GPI DATA REVIEW
GRAND GULF NUCLEAR STATION
PORT GIBSON, MISSISSIPPI

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1.0 INTRODUCTION

This report was prepared by GZA GeoEnvironmental, Inc. (GZA) on behalf of Entergy Operations, Inc (Entergy) and presents a summary of GZA's review of recent hydrogeologic investigation activities performed at Entergy's Grand Gulf Nuclear Station located in Port Gibson, Mississippi (hereafter referred to as the "Site" or the "GGNS Plant") and provides an opinion of the status of the Site's Groundwater Protection Initiative (GPI) program relative to the GPI guidance document 07-07 prepared by the Nuclear Energy Institute (NEI)[1]. This report is intended to fulfill the requirements of Objective 3.1a of the 07-07 NEI guidance document, and is subject to the Limitations outlined in **Appendix A.**

GZA assessed the plant's progress relative to the NEI 07-07 guidance objectives based on our understanding of the plant and associated Site Conceptual Model (SCM), using our technical expertise and experience developed through performance of groundwater investigations and remediation at thousands of sites contaminated with industrial chemicals and/or radionuclides. Our opinions and judgments are based on well established, industry hydrogeologic and environmental engineering principals. Founded in 1964, GZA is a leading environmental and geotechnical engineering firm with over 500 highly skilled professionals including, geologists, hydrogeologists, and hydrologists, as well as geotechnical, instrumentation and environmental engineers, who underpin our technical qualifications to perform projects of this type. Our recent experience includes performance of "limited-scope", as well as sophisticated groundwater protection investigations, including a well documented Observational Method[2]/SCM approach to the investigation of the Indian Point Energy Center in Buchanan, New York. This work has been reviewed and validated by both the U.S. Nuclear Regulatory Commission and the U.S. Geological Survey.

During the fall of 2006 and winter of 2007, GZA was retained by Entergy, through Enercon Services, Inc. to perform an initial (Phase I) hydrogeologic assessment of GGNS in support of Entergy's corporate GPI program. This work was performed in general accordance with the then evolving NEI GPI guidelines and focused on assessing potential radionuclide pathways from impacted or potentially impacted, plant systems to, and then with, the groundwater. The findings of GZA's initial GPI study are presented in a report dated January 30, 2007 (Phase I Report)[3]. Since completion of the Phase I study, NEI adopted the final 07-07 GPI guidance document and Entergy installed a series of groundwater monitoring wells downgradient of the Site and commenced groundwater monitoring activities.

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[1] NEI, August 2007, Industry Ground Water protection Initiative – Final Guidance Document, NEI document No. 07-07 [Final].

[2] a *Use of the Observational Method in the Investigation and Monitoring of a Spent Fuel Pool Release*, Barvenik, et. al., NEI Groundwater Workshop, Oct. 2007.

b. *Use of the Observational Method in the Remedial Investigation and Cleanup of Contaminated Land*, Dean, A.R. and M.J. Barvenik, The Seventh Geotechnique Symposium - Geotechnical Aspects of Contaminated Land, sponsored by the Institution of Civil Engineers, London, Volume XLII, Number 1, March 1992.

[3] GZA and Enercon, January 30, 2007, Site Hydrogeologic Assessment in Support of Entergy GPI, Grand Gulf Nuclear Power Station, Port Gibson, Mississippi.

This report provides a brief summary of GZA's Site Conceptual Model (SCM) of the geology and hydrogeology of the site, a review of recent GPI field activities conducted by others at the GGNS Plant, an assessment regarding the consistency of the recent findings with respect to the existing SCM, and our assessment of the Site's progress towards implementation of the GPI program relative to the NEI 07-07 guidance document.

2.0 BACKGROUND: SITE GEOLOGY AND HYDROLOGY

2.1 SITE DESCRIPTION

Grand Gulf Nuclear Station consists of approximately 2,100 acres and is located in Claiborne County in southwestern Mississippi as shown on **Figure 1.** The plant is located on the east side of the Mississippi River about 25 miles south of Vicksburg and 37 miles north-northeast of Natchez.

The Site consists primarily of woodlands, former farms and two oxbow lakes, Hamilton Lake and Gin Lake, which formed within a former channel of the Mississippi River. The Site is divided roughly in half between the eastern upland area that is in the elevation range of about 100 to 210 feet above mean sea level (msl) and the lowland western area that is in the elevation range of 55 to 80 feet above msl. Surface drainage over a majority of the developed upland portion of the Site occurs within two watersheds which discharge to Hamilton Lake. Most of the undeveloped western lowland area of the Site drains to Hamilton and Gin Lakes with only a very limited drainage area to the Mississippi River along its bank. The GGNS facilities, including the power generating facilities and administrative offices, are located in the eastern upland portion of the site.

2.2 SITE CONCEPTUAL MODEL

This section provides a brief summary of GZA's understanding of Site geology and hydrogeology as discussed in the Phase I report and is presented herein as a **Site Conceptual Model (SCM).** Combined with the results of recent data collection activities (described below in Section 4.0), this understanding forms the basis of our assessment of the technical aspects of the GPI program for the GGNS Plant.

2.2.1 Site Geology

The region lies within the Coastal Plain physiographic province which extends from New Jersey to Texas and encompasses all of Louisiana and nearly all of Mississippi. The wide Coastal Plain consists primarily of Late Cretaceous to Holocene deposits that were deposited mostly in a marine environment, were later uplifted and now tilt seaward, or to the south in Louisiana and Mississippi. The Site lies within the north-south trending Mississippi Alluvial Plain Section of the Coastal Plain Province that parallels the Mississippi River extending from north of Mississippi to the Gulf of Mexico and consists of a low flood plain and delta system formed by the Mississippi River.

The results of previous borings drilled at the site indicate that the subsurface consist of the following (listed from youngest to oldest):

- 0 to 145 feet of Holocene Alluvium consisting of clay, silt, sand, and gravel;
- 0 to 82 feet of Pleistocene Loess consisting of silt;

- 0 to 151 feet of Pleistocene Terrace Deposits consisting of clay, silt, and gravel;
- Miocene Catahoula Formation consisting of up to 320 feet of hard to very hard partially indurated silty, fine, sandy clay to clayey silt and sand; and
- Oligocene Vicksburg Group consisting of hard clays and interbedded limestone and fine sand.

Due to the lack of intermediate-age Pliocene deposits, an unconformity exists between the older Catahoula clay and the overlying younger terrace deposits and alluvium. The top of the Catahoula clay is elevated in the area of the power block with elevations generally above 80 ft msl and as high as about 100 ft msl. The top of Catahoula clay elevations generally decrease in all directions from the power block area with topographic lows of less than 70 feet below msl to the west beneath Hamilton and Gin Lakes; less than 20 feet below msl along the north property line; about 10 ft msl to the northeast, and 30 ft msl to south. The area of elevated Catahoula clay appears to exist as a ridge beneath the power block oriented generally northwest-southeast.

The Catahoula clay is the load bearing unit for the major plant structures at the Site. The foundations for the major plant structures including the Auxiliary Building and Control Building were excavated into the Catahoula clay. Sumps beneath the containment building were excavated to depths of about 69 ft msl compared to the existing grade around the power block of about 132 ft msl and pre-construction surface grades as high as 200 ft msl.

The Terrace deposits generally blanket the upland portion of the Site with pre-construction thicknesses of at least 25 feet. The areas of thinnest Terrace deposits were in the power block area where the Catahoula is most elevated. The Loess deposits overlie the Terrace deposits and generally blanket the upland portion of the Site with pre-construction thicknesses of at least 50 feet. The Alluvium deposits are generally only present in the low lying portion of the Site from the ground surface to depths generally greater the 50 feet and maximum thicknesses of about 180 feet near the banks of the Mississippi River.

2.2.2 Hydrogeology

The findings of the Phase I report indicated that several important major regional aquifers exist at or near the Site corresponding to the geologic units described above. These include the:

- Pleistocene to Holocene Mississippi River Alluvial Aquifer system;
- Oligocene to Holocene Coastal Lowlands Aquifer system; and
- Upper Cretaceous through Eocene Mississippi Embayment Aquifer system.

The southern extent of the Mississippi River Alluvial Aquifer system is not present at the site but exists approximately 10 miles north of the Site. The northern extent of the Coastal Lowlands Aquifer system exists approximately 10 miles north of the Site and extends to beyond the Gulf of Mexico to the south. The Site is present near the center of Mississippi Embayment Aquifer system which extends from the southern tip of Illinois to beyond the southern extent of Mississippi into the Gulf of Mexico. The top of this third aquifer is estimated to be approximately 600 feet below msl in the area of the Site.

The Coastal Lowlands Aquifer system is the first and primary aquifer encountered at the Site. The Coastal Lowlands Aquifer system consists of a "gulf-ward thickening, heterogeneous unconsolidated to poorly consolidated wedge of discontinuous beds of sand, silt and clay that range from Oligocene to Holocene." Where sufficiently thick and permeable, the Coastal Lowlands

Aquifer system yields large quantities of groundwater for high capacity well systems for industrial, municipal, commercial, and irrigation uses. While the Coastal Lowlands Aquifer system consists of five permeable units and two confining units and is greater than 10,000 feet thick south of the Site, it is only present at the Site in the form of the relatively thin alluvial deposits in the lowland western portion of the Site and the terrace deposits and loess in the eastern upland areas of the Site. Given the presence of alluvial sands in close proximity to the Mississippi River, cooling and drinking water for the GGNS Site is obtained from wells constructed in the Coastal Lowlands Aquifer system. Additional cooling water is obtained from wells constructed in Holocene Mississippi alluvial deposits and water for other uses at the Site including for consumption is obtained from the Pleistocene Terrace deposits in the eastern upland portion of the Site.

Within the shallow soils at the site, there are three distinct water levels: a "perched"[4] water table in the Terrace deposits in the vicinity of the power block, a regional water table in the Mississippi River alluvium and potentiometric head in the confined aquifer within the Catahoula Formation. These are further described below:

- **Perched Water Table**: Perched groundwater is present in the power block area where the top of the Catahoula clay is above 70 ft msl (less than 60 ft bgs in the power block). Water levels measured in the perched groundwater system prior to construction during the period of 1972 to 1976 were generally in the range of 95 to 110 ft msl (20 to 35 ft bgs in the power block), with the highest water level measured in the perched groundwater system of 130 ft msl.
- **Regional Water Table**: The regional groundwater table corresponds to the water level within the alluvial deposits and terrace deposits outside the clay ridge and are reported to be in the 60- to 85-foot msl elevation range (approximately 50 ft bgs in the power block area). Groundwater flow in this deposit is in a generally westward direction toward the Mississippi River. In the southern portion of the site, groundwater flow patterns in the Mississippi River alluvium are strongly influenced by the pumping from four radial wells that supply water for the GGNS cooling water system.
- **Potentiometric Head:** The potentiometric head in the Catahoula Formation was reported to be in the range of 55- to 80-foot msl. Groundwater flow in the Catahoula Formation is expected to be generally towards the west with discharge to the Mississippi River.

3.0 RECENT GPI FIELD ACTIVITIES PERFORMED AT THE GGNS PLANT

This section summarizes information provided by Entergy pertaining to recent field investigation activities performed by others at the GGNS site in support of the pending Combined Operating License Application (COLA) for the proposed GGNS Unit 3 Plant, and incorporated as part of the overall GPI activities for the existing GGNS site.

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[4] Note that the term "perched" is used in this document to be consistent with the historical terminology used for the elevated groundwater in the power block portion of the Site. In reality, perched water classically refers to water elevated above the regional water table with an unsaturated zone beneath. GZA believes that the elevated water identified in the power block area may actually reflect mounding of groundwater due to the extensive ridge of low permeability clay and that an unsaturated zone may not exit below the elevated water in the power block.

3.1 GROUNDWATER MONITORING WELL INSTALLATION

Monitoring wells were recently installed at the plant to support the GGNS Unit 3 COLA. A total of 44 groundwater monitoring wells were installed at locations west of the existing GGNS Plant within the terrace deposits or Mississippi River Alluvium. Four (4) of these wells located closest to the GGNS Plant (designated wells MW1020B, MW1026B, MW1027B, and MW1134B) were then selected for groundwater monitoring for the presence of radionuclides in support of the GPI activities for the GGNS Plant. Well locations are shown the groundwater contour plans provided in **Appendix C**. Boring logs for these wells were not provided to GZA for review.

3.2 GROUNDWATER SAMPLING AND ANALYSIS

GZA was provided with groundwater monitoring data (analytical testing and groundwater elevation measurements) for each of the new wells. Groundwater monitoring rounds were performed on July 31, 2007, October 31, 2007, February 1, 2008, and April 14, 2008. Each of the samples was tested for tritium and gamma activity[5] by Entergy's Chemistry Laboratory. Analytical results are provided in **Appendix B.**

3.3 GROUNDWATER ELEVATION MONITORING

The draft COLA for GGNS Unit 3 includes groundwater contour plans prepared based on groundwater level measurements in the new wells on December 2006 and May 2007, corresponding to the periods of highest and lowest groundwater elevations, respectively. Copies of these plans are provided in **Appendix C**. Groundwater measurements are provided in table 2.4.12-202 of the draft COLA. Depth to groundwater measurements recorded in the wells used for GPI groundwater monitoring ranged from approximately 45 to 60 feet below the ground surface.

4.0 FINDINGS OF RECENT GPI FIELD ACTIVITIES

The following subsections provide a summary of GZA's review of the recent work performed by others at the GGNS site relative to geology, hydrogeology, and groundwater monitoring results.

4.1 GEOLOGY

Although GZA was not provided with copies of boring logs for the new COLA wells, the information presented within the draft COLA suggests the subsurface materials encountered in the new borings were generally consistent with the materials previously described for the site (**Section 2.2.2**).

4.2 HYDROGEOLOGY AND SHALLOW GROUNDWATER FLOW DIRECTIONS

The information presented in the draft COLA indicates that small isolated areas of perched groundwater exist in the loess. The soils of the Terrace Deposits (a.k.a. the Upland Complex) are the principal shallow groundwater bearing unit at the site, consistent with the pre-existing information.

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[5] These parameters include, ^{54}Mn, ^{58}Co, ^{59}Fe, ^{50}Co, ^{65}Zn, ^{95}Nb, ^{95}Zr, ^{131}I, ^{134}Cs, ^{137}Cs, ^{149}Ba, and ^{140}La.

As stated in **Section 3.3**, groundwater contour plans provided in the draft GGNS Unit 3 COLA were based on groundwater level measurements in the Upland Complex wells recorded in December 2006 and May 2007. Copies of these plans are provided in **Appendix C**. For each plan, the groundwater elevation contours depict a groundwater gradient to the west/northwest towards the Mississippi River, consistent with the SCM. The available information also indicates that although an aquitard exists between the Upland Complex and the underlying Catahoula Formation, a downwards vertical hydraulic gradient from the Upland Complex to the Catahoula formation exists.

Although the groundwater contours from the GGNS Unit 3 COLA provide a solid understanding of groundwater gradients west of the existing GGNS plant, they do not show actual gradients and flow directions within the existing plant. In addition, because 1) the closest of these wells to the existing GGNS plant are located approximately 650 feet west of the GGNS plant, 2) that they are spaced 600 to 800 feet apart, and 3) that only one well (MW-1027B) is hydraulically downgradient of the plant, this monitoring well network does not provide adequate groundwater quality monitoring for the existing plant.

4.3 SAMPLING AND ANALYSES

Radionuclides were not detected in any of the groundwater samples collected from the new monitoring wells sampled as part of the GPI program (Section 3.2). However, it is noted that none of these wells is likely installed immediately downgradient of the potentially contaminated SSCs within the power block.

4.4 COMPARISON TO THE SCM

As discussed above, the recently collected GPI field data are generally consistent with the Site's SCM. Thus, no changes to the SCM or the Plant's Final Safety Analysis Report (FSAR) are suggested at this time. A brief summary of key findings of the new GPI data relative to the pre-existing SCM is presented below:

- The subsurface aquifer materials described in the draft COLA are generally consistent with the SCM which includes a layer of loess overlying alluvial materials of the Upland Complex.
- The groundwater elevation data and interpreted groundwater contour plan provided are generally consistent with the anticipated westerly flow towards the Mississippi River and Gin and Hamilton lakes. Tritium and gamma activity were not detected in any of the samples collected from the new wells. However, as noted above, these wells are not likely located immediately downgradient of potentially contaminated SSCs.
- The available analytical data do not indicate that radionuclides are migrating off-site into the Mississippi River.

5.0 EVALUATION OF THE PLANT'S GPI PROGRAM RELATIVE TO NEI GUIDANCE

Consistent with NEI 07-07, Objective 3.1a, GZA has assisted Entergy in performing a self-assessment of the GGNS Plant's GPI program. In performing this assessment, GZA completed the checklist provided in Appendix B of NEI 07-07 and included in this report as **Table 1**. An overview of the results and key findings of this review is presented below.

Our assessment of the Plant's progress relative to the NEI 07-07 criteria was based on information provided by Entergy, including:

- various documents associated with recent field activities, including the draft COLA for GGNS Unit 3;
- corporate and Plant procedures, and program documents; and
- verbal communications with plant personnel.

A listing of the documents reviewed and personnel contacted is presented in **Appendix D**.

It should be noted that the NEI guidance document is a little over 12 months old. As such, facilities across the country are currently working to put in place GPI programs consistent with this guidance. As with any endeavor involving an understanding of subsurface conditions, this is best accomplished in an iterative fashion. As such, and given the newness of this program, some degree of follow-on work is to be expected as programs are initiated and then refined.

5.1 OVERVIEW ASSESSMENT

Entergy and the GGNS Plant personnel have made a significant commitment to the GPI Initiative. This effort commenced in 2006, before final NEI guidance was released in August 2007 has included, among other things:

- the preparation of a corporate GPI program;
- the preparation of an initial hydrogeology assessment of the Plant (January 2007 Phase I Report);
- the installation of supplemental Site monitoring wells (Section 3.1);
- implementation of groundwater monitoring (Section 3.2); and
- initial stakeholder communications about the GPI program.

This has resulted in real progress at the Site and substantial achievement of the NEI objectives. A brief summary of the key findings for each of the NEI objectives follows. Additional discussion is provided as comments within **Table 1**.

5.1.1 Key Findings: Objective 1 – Groundwater Protection Program

Based on our review of the information provided, GZA is of the opinion that Entergy and the GGNS plant have made real progress towards meeting the general criteria of Objective 1 of the 07-07 guidance document. This opinion is offered in consideration that the information presented in the Phase I report, combined with the data from the recent GPI field activities, forms the basis of the SCM as presented herein. However, it is noted that, as with all hydrogeologic site characterizations conducted following an observational approach, the activities performed to date should be considered part of an iterative process as data gaps are identified and addressed and the SCM is refined. For the GGNS site, the available data indicate that the following enhancements to the existing GPI program are recommended to meet the 07-07 guidance document:

- Performance of a groundwater monitoring well inventory to assess the status of existing wells at the existing GGNS site. If the results of this inventory indicate that existing wells are serviceable and appropriately positioned, select additional wells should be used to assess groundwater gradients, flow pathways, and groundwater quality at the existing

GGNS plant. If the pre-existing wells are not serviceable, installation of additional monitoring wells to better define the on-site horizontal and vertical hydraulic gradients within the power block area would be required.

- Preparation and implementation of a site-specific groundwater monitoring plan, including groundwater monitoring locations, sampling frequency, data quality objectives, and procedures for periodic review and revision of the plan;
- Preparation and implementation of a buried pipe and tank monitoring and inspection plan;
- Expansion of the plant's risk assessment of engineering systems to include work practices and existing leak detection systems and programs; and
- Preparation of a remedial action plan to address potential spills and releases of licensed material at the site.

5.1.2 Key Findings: Objective 2 – Communication

External communications is managed in accordance with Entergy's written procedures. These procedures are generally consistent with the criteria for Objective 2. Thus, only minor enhancements are suggested including but not limited to the addition of procedures for the notification of NEI officials.

5.1.3 Key Findings: Objective 3 – Program Oversight

Through completion of this review, the plant is complying with the NEI Objective for Program Oversight. Further reviews in the future should be performed in accordance with NEI guidance.

6.0 OPTIONS TO ENHANCE CURRENT GPI PROGRAM

Options to enhance the current GPI program at the plant are included in **Table 1.**

TABLES

TABLE 1
NEI SELF ASSESSMENT CHECKLIST
Grand Gulf Nuclear Station
Port Gibson, Mississippi

Guideline Section	Objective/Acceptance Criteria	Section Met Yes-No	Comments As Required	Potential Areas for Improvement
1.1 Ensure that the site characterization of geology and hydrology provides an understanding of predominant ground water gradients based upon current site conditions.				
1.1.a	Perform hydrogeologic and geologic studies to determine predominant ground water flow characteristics and gradients.	Yes*	An initial Site Hydrogeologic Assessment of the GGNS Plant was completed January 2007 (Phase I Report). Forty four (44) groundwater monitoring wells were subsequently installed at locations west of the plant in support of the COLA for GGNS Unit 3. The data from these wells, along with information provided in previous studies, form an initial basis for assessing regional groundwater flow directions. Based on these data, the dominant shallow groundwater flow directions is towards the west/northwest in the vicinity of the proposed GGNS Unit 3. Additional explorations are required to confirm groundwater gradients and groundwater flow directions in the area of the existing GGNS plant.	Performance of a monitoring well inventory to assess the status of any existing wells. If the results of this inventory indicate that existing wells are serviceable and appropriately positioned, additional wells should be used to assess groundwater gradients, flow pathways, and groundwater quality at the plant. If the pre-existing wells are not serviceable, additional monitoring wells in and around the power block area are recommended to assess site groundwater gradients and flow directions at the plant.
1.1.b	As appropriate, review existing hydrogeologic and geologic studies, historical environmental studies, and permit or license related reports	Yes	Substantially completed January 2007 and presented in the January 2007 Phase I Report and draft GGNS Unit 3 COLA report.	None
1.1.c	Identify potential pathways for ground water migration from on-site locations to off-site locations through ground water.	Yes*	Initial identification of pathways completed January 2007 and presented in the January 2007 Phase I Report.	Review and update SCM and associated pathways following any additional site characterization conducted under 1.1.a above.

Notes: * indicates progress has been made towards meeting the stated NEI criteria. However, additional progress is required to fully meet the criteria.

TABLE 1
NEI SELF ASSESSMENT CHECKLIST
Grand Gulf Nuclear Station
Port Gibson, Mississippi

Guideline Section	Objective/Acceptance Criteria	Section Met Yes-No	Comments As Required	Potential Areas for Improvement
1.1.d	Establish the frequency for periodic reviews of site hydrogeologic studies.*	Yes*	A review of existing hydrogeologic studies has been completed as part of the GPI development process, which is ongoing. Going forward, hydrogeologic information should be reviewed periodically and following any significant plant or off-site modifications.	Prepare plant-specific plan to periodically review available hydrogeologic studies.
1.1.e	As appropriate, update the Final Safety Analysis Report with changes to the hydrology and/or geology.	Yes*	The preliminary hydrogeologic testing results for the GGNS Plant are generally consistent with the existing FSAR.	Conduct additional characterization as identified under 1.1.a above and then update FSAR if and as appropriate.
1.2 Identify site risk based on plant design and work practices*				
1.2.a	Identify each SSC and work practice that involves or could reasonably be expected to involve licensed material and for which there is a credible mechanism for the licensed material to reach ground water.*	Yes*	An Operational Engineering Review of SSCs was performed as part of the January 2007 Phase I report. This review included identification of potentially contaminated systems, release areas, and potential unmonitored contaminant transport pathways.	Conduct a formal review of work practices consistent with NEI guidance.
1.2.b	Identify existing leak detection methods for each SSC and work practice that involves or could involve licensed material and for which there is a credible potential for inadvertent releases to ground water.*	No	Information pertaining to leak detection systems from the potentially contaminated SSCs identified in the Phase I report has not been provided to GZA. Plant personnel indicate that monitoring of "non-contaminated" systems is performed to detect cross contamination. Plant personnel indicate that GGNS has begun to implement EN-DC-343 Buried Piping and Tanks Inspection Program	• Expand SSC and Work Practice assessment (1.2.a) to include an assessment of current leak detection systems. • Fully implement Entergy procedure number EN-DC-343, Buried Piping and Tanks Inspection Program

Notes: * indicates progress has been made towards meeting the stated NEI criteria. However, additional progress is required to fully meet the criteria.

TABLE 1
NEI SELF ASSESSMENT CHECKLIST
Grand Gulf Nuclear Station
Port Gibson, Mississippi

Guideline Section	Objective/Acceptance Criteria	Section Met Yes-No	Comments As Required	Potential Areas for Improvement
1.2.c	Identify potential enhancements to leak detection systems or programs.*	No	Information pertaining to potential enhancements to leak detection systems from the potentially contaminated SSCs identified in the Phase I report has not been provided to GZA. While the new wells to the west provide some enhanced leak detection capability, they are not close to the power block and are not well-positioned in general to serve as a pro-active leak detection mechanism within the intent of this criteria. Plant personnel indicate that GGNS has begun to implement EN-DC-343 Buried Piping and Tanks Inspection Program	• Assess potential enhancements to leak detection systems • Fully implement Entergy procedure number EN-DC-343, Buried Piping and Tanks Inspection Program
1.2.d	Identify potential enhancements to prevent spills or leaks from reaching ground water.*	No	The information provided by the GGNS plant did not indentify potential enhancements or an assessment of potential enhancements to prevent spills or leaks from reaching the groundwater. Plant personnel indicate that GGNS has begun to implement EN-DC-343 Buried Piping and Tanks Inspection Program	• Complete an assessment of procedures and equipment to prevent releases from reaching groundwater. • Fully implement Entergy procedure number EN-DC-343, Buried Piping and Tanks Inspection Program
1.2.e	Identify the mechanism or site process for tracking corrective actions.	Yes	Corrective Actions are identified and tracked in accordance with Entergy's corporate corrective action program (Procedure EN-LI-102). Under this program, when a problem is identified, a condition report (CR) is initiated, corrective actions will be assigned, and the CR is dispositioned based on its severity.	None

Notes: * indicates progress has been made towards meeting the stated NEI criteria. However, additional progress is required to fully meet the criteria.

TABLE 1
NEI SELF ASSESSMENT CHECKLIST
Grand Gulf Nuclear Station
Port Gibson, Mississippi

Guideline Section	Objective/Acceptance Criteria	Section Met Yes-No	Comments As Required	Potential Areas for Improvement
1.2.f	Establish long term programs to perform preventative maintenance or surveillance activities to minimize the potential for inadvertent releases of licensed materials due to equipment failure.	Yes*	Monitoring for cross contamination of clean systems is routinely performed at the plant. Entergy procedure EN-DC-343 provides requirements for each plant to develop a site-specific Buried Piping and Tanks Inspection and Monitoring program. However, a site-specific program for the GGNS Plant has not yet been prepared and/or provided to GZA.	Prepare site-specific plan in accordance with Entergy procedure EN-DC-343
1.2.g	Establish the frequency for periodic reviews of SSCs and work practices.	No	The frequency of periodic reviews of SSCs and work practices at the GGNS Plant has not been established.	Prepare plant-specific plan to periodically review SSCs and work practices.
1.3 Establish an on-site ground water monitoring program to ensure timely detection of inadvertent radiological releases to ground water.				
1.3.a	Using the hydrology and geology studies developed under Objective 1.1, consider placement of ground water monitoring wells downgradient from the plant but within the boundary defined by the site license.	Yes*	Forty Four (44) wells were installed west of the GGNS plant in support of the GGNS Unit 3 COLA. However, these wells are not close to the power block, are widely spaced, and are not well positioned in general to serve as downgradient boundary monitoring points within the intent of this criteria. Additional wells are now needed downgradient of the power block to the fill data gaps in the recently installed COLA well network.	Installation of additional shallow groundwater monitoring wells at hydraulically downgradient locations to the west/northwest.
1.3.b	Consider, as appropriate, placing sentinel wells closer to SSCs that have the highest potential for inadvertent releases that could reach ground water or SSCs where leak detection capability is limited.	No	There are currently no sentinel wells at the GGNS plant.	Evaluate installation of sentinel wells near potentially contaminated SSCs, taking into account other leak detection and surveillance activities

Notes: * indicates progress has been made towards meeting the stated NEI criteria. However, additional progress is required to fully meet the criteria.

TABLE 1
NEI SELF ASSESSMENT CHECKLIST
Grand Gulf Nuclear Station
Port Gibson, Mississippi

Guideline Section	Objective/Acceptance Criteria	Section Met Yes-No	Comments As Required	Potential Areas for Improvement
1.3.c	Establish sampling and analysis protocols, including analytical sensitivity requirements, for ground water and soil.*	Yes*	While ongoing groundwater monitoring activities have been initiated at GGNS, a comprehensive written plan including these details has not yet been prepared.	Prepare site-specific groundwater monitoring plan.
1.3.d	Establish a formal, written program for long-term ground water monitoring.*	Yes*	Groundwater monitoring at the GGNS plant is performed in accordance with Entergy Procedure EN-CY-109	Prepare site-specific groundwater monitoring plan
1.3.e	Periodically review existing station or contract lab(s) analytical capabilities.*	Yes*	While ongoing groundwater monitoring activities have been initiated at GGNS, a comprehensive written plan including these details has not yet been prepared	Prepare site-specific groundwater monitoring plan
1.3.f	Establish a long-term program for preventative maintenance of ground water wells.	Yes*	While ongoing groundwater monitoring activities have been initiated at GGNS, a comprehensive written plan including these details has not yet been prepared	Prepare site-specific groundwater monitoring plan
1.3.g	Establish the frequency for periodic review of the ground water monitoring program.	Yes*	While ongoing groundwater monitoring activities have been initiated at GGNS, a comprehensive written plan including these details has not yet been prepared	Prepare site-specific groundwater monitoring plan
1.4 Establish a remediation protocol to prevent migration of licensed material off-site and to minimize decommissioning impacts				
1.4.a	Establish written procedures outlining the decision making process for remediation of leaks and spills or other instances of inadvertent releases. This process is site specific and shall consider migration pathways	Yes*	Leaks, spills, or other releases at the GGNS are managed pursuant to Entergy's procedure EN-RP-113, Response to Contaminated Spills/Leaks	Prepare a site specific Remediation Plan consistent with EN-RP-113.
1.4.b	Evaluate the potential for detectible levels of licensed material resulting from planned releases of liquids and/or airborne materials.	Yes*	Licensed materials have not been detected in groundwater samples from the site wells.	The potential for detectible levels of licensed material resulting from planned releases (e.g., airborne wash-out of Tritium) should be considered in future groundwater monitoring reports.

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TABLE 1
NEI SELF ASSESSMENT CHECKLIST
Grand Gulf Nuclear Station
Port Gibson, Mississippi

Guideline Section	Objective/Acceptance Criteria	Section Met Yes-No	Comments As Required	Potential Areas for Improvement
1.4.c	Evaluate and document, as appropriate, decommissioning impacts resulting from remediation activities or the absence thereof.	No	Based on the available information, an evaluation of the impact of site conditions on plant decommissioning has not been performed	Perform an evaluation of decommissioning impacts.
1.5 Ensure that records of leaks, spills, remediation efforts are retained and retrievable to meet the requirements of 10 CFR 50.75(g).				
1.5.a	Establish a record keeping program to meet the requirements of 10 CFR 50.75(g)	Yes	The plant maintains a record keeping system pursuant to 10 CFR 50.75(g). These files were reviewed as part of the 2007 Phase I study.	None
2.1 Each licensee should conduct initial and periodic briefings of their site specific GPI program with the designated State/Local officials				
2.1.a	The licensee should discuss i) The background or industry events that led to the GPI ii) If there is additional information that the State/Local officials need to better understand the issue or place it in perspective for their constituents iii) "How" the State/Local officials will use or distribute the information	Yes	Information from the GGNS plant indicates that initial briefings with municipal officials has been performed.	None

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TABLE 1
NEI SELF ASSESSMENT CHECKLIST
Grand Gulf Nuclear Station
Port Gibson, Mississippi

Guideline Section	Objective/Acceptance Criteria	Section Met Yes-No	Comments As Required	Potential Areas for Improvement
2.1.b	Licensees should consider including additional information or updates on ground water protection in periodic discussions with State/Local officials	No	The information from the GGNS plant do not indicate that additional updates have been made to municipal officials	Provide communication updates with municipal officials
2.1.c	For licensees that are in States where multiple nuclear power plants are located and multiple owner companies, it is highly recommended that the licensees coordinate their efforts and communicate with each other. The initial briefing for the State/local officials and the contents of a voluntary communication should be consistent.	Yes	GGNS is the only nuclear power plan in Mississippi.	None

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TABLE 1
NEI SELF ASSESSMENT CHECKLIST
Grand Gulf Nuclear Station
Port Gibson, Mississippi

Guideline Section	Objective/Acceptance Criteria	Section Met Yes-No	Comments As Required	Potential Areas for Improvement
2.2 Make informal communication as soon as practicable to appropriate State/Local officials, with follow-up notifications to the NRC, as appropriate, regarding significant "on-site leaks/spills into ground water and on-site or off-site water sample results exceeding the criteria in the REMP as described in the OCDM/ODAM.*				
2.2.a	Communication with the designated State/Local officials shall be made before the end of the next business day if an inadvertent leak or spill to the environment has or can potentially get into groundwater and exceeds any of the following criteria: i) If a spill or leak exceeding 100 gallons from a source containing licensed material, ii) If the volume of a spill or leak can not be quantified, but is likely to exceed 100 gallons, from a source containing licensed material, or iii) Any leak of spill, regardless of volume or activity, deemed by the licensee to warrant voluntary communication. *	Yes	Entergy's procedure EN-RP-113, Response to Contaminated Spills/Leaks, requires notification of Federal, State and Local agencies within one business day of the release to the environmental of contaminated material of more than 100 gallons, or of unknown volume, or other leaks deemed by the plant to warrant voluntary communication. To our knowledge, no conditions triggering this notification have been recorded.	None

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TABLE 1
NEI SELF ASSESSMENT CHECKLIST
Grand Gulf Nuclear Station
Port Gibson, Mississippi

Guideline Section	Objective/Acceptance Criteria	Section Met Yes-No	Comments As Required	Potential Areas for Improvement
2.2.b	Communication with the designated State/Local officials shall be made before the end of the next business day for a water sample result (i) of off-site ground water or surface water that exceeds any of the REMP reporting criteria for water as described in the ODCM/ODAM, or (ii) of on-site surface water, that is hydrologically connected to ground water, or ground water that is or could be used as a source of drinking water, exceed any of the REMP reporting criteria for water as described in the ODCM/ODAM	Yes	Entergy's procedure EN-RP-113, Response to Contaminated Spills/Leaks, requires notification of Federal, State and Local agencies within one business day of the confirmed detection of activity in either an off-site or on-site groundwater or surface water sample which exceeds the REMP reporting criteria. To our knowledge, no conditions triggering this notification have been recorded.	None
2.2.c	When communicating to the State/Local officials, be clear and precise in quantifying the actual release information as it applies to the appropriate regulatory criteria. *	Yes	Entergy's procedure EN-RP-113, Response to Contaminated Spills/Leaks provides guidance for communications with Federal, State and Local officials. To our knowledge, no conditions triggering this notification have been recorded.	None
2.2.d	Voluntary communication to State and/or Local officials may also require NRC notification under 10 CFR 50.72(b) (2) (xi). Licensees should perform these notifications consistent with their existing program	Yes	As stated above, Entergy's procedure EN-RP-113, Response to Contaminated Spills/Leaks, includes notification of Federal NRC regulators. To our knowledge, no conditions triggering this notification have been recorded.	None

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TABLE 1
NEI SELF ASSESSMENT CHECKLIST
Grand Gulf Nuclear Station
Port Gibson, Mississippi

Guideline Section	Objective/Acceptance Criteria	Section Met Yes-No	Comments As Required	Potential Areas for Improvement
2.2.e	Contact NEI by email to GW_Notice@nei.org as part of a voluntary communication event	Unknown	Information from the GGNS does not confirm if this communication has been made.	Confirm that procedures to communicate with NEI per Objective 2.2.e are in place.
2.3 Submit a written 30-day report to the NRC for any water sample result for on-site ground water that is or may be used as a source of drinking water that exceeds any of the criteria in the licensee's existing REMP/ODCM for 30-day reporting of off-site water sample results. Copies of the written 30-day reports for both on-site and off-site water samples shall also be provided to the appropriate State/Local officials.				
2.3.a	All ground water samples taken for the Industry Initiative shall be analyzed and compared to the standards and limits contained in the station's REMP as described in the ODCM/ODAM*	Yes*	We understand that the groundwater samples were analyzed and compared to the plants REMP.	Verify that all groundwater analysis are compared to the plant's REMP
2.3.b	The 30-day special report should include the items listed*	Yes	No 30-day reports have been submitted to the NRC for the plant.	None
2.3.c	All written 30-day NRC reports generated under item 2.3.a are to be concurrently forwarded to the designated State/Local officials	Yes	No 30-day reports have been submitted to the NRC for the plant.	None

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TABLE 1
NEI SELF ASSESSMENT CHECKLIST
Grand Gulf Nuclear Station
Port Gibson, Mississippi

Guideline Section	Objective/Acceptance Criteria	Section Met Yes-No	Comments As Required	Potential Areas for Improvement
2.4 Document all on-site ground water sample results and a description of any significant on-site leaks/spills into ground water for each calendar year in the Annual Radiological Environmental Operating Report (AREOR) for REMP or the Annual Radioactive Effluent Release Report (ARERR) for the RETS as contained in the appropriate Site reporting procedure, beginning with the report for calendar year 2006.				
2.4.a	Complete appropriate changes to the ODCM/ODAM or to the appropriate procedures to support the 2007 report. For new plants, appropriate procedures that require inclusion of significant on-site leaks/spills into ground water and all on-site ground water results shall be developed and implemented prior to initial receipt of nuclear fuel*	Yes*	No changes to the ODCM/ODAM have been made given that a groundwater monitoring plan for the site is not yet available.	Complete written groundwater monitoring plan and make appropriate changes to ODCM/ODAM

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TABLE 1
NEI SELF ASSESSMENT CHECKLIST
Grand Gulf Nuclear Station
Port Gibson, Mississippi

Guideline Section	Objective/Acceptance Criteria	Section Met Yes-No	Comments As Required	Potential Areas for Improvement
2.4.b	Report on-site ground water sample results as follows i) Ground water sample results that are taken in support of the GPI but not part of REMP in the ARERR ii) For long-term sample points that are included in the REMP as described in the ODCM/ODAM, the results are reported in the AREOR; those long-term sample points that are not included in REMP, the results are reported in the ARERR *	Yes	Information provided by the GGNS Plant indicate that the available groundwater monitoring data were appropriately reported in the 2007 ARERR. However, a copy of this report was not provided for review.	None

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TABLE 1
NEI SELF ASSESSMENT CHECKLIST
Grand Gulf Nuclear Station
Port Gibson, Mississippi

Guideline Section	Objective/Acceptance Criteria	Section Met Yes-No	Comments As Required	Potential Areas for Improvement
2.4.c	In addition to 2.1.b, voluntary communications shall be included as follows: the following are to be included in either the ARERR and/or the AREOR i) A description of all spills or leaks that were communicated per Objective 2.2 acceptance criterion a shall be included in the ARERR ii) All on-site or off-site ground water sample results that exceeded the REMP reporting thresholds as described in the ODCM/ODAM that were communicated per Objective 2.2 acceptance criterion b shall be included in either the ARERR and/or the AREOR	Yes*	Based on information provided by the GGNS Plant, this information will be provided in future reports as appropriate.	Verify that the information will be provided in the 2009 report
3.1 Perform a self-assessment of the GPI program (references this check sheet)				
3.1.a	An independent, knowledgeable individual(s) shall perform the initial self assessment within one year of implementation.*	Yes	Performed by GZA	None
3.1.b	Perform periodic self-assessments of the GPI program at least once every five years after initial self-assessment.			

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TABLE 1
NEI SELF ASSESSMENT CHECKLIST
Grand Gulf Nuclear Station
Port Gibson, Mississippi

Guideline Section	Objective/Acceptance Criteria	Section Met Yes-No	Comments As Required	Potential Areas for Improvement
3.1.c	The self-assessment, at a minimum, shall evaluate implementation of all objectives identified in this document.			
3.1.d	The self-assessment shall be documented consistent with applicable procedures.			
3.2 Conduct a review of the GPI program, including at a minimum the licensee's self-assessments, under the auspices of NEI.				
3.2.a	An independent, knowledgeable individual(s) shall perform the initial review within one year of the initial self-assessment performed per objective 3.1.a above			
3.2.b	Periodic review of the GPI program should be performed every five years, subsequent to the license's periodic self-assessment performed per Objective 3.1.b above.			

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FIGURES

Outside of Scope

Outside of Scope

APPENDIX A
LIMITATIONS

APPENDIX A

PROJECT LIMITATIONS

1. This focused report was prepared for use by the Client at the subject Facility, for the limited technical and legal purposes stated in the report. We take no responsibility for other uses of this report, or for use by other parties.

2. By agreement with the Client, we reviewed and relied on information provided by the Client and Facility to develop our opinions. We also relied upon public sources of information to help develop our understanding of the Facility's hydrogeologic setting. Local subsurface conditions or soil heterogeneities may exist and may subsequently be shown to have an unanticipated effect on groundwater flow patterns. These were initial reviews; we did not attempt to verify or validate information, oral or written.

3. Unidentified and/or unanticipated conditions may exist. Should such conditions become obvious, it may be necessary for us to reevaluate the opinions expressed in this report.

4. Our findings and conclusions are provided as professional opinions, and not as statements of fact.

5. Our services were provided with the degree of skill and care ordinarily used by qualified professionals performing the same or similar services, at the same time, under similar circumstances, in the same or similar locations. No other warranty expressed or implied is made.

APPENDIX B
ANALYTICAL RESULTS

SITE ID	LAB ID	SAMPLE TYPE	SAMPLE ID	END DATE	END TIME	S1	MN-54	S2	CO-58	S3	FE-59	S4	CO-60	S5	ZN-65	S6	NB-95	S7	ZR-95	S8	I-131	S9	CS-134	S10	CS-137
GGNS	20070820	GMW	MW-1134B Pre-Sample	7/31/2007	8:06	<	12.34	<	8.47	<	18.85	<	9.75	<	17.00	<	10.68	<	17.43	<	11.88	<	14.62	<	10.35
GGNS	20070821	GMW	MW-1134B GW	7/31/2007	9:32	<	10.34	<	7.27	<	22.99	<	8.75	<	29.94	<	14.76	<	16.23	<	9.36	<	12.81	<	10.68
GGNS	20070822	GMW	MW-1134B post-sample	7/31/2007	9:51	<	8.70	<	8.38	<	16.91	<	8.26	<	19.51	<	9.04	<	12.31	<	13.32	<	7.99	<	7.45
GGNS	20070823	GMW	MW-1027B GW	7/31/2007	11:15	<	8.35	<	8.97	<	16.17	<	6.97	<	25.16	<	11.61	<	17.87	<	14.84	<	9.28	<	7.27
GGNS	20070824	GMW	MW-1027B Post-Sample	7/31/2007	11:38	<	8.99	<	10.34	<	18.51	<	8.10	<	16.03	<	12.38	<	16.99	<	10.09	<	10.08	<	8.96
GGNS	20070825	GMW	MW-1020B GW	7/31/2007	13:03	<	7.40	<	4.35	<	11.28	<	3.67	<	16.63	<	9.38	<	14.68	<	12.13	<	7.90	<	8.37
GGNS	20070826	GMW	MW-1020B Post-sample	7/31/2007	13:28	<	9.57	<	8.35	<	21.88	<	7.52	<	18.95	<	10.60	<	13.88	<	9.22	<	8.04	<	8.42
GGNS	20070827	GMW	MW-1026B GW	7/31/2007	14:40	<	12.48	<	9.01	<	11.42	<	11.29	<	21.18	<	13.17	<	20.14	<	11.98	<	12.93	<	14.34
GGNS	20070828	GMW	MW-1026B Post-sample	7/31/2007	15:00	<	10.74	<	9.29	<	11.41	<	8.30	<	21.93	<	10.29	<	14.04	<	12.93	<	12.12	<	8.22
GGNS	20071175	GMW	MW-1134B Pre-Sample	10/31/2007	9:00	<	7.87	<	7.99	<	16.03	<	6.30	<	14.31	<	8.89	<	18.10	<	13.04	<	7.82	<	6.69
GGNS	20071176	GMW	MW-1134B GW	10/31/2007	9:30	<	6.29	<	7.72	<	14.62	<	5.76	<	11.50	<	8.15	<	12.34	<	11.17	<	8.40	<	8.31
GGNS	20071177	GMW	MW-1134B Post-Sample	10/31/2007	9:45	<	7.31	<	7.40	<	13.27	<	8.18	<	10.29	<	8.67	<	12.68	<	13.14	<	7.25	<	8.26
GGNS	20071178	GMW	MW-1027B GW	10/31/2007	11:00	<	6.96	<	7.53	<	13.12	<	6.12	<	18.20	<	8.33	<	13.15	<	8.88	<	7.89	<	7.08
GGNS	20071179	GMW	MW-1027B Post-Sample	10/31/2007	11:06	<	10.10	<	10.66	<	22.23	<	5.02	<	23.59	<	8.83	<	17.50	<	14.44	<	13.72	<	6.25
GGNS	20071180	GMW	MW-1020B GW	10/31/2007	12:15	<	9.29	<	7.25	<	12.83	<	6.52	<	17.55	<	9.70	<	15.38	<	13.86	<	7.90	<	11.00
GGNS	20071181	GMW	MW-1020B Post-Sample	10/31/2007	12:20	<	7.20	<	7.41	<	13.23	<	6.09	<	14.01	<	6.55	<	11.65	<	10.59	<	7.83	<	7.90
GGNS	20071182	GMW	MW-1026B GW	10/31/2007	13:30	<	7.47	<	6.48	<	12.32	<	6.36	<	14.53	<	8.72	<	11.93	<	10.99	<	7.13	<	6.67
GGNS	20071183	GMW	MW-1026B Post-Sample	10/31/2007	13:40	<	8.51	<	9.30	<	19.03	<	5.90	<	25.90	<	10.23	<	14.15	<	12.42	<	8.91	<	9.82

SITE ID	LAB ID	SAMPLE TYPE	SAMPLE ID	END DATE	END TIME	S1	MN-54	S2	CO-58	S3	FE-59	S4	CO-60	S5	ZN-65	S6	NB-95	S7	ZR-95	S8	I-131	S9	CS-134	S10	CS-137
GGNS	20080251	GMW	MW-1134b Pre.	2/1/2008	8:30	<	10.74	<	7.88	<	17.25	<	6.05	<	23.90	<	6.94	<	16.56	<	12.84	<	7.98	<	8.46
GGNS	20080252	GMW	MW-1134b GW	2/1/2008	9:15	<	7.10	<	6.98	<	11.20	<	7.65	<	17.71	<	8.11	<	12.95	<	14.95	<	7.46	<	6.91
GGNS	20080253	GMW	MW-1134b Post	2/1/2008	9:30	<	8.88	<	7.86	<	21.95	<	8.24	<	10.14	<	8.59	<	12.64	<	14.93	<	9.45	<	9.60
GGNS	20080254	GMW	MW-1027B GW	2/1/2008	10:35	<	5.32	<	5.65	<	13.60	<	5.97	<	13.57	<	8.49	<	12.58	<	11.33	<	6.83	<	6.04
GGNS	20080255	GMW	MW-1027B post	2/1/2008	11:00	<	8.60	<	8.04	<	13.04	<	9.18	<	18.28	<	8.99	<	11.98	<	13.58	<	7.76	<	8.45
GGNS	20080256	GMW	MW-1027B GW	2/1/2008	10:35	<	5.82	<	5.56	<	13.30	<	5.78	<	11.32	<	7.39	<	11.57	<	10.65	<	6.43	<	5.90
GGNS	20080257	GMW	MW-1020B post	2/1/2008	12:15	<	9.68	<	7.42	<	13.22	<	4.69	<	18.07	<	9.05	<	17.09	<	12.97	<	10.06	<	8.37
GGNS	20080258	GMW	MW-1026B GW	2/1/2008	13:15	<	9.72	<	5.54	<	19.61	<	9.41	<	15.35	<	12.10	<	10.41	<	13.35	<	9.23	<	9.05
GGNS	20080259	GMW	MW-1026B post	2/1/2008	13:30	<	9.91	<	7.56	<	17.15	<	10.89	<	19.05	<	10.13	<	13.83	<	14.15	<	9.67	<	11.25
GGNS	20080476	GMW	MW-1134B PRE	4/14/2008	8:40	<	10.90	<	9.29	<	18.83	<	8.82	<	26.75	<	10.94	<	14.59	<	11.42	<	10.85	<	11.09
GGNS	20080477	GMW	MW-1134B GW	4/14/2008	9:20	<	5.21	<	9.58	<	21.16	<	8.67	<	22.88	<	12.81	<	14.76	<	13.27	<	7.85	<	10.43
GGNS	20080478	GMW	MW-1134B POST	4/14/2008	9:30	<	10.71	<	10.58	<	14.15	<	10.12	<	19.83	<	9.97	<	16.45	<	12.62	<	11.78	<	9.93
GGNS	20080479	GMW	MW-1027 GW	4/14/2008	10:30	<	7.25	<	7.94	<	12.91	<	9.73	<	17.58	<	9.13	<	14.58	<	8.42	<	8.94	<	9.80
GGNS	20080480	GMW	MW-1027 POST	4/14/2008	10:35	<	7.62	<	8.47	<	16.80	<	7.53	<	15.51	<	7.76	<	14.11	<	10.58	<	7.20	<	6.74
GGNS	20080481	GMW	MW-1020 GW	4/14/2008	11:35	<	10.46	<	7.68	<	22.56	<	10.15	<	23.63	<	10.26	<	15.63	<	12.67	<	11.87	<	10.10
GGNS	20080482	GMW	MW-1020 POST	4/14/2008	11:45	<	10.24	<	9.40	<	17.05	<	9.05	<	18.54	<	6.50	<	17.16	<	11.50	<	8.87	<	11.12
GGNS	20080483	GMW	MW-1026 GW	4/14/2008	12:45	<	8.97	<	8.07	<	22.51	<	10.71	<	26.92	<	9.80	<	11.82	<	12.20	<	11.06	<	11.43
GGNS	20080484	GMW	MW-1026 POST	4/14/2008	12:55	<	6.97	<	9.16	<	18.40	<	7.11	<	21.24	<	9.78	<	17.12	<	10.75	<	7.96	<	9.48

SITE ID	LAB ID	SAMPLE TYPE	SAMPLE ID	END DATE	S11	BA-140	S12	LA-140	S14	H-3	Error15
GGNS	20070820	GMW	MW-1134B Pre-Sample	7/31/2007	<	37.57	<	13.50	<	527.55	
GGNS	20070821	GMW	MW-1134B GW	7/31/2007	<	34.31	<	11.97	<	527.27	
GGNS	20070822	GMW	MW-1134B post-sample	7/31/2007	<	37.88	<	14.67	<	528.91	
GGNS	20070823	GMW	MW-1027B GW	7/31/2007	<	47.45	<	8.33	<	552.29	
GGNS	20070824	GMW	MW-1027B Post-Sample	7/31/2007	<	39.01	<	13.98	<	551.15	
GGNS	20070825	GMW	MW-1020B GW	7/31/2007	<	31.39	<	12.85	<	525.60	
GGNS	20070826	GMW	MW-1020B Post-sample	7/31/2007	<	38.62	<	12.50	<	526.90	
GGNS	20070827	GMW	MW-1026B GW	7/31/2007	<	41.71	<	11.62	<	528.96	
GGNS	20070828	GMW	MW-1026B Post-sample	7/31/2007	<	40.24	<	13.76	<	527.43	
GGNS	20071175	GMW	MW-1134B Pre-Sample	10/31/2007	<	34.78	<	13.31	<	528.23	
GGNS	20071176	GMW	MW-1134B GW	10/31/2007	<	30.82	<	14.20	<	553.18	
GGNS	20071177	GMW	MW-1134B Post-Sample	10/31/2007	<	36.72	<	13.02	<	549.48	
GGNS	20071178	GMW	MW-1027B GW	10/31/2007	<	30.16	<	12.16	<	550.51	
GGNS	20071179	GMW	MW-1027B Post-Sample	10/31/2007	<	52.00	<	14.10	<	543.25	
GGNS	20071180	GMW	MW-1020B GW	10/31/2007	<	38.78	<	13.91	<	546.28	
GGNS	20071181	GMW	MW-1020B Post-Sample	10/31/2007	<	31.23	<	12.93	<	550.51	
GGNS	20071182	GMW	MW-1026B GW	10/31/2007	<	31.21	<	12.78	<	523.61	
GGNS	20071183	GMW	MW-1026B Post-Sample	10/31/2007	<	33.57	<	12.51	<	519.42	

SITE ID	LAB ID	SAMPLE TYPE	SAMPLE ID	END DATE	S11	BA-140	S12	LA-140	S14	H-3	Error15
GGNS	20080251	GMW	MW-1134b Pre	2/1/2008	<	47.00	<	12.57	<	463.33	
GGNS	20080252	GMW	MW-1134b GW	2/1/2008	<	36.57	<	11.78	<	464.10	
GGNS	20080253	GMW	MW-1134b Post	2/1/2008	<	48.59	<	7.27	<	470.84	
GGNS	20080254	GMW	MW-1027B GW	2/1/2008	<	36.07	<	14.36	<	466.50	
GGNS	20080255	GMW	MW-1027B post	2/1/2008	<	41.01	<	14.88	<	445.69	
GGNS	20080256	GMW	MW-1027B GW	2/1/2008	<	31.13	<	10.33	<	464.39	
GGNS	20080257	GMW	MW-1020B post	2/1/2008	<	43.14	<	13.99	<	452.64	
GGNS	20080258	GMW	MW-1026B GW	2/1/2008	<	47.98	<	3.69	<	431.97	
GGNS	20080259	GMW	MW-1026B post	2/1/2008	<	51.11	<	6.21	<	562.81	
GGNS	20080476	GMW	MW-1134B PRE	4/14/2008	<	35.29	<	13.32	<	619.53	
GGNS	20080477	GMW	MW-1134B GW	4/14/2008	<	39.50	<	14.53	<	608.77	
GGNS	20080478	GMW	MW-1134B POST	4/14/2008	<	32.89	<	13.92	<	618.11	
GGNS	20080479	GMW	MW-1027 GW	4/14/2008	<	28.70	<	12.26	<	617.88	
GGNS	20080480	GMW	MW-1027 POST	4/14/2008	<	33.33	<	11.94	<	617.56	
GGNS	20080481	GMW	MW-1020 GW	4/14/2008	<	27.54	<	13.02	<	616.61	
GGNS	20080482	GMW	MW-1020 POST	4/14/2008	<	34.87	<	12.86	<	618.51	
GGNS	20080483	GMW	MW-1026 GW	4/14/2008	<	41.10	<	7.34	<	616.65	
GGNS	20080484	GMW	MW-1026 POST	4/14/2008	<	33.38	<	8.09	<	616.52	

APPENDIX C
GROUNDWATER LEVEL DATA

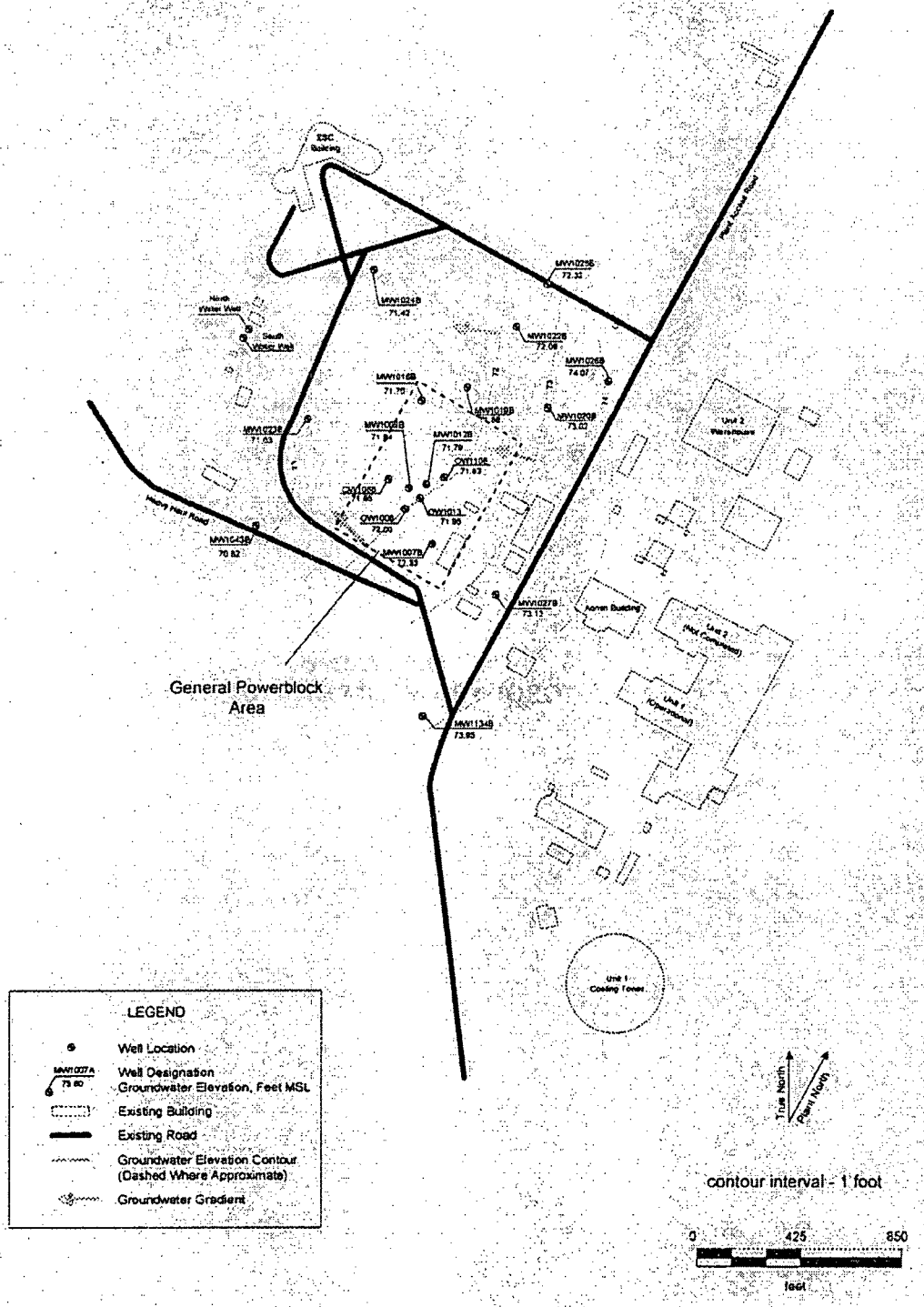

Figure 2.4-12-203. December 2006 Groundwater Gradient Map, Wells Screened in the Upland Complex

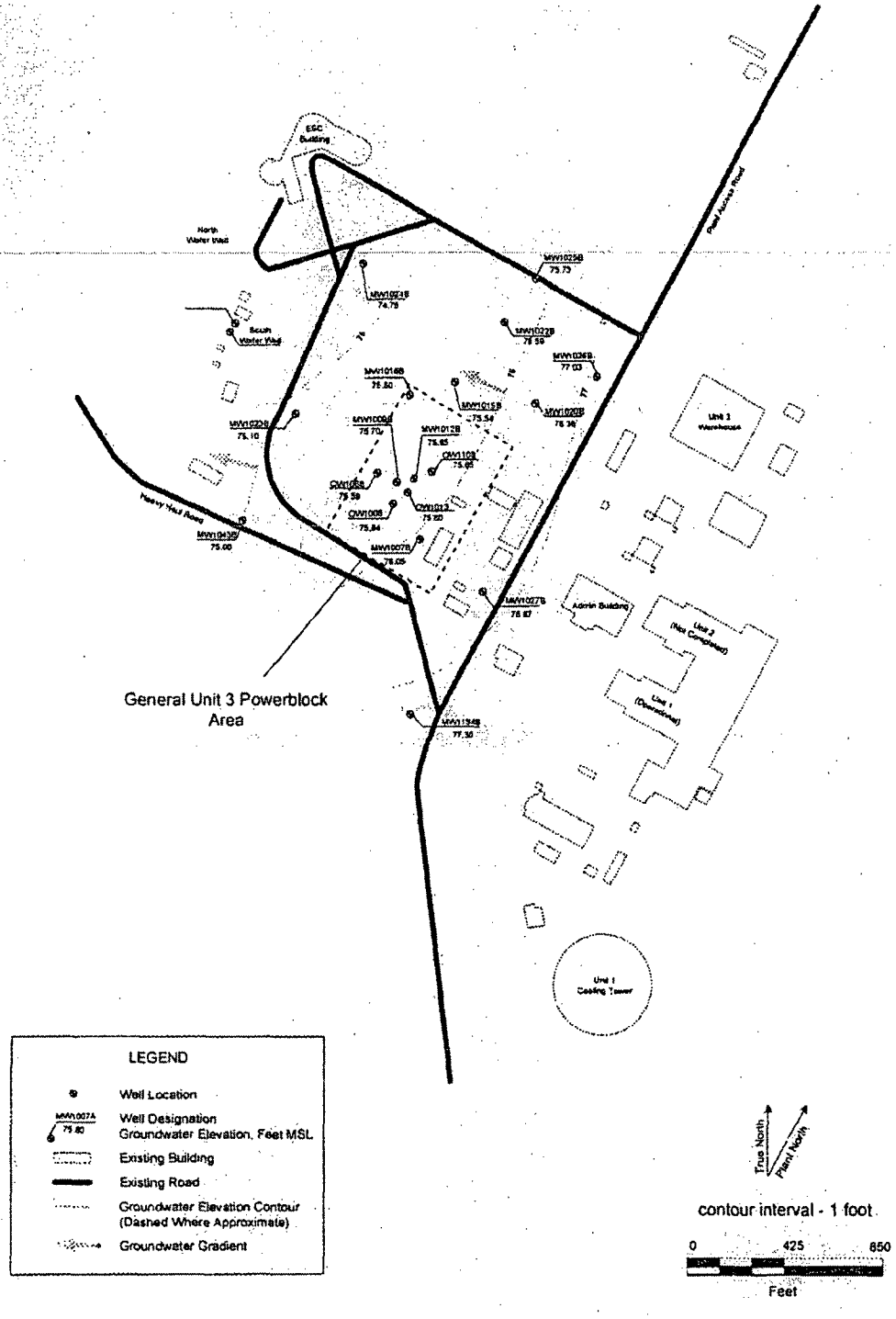

Figure 2.4.12-204. May 2007 Groundwater Gradient Map, Wells Screened in the Upland Complex

APPENDIX D
LIST OF DOCUMENTS REVIEWED AND PERSONNEL CONTACTED

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LIST OF DOCUMENTS REVIEWED AND PERSONNEL CONTACTED
Grand Gulf Nuclear Station
Port Gibson, Mississippi

- NEI, August 2007, Industry Ground Water Protection Initiative – Final Guidance Document, NEI 07-07.
- Entergy, EN-RP-113, Rev. 4, Response to Contaminated Spills / Leaks
- Entergy, EN-CY-108, Rev. 2, Monitoring of Nonradioactive Systems
- Entergy, EN-CY-109, Rev. 2, Sampling and Analysis of Groundwater Monitoring Wells
- Entergy, EN-RP-106, Rev. 1, Radiological Survey Documentation
- Entergy, EN-LI-108, Rev. 2, Event Notification and Reporting
- Entergy, EN-LI-102, Rev. 12, Corrective Action Process
- Entergy, EN-IS-112, Rev 5, Trenching, Excavating, and Ground Penetrating Activities
- Entergy EN-DC-343, Rev. 1, Buried Piping and Tanks Inspection and Monitoring Program
- Draft COL Application, Grand Gulf Nuclear Station, Unit 3, Part 2 FSAR, Section 2.4.12 Groundwater
- Microsoft Excel spreadsheet titled "Entergy South GMW Sampling Results.xls" provided by Entergy
- John M. Lassetter, Grand Gulf Nuclear Station
- GZA and Enercon, January 30, 2007, Site Hydrogeologic Assessment in Support of Entergy GPI, Grand Gulf Nuclear Power Station, Port Gibson, Mississippi.