FS	Min. Calculated FS
Steady Seepage	1.50	1.56	1.52	1.55
Seismic – Steady Seepage	1.00	1.08	1.14	1.08

The source for these values can be found in the "2.5H:1V w/ 20' Bench" column in the June 13, 2007 Slope Stability Analysis that is located in Appendix C of the Dam Safety Permit Pond B-1, June 2008, Stanley Consultants.

For Pond F Steady Seepage Slope Stability see Comment 42.

Comment 40. Section 9.4, page 20, first paragraph

GEI: *"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."*

NVE: See the responses to Comments 36 and 39.

Comment 41. Section 9.4, page 20, second paragraph

GEI: *"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…"*

NVE: This entire paragraph should be removed per the responses to Comments 12, 36, and 39.

Comment 42. Section 9.4, page 20, third paragraph

GEI: *"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."*

NVE: The Slope Stability Analysis performed by Stanley Consultants for Pond F (dated October 25, 2005) stated, "A factor of safety of 1.5 was achieved with cohesion of 50 psf added to layer 1, the lean clay with sand embankment fill. For a conservative analysis it was assumed that c'=0 psf, however, compacted clays still exhibit cohesion under effective stress conditions. Values of c' for overconsolidated cohesive soils can range from 100 to 500 psf under effective stress conditions based on Ref. 6, p. 310 [Lambe, T. William and Robert V. Whitman, Soil Mechanics. John Wiley & Sons, Inc., 1969]. Therefore, the embankments are considered acceptably stable under all loading conditions."

Comment 43. Section 9.4, page 20, fourth paragraph

GEI: *"While the FS values obtained for the Ponds C1, C2, E1, and E2 meet the 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."*

NVE: See response to Comment 37. This entire paragraph can be revised accordingly.

Comment 44. Section 9.5, pages 20/21

GEI: *"The liquefaction potential at the eight CCW impoundments was not previously evaluated based on review of the available documents."*

NVE: A review of the available boring logs and the geologic cross sections developed by Stanley Consultants in January 2010 was completed to identify potentially liquefiable soil strata. Boring logs were reviewed from each of the Converse Geotechnical Investigation Reports (for each respective pond). Borings were reviewed for the presence of shallow (less than 50 feet deep) loose sandy deposits below the water table and near the impoundment embankments. The review indicated that a majority of the soils underlying the embankments consist of clayey soils or medium dense to dense sandy soils. Isolated stratum of loose sands and silty sands were identified in some soil borings. These borings were selected for further analysis to determine if the soils identified in the borings are susceptible to liquefaction induced settlement or strength loss.

Liquefy Pro was used to analyze the liquefaction potential at the isolated boring locations. Soil types, blow counts, total unit weights, and percent fines were input along with the acceleration of 0.15g and a magnitude of 6.0. The earthquake magnitude of 6.0 was based on research of historical earthquake events within 100 miles of the project site.

The analysis determined that the shallow loose sand deposits shown in Borings AB-6 and B-14 located near the southwest corner of Pond B3 show potential for liquefaction (factors of safety below 1.0). The Liquefy Pro analysis estimated between 1" and 3" of settlement as a result of liquefaction of these strata. Typically differential settlements due to liquefaction are less than 1/2 of total settlement. The liner system would be able to tolerate this amount of total and differential settlement.

Potentially liquefiable soils were also identified near the E Ponds in Boring B-4 and near the F Ponds in Boring B-1. Again, these soils were limited in lateral extent under the ponds. A seismic event was modeled with an acceleration of 0.15g and a magnitude of 6.0. Following the analysis, it was determined that two zones of loose sands located below the water table return factors of safety below 1.0. For Boring B-4 near the E Pond embankment, the Liquefy Pro analysis estimated between 8" and 9" of total settlement as a result of liquefaction of these strata. For Boring B-1 near the F Pond, approximately 1" of total settlement was estimated. Typically differential settlements due to liquefaction are less than 1/2 of total settlement. The liner system would be able to tolerate this amount of total and differential settlement.

Review of the available soil boring logs and geologic sections for the Reid Gardner site indicate that there are soil strata potentially susceptible to liquefaction. These strata are of limited horizontal and vertical extent, and the resulting settlements estimated by the analysis would be tolerated by the liner system. Several of the borings indicating loose sandy soils were advanced utilizing hollow stem augers or air rotary techniques. Both of these methods of advancing borings below the water table are susceptible to hole "blow-up" and corresponding reduction in SPT N-Values. In addition, many of the samples were obtained utilizing a larger diameter "Converse Sampler". Correlations between blow counts with larger diameter samplers and SPT N-Values are sometimes unreliable.

Comment 45. Section 11.1.1, page 23

GEI: *"Embankment slopes of the impoundments showed minor signs of erosion from surface runoff and tire rutting on Ponds B1, C1, C2, E1, and E2."*

NVE: We have begun repairing the erosion noted during the site assessment. Additionally, visual observation of the impoundments to check for erosion is planned after significant rainfall events.

Comment 46. Section 11.1.1, page 23

GEI: *"Minor damages to the HDPE liner system involving small, localized, unsealed connections, tears, and bulging, at Ponds B1, B3, C1, and E1."*

NVE: We have begun repairing the HDPE liner damages noted during the site assessment.

Comment 47. Section 11.1.1, page 23

GEI: *"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."*

NVE: As a part of the erosion repairs mention in Comment 45 these slopes will be restored to the original design slopes of 2H:1V.

Comment 48. Section 11.1.1, page 23

GEI: *"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."*

NVE: The irrigation pipe to the former dairy downstream of the Station will be monitored regularly to identify possible seepage or sediment transport offsite.

Comment 49. Section 11.1.1, page 23

GEI: *"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."*

NVE: We will inspect this dike on a regular basis so we can promptly identify and address erosion. Additionally, it should be noted that sheet piling exists along parts of the northern dike between the pond and the Muddy River.

Comment 50. Section 11.1.1, page 23

GEI: *"Future removal of the Pond G dike should be planned to not adversely affect the performance of the Pond F dike slurry wall."*

NVE: The remaining Pond G dikes will not be removed until Pond F is taken out-of-service.

Comment 51. Section 11.1.2, page 23

GEI: *"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."*

NVE: See the responses to Comments 36 and 39 for Pond B1. See Comment 42 for Pond F.

Comment 52. Section 11.1.2, pages 23/24

GEI: *"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."

NVE: This entire paragraph should be removed per the responses to Comments 36 and 39.

Comment 53. Section 11.1.2, page 24

GEI: *"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."*

NVE: See response to Comment 42.

Comment 54. Section 11.1.2, Page 24

GEI: *"... 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."*

NVE: This entire paragraph should be removed per Comment 37.

Comment 55. Section 11.1.4, page 24

GEI: *"Surveyed benchmarks, embankment settlement monuments to measure and record movement of the dikes should be considered."*

NVE: See response to Comment 30.

Comment 56. Section 11.1.4, page 24

GEI: *"A high water level alarm should be considered."*

NVE: See Comment 29.

Comment 57. Section 12.1, page 25

GEI: *"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."*

NVE: This recommendation should be removed per the responses to Comments 36 and 39.

Comment 58. Section 12.1, page 25

GEI: *"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."*

NVE: This recommendation should be removed per the responses to Comment 42.

Comment 59. Section 12.1, page 25

GEI: *"Update all seismic stability analyses to the approximate 2,500 year return period ½ peak ground acceleration of 0.15g."*

NVE: This recommendation should be removed per Comment 37.

Comment 60. Section 12.1, page 25

GEI: *"Perform a liquefaction potential analysis for the impoundments."*

NVE: This recommendation should be removed per Comment 44.

Comment 61. Section 12.1, page 25

GEI: *"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."*

NVE: Vegetation will be cleared from the Pond F dike above the fenceline. Vegetation will not be removed from within the banks of the Muddy River, however, regular inspections will be done to assess the potential for encroachment of the river on the toe of the Pond F dike.

Comment 62. Section 12.1, page 25

GEI: *"Prepare a plan to protect the integrity of the Pond F dike slurry wall after removal of the adjacent Pond G dike."*

NVE: See response to Comment 50.

Comment 63. Section 12.1, page 25

GEI: *"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."*

NVE: See response to Comment 48.

Comment 64. Section 12.1, page 25

GEI: *"Perform repairs to the HDPE lining to seal the interstitial liner drainage system."*

NVE: See response to Comment 46.

Comment 65. Section 12.2, page 25

GEI: *"Daily water levels of the impoundments should be monitored by plant staff and recorded monthly."*

NVE: Pond water levels are monitored daily and will be recorded on a monthly basis.

Comment 66. Section 12.2, page 25

GEI: *"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."*

NVE: See response to Comment 30.

Comment 67. Section 12.2, page 25

GEI: *"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.*

NVE: As stated in our response to Comment 30, we will survey at least one concrete pedestal regularly for each impoundment. An evaluation will be made regarding making the dike crests uniform based upon the survey results.

Comment 68. Section 12.2, page 25

GEI: *"We recommend the installation of a high level alarm."*

NVE: See response to Comment 29.

Comment 69. Section 12.2, page 25

GEI: *"We recommend a standardized monitoring program be established that includes all monitoring instrumentation and documents the methods used for data collection."*

NVE: See responses to Comments 30, 45, 46, 48, 49, and 61.

Comment 70. Section 12.3, page 26

GEI: *"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."*

NVE: See responses to Comments 30, 45, 46, 48, 49, and 61.

Comment 71. Section 12.5, page 26

GEI: *"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."*

NVE: This rating consideration should be removed per the responses to Comments 36 and 39.

Comment 72. Section 12.5, page 26

GEI: *"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."*

NVE: This rating consideration should be removed per the responses to Comment 42.

Comment 73. Section 12.5, page 26

GEI: *"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."*

NVE: See response to Comment 44.

Comment 74. Section 12.5, page 26

GEI: *"There is no instrumentation provided to enable accurate monitoring of perimeter dike performance for potential movement or settlement."*

NVE: See response to Comment 30.

Comment 75. Section 12.6, page 27

NVE: Based on the information and technical clarifications contained in these responses to the draft report, NVE asks you to consider giving these management units a **Satisfactory** rating.

Comment 76. Section 12.6, page 27, List of Participants

NVE: Two additional people were present during the entire assessment on February 15, 2011, Tony Garcia, C.E.M., Manager, Environmental Services, NV Energy and Joseph Welter, P.E., Environmental Engineer, Stanley Consultants.

Comment 77. Figure 3 Impoundment Water Level Measurements, Notes

GEI: *"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."*

NVE: NVE suggests the following wording change: "3. Water levels for the time frame plotted for Pond C2 were provided for June 3, 2010 and February 15, 2011 only and for Pond F on February 15, 2011 only."

Comment 78. Appendix B, Photo 25

NVE: This photo shows the Muddy River on the left (the caption notes it being on the right).

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