Attachment 14 to

GNRO-2012/00039

Entergy Nuclear Grand Gulf Nuclear Station License Renewal Environmental Audit – Hydrology Patton - Hydrology Information Needs for the Grand Gulf Nuclear Station (GGNS) License Renewal Environmental Review

Grand Gulf Nuclear Site Needs List for Hydrology from Bill Ford, NRC

Groundwater Protection Initiative

We would like to discuss what is being learned from the "Site Groundwater Protection Initiative" that is part of the Nuclear Energy Institute (NEI) "Industry Ground Water Protection Initiative".

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Specifically we are interested in:

- The vertical hydrologic interconnectivity between the Loess, Upland Complex, and Catahoula Aquifers beneath the site.

  Response: This information is described in Sections 2.3.3.1, 2.3.3.2, 2.3.3.3 and 2.3.3.4 of the GGNS ER. Measured water levels indicate hydraulic separation between perched groundwater, encountered in some locations, the water table in the Upland Complex, and confined groundwater conditions in the Catahoula Formation.

- The horizontal direction and if available, the rate of flow of groundwater flow in the Loess, Upland Complex, and Catahoula Aquifers beneath the site.

  Response: The direction of groundwater flow is discussed in Section 2.3.3.4 of the GGNS ER. As discussed, measured water levels show hydraulic separation between the perched groundwater, the water table aquifer in the Upland Complex, and the underlying Catahoula Formation. Generally, the flow direction of perched groundwater has not been mapped. West of the Unit 1 power block, recent investigations have shown the perched groundwater is of limited extent and of an ephemeral nature. It is reasonable to believe the direction of any perched groundwater may mirror that in the Upland Complex. As discussed in the ER, the groundwater gradient observed in the Upland Complex is generally to the west toward the Mississippi River. Unit 1 was constructed on a ridge of the Catahoula. Hydrogeologic investigations have indicated the confining strata of the upper Catahoula appear to influence the direction of groundwater flow in the Upland Complex in the immediate area of Unit 1 such that the direction of flow in the Upland Complex is indicated to be toward the east and or northeast on the eastward side of the power block. GGNS UFSAR Figure 2.4-48 illustrates the general direction of flow immediately around Unit 1.

- The vertical direction and if available, the rate of flow of groundwater in the Loess, Upland Complex, and Catahoula Aquifers beneath the site.

  Response: Recharge of the various units is discussed in Section 2.3.2 of the GGNS ER. As noted in Section 2.3.2.2 of the GGNS ER, recharge to the terrace deposits (locally identified as Upland Complex) is from underflow and downward seepage through overlying loess. Section 2.3.2.3 of the GGNS ER states that recharge area for the Catahoula lies to the north of GGNS in Warren and Hinds Counties beneath the alluvial plain and loess bluffs.

- The water quality of the Loess, Upland Complex, and Catahoula Aquifers beneath the site.

  Response: The requested information is contained in Section 2.3.3.5 of the GGNS ER.

- The location of any radiological or non-radiological contaminants detected in groundwater underlying the site.

  Response: Section 9.1.3.8 of the GGNS ER addresses radiological contaminants detected in onsite groundwater. Attachment A includes a figure that shows wells where tritium has being detected in concentrations >1,000 pCi/l. As discussed in Section 9.1.3.2 of the GGNS ER, there is no surface or sub-surface areas contaminated with nonradiological contaminants.

- Confirm the aquifers that are supplying water the North Drinking Water Well, the South Drinking Water Well, and the North Construction Well.

  Response: The terrace deposit (locally identified as the Upland Complex) aquifer supplies water to these wells. As discussed in Section 2.3.4.3 of the GGNS ER, an error in permitting led to an inaccurate conclusion that these wells were completed in the Catahoula. However, GGNS does not withdraw groundwater from the Catahoula Formation. Therefore, GGNS notified the MDEQ of this error and MDEQ concurred that these wells were indeed screened in localized terrace deposits and not the Catahoula Formation. Attachment B includes the correspondence associated with this issue and that was referenced in Section 2.3.4.3 of the GGNS ER as GGNS 2007a and MDEQ 2007.

- List voluntary reporting notifications made over the previous five ears in accordance with NEI 07-07 (Industry Groundwater Protection Initiative).

  Response: Over the previous five years, there has only been one event that has triggered the voluntary notification reporting requirements under NEI 07-07 (Industry Groundwater Protection Initiative). In April 2011, it was determined that unmonitored tritium contaminated water from the Unit 2 Turbine Building east and west sumps was being discharged to the storm drain to Lake Hamilton via Sedimentation Basin B. The condition reports associated with this event are included in Attachment C, and documentation associated with reporting the event is included in Attachment D.

Dewatering Wells

The onsite dewatering wells are completed into what aquifers? What is their purpose (dry basements, prevent swampy conditions, etc? Why are they not being pumped?

Response: Based on Section 2.5.4.6 of the GGNS UFSAR (pages 2.5-65 and 2.5-65a), the dewatering wells were completed in the terrace deposit (locally identified as the Upland Complex) aquifer. These dewatering wells were constructed in the Unit 1, Unit 2 and Ultimate Heat Sink areas in 1979 and 1980 prior to the placement of backfill in the Unit 2 area to remove perched water drainage and water added to the granular backfill during the compaction process. In addition, from September 1990 through November 1991, a study was initiated to determine groundwater flow paths in the backfill and terrace deposits, the location(s) in the backfill where

pumping was actually required to maintain water levels, and the quantity of water being produced from the dewatering wells. In summary, the dewatering wells have not been pumped in recent years because there has been no need for continued dewatering. Attachment E includes the dewatering groundwater well permits issued by the MDEQ.

Basements

What aquifers are plant basements excavated into. Do the basements contain sump pumps to collect inflowing groundwater and if they do, have they been in use in the recent past?

Response: GGNS Unit 1 is located on a ridge-like feature of the Catahoula Formation which originally rose to an elevation of approximately 90 feet mean seal level (see GGNS ER Figure 2.3-5). As shown in GGNS ER Figure 2.3-3, this Catahoula ridge was excavated to allow construction of Unit 1. Section 2.5.4.5.3 of the GGNS UFSAR states the Catahoula was excavated to provide a common bearing surface for foundation. As discussed in GGNS ER Section 2.3.4.3, there has been no need for use of the plant dewatering wells for at least the past decade. Therefore based on available information to date, there is no identified inflowing groundwater into plant basements.

CS&I Water Association #1

If known, what aquifers (Pascagoula, Hattiesburg, or Catahoula aquifers) in the Miocene Aquifer does the CS&I Water Association #1 obtain its water from?

Response: Based on CS&I's Annual Drinking Water Quality Report that is included in Attachment F, water is obtained from the Catahoula aquifer.

Industrial Chemicals That Might Contaminant Groundwater

What types of liquid industrial chemicals (such as sulfuric acid, chlorine, etc) are stored on site in significant quantities (inside tanks) that if their containers broke could flow into the groundwater?

Response: Bulk tanks are located within secondary containment so any spills would be contained and groundwater unaffected. Some of the typical bulk liquid chemical stored on-site is identified in Section 9.1.3.14.1 of the GGNS ER and include such products as fuel oil, gasoline, lubricating oils, water treatment products, sodium hydroxide, sodium hypochlorite, sulfuric acid, and transformer oil.

Surface Water Use

On page 4-20 of the environmental report it states that there are no known current offsite uses of groundwater from the Mississippi River Alluvium aquifer between the Big Black River to the north and the Bayou Pierre River to the south. Does this include both sides of the Mississippi River? Does it include wells in the State of Louisiana as well as the State of Mississippi?

Response: As discussed in Section 2.3.2 of the GGNS ER (page 2-32), the area west of the Mississippi River was excluded from the regional groundwater investigations since the river forms an effective hydrologic boundary. Also as discussed in Section 4.7.5.1 of the GGNS ER (page 19), groundwater drawdown, and thus any potential impact to offsite groundwater users

from the withdrawal of the radial wells, is limited by the recharge boundary created by the Mississippi River and thus is not expected to extend to the west beyond the river.

If alluvial aquifer wells exists what is the use of the water (industrial, agriculture, domestic use)?

Response: As discussed in Section 2.3.4.1 of the GGNS ER (pages 2-40 and 2-41), use of alluvium aquifers is limited to several industrial wells in Warren County and shallow domestic wells along the Mississippi River and its larger tributaries

Within a reasonable distance from the plant (i.e., that could be impacted) are there any Mississippi River surface water users in either the State of Louisiana or the State of Mississippi? If so, what is the water being use for (industrial, agriculture, domestic use)?

Response: No. As discussed in Section 2.2.1.6 (page 2-19), the nearest downstream user of Mississippi River water is Southeast Wood Fiber located at the Claiborne County Port facility, 0.8 miles downstream of the GGNS site. The maximum intake requirement for this facility is less than 0.9 mgd for industrial purposes; however, none of this intake is used as potable water. There are only three public water supply systems in the State of Mississippi that use surface water as a source, and none of these are located within 50 miles of the GGNS site.

As discussed in Section 2.4.1.2 of the GGNS UFSAR (page 2.4-4), there are no users of surface waters of the Mississippi River from the GGNS site, River Mile 406, downstream to below the Mississippi-Louisiana border, River Mile 306. The nearest downstream user of Mississippi River water is located south of St. Francisville, Louisiana, at River Mile 260.4, approximately 146 miles downstream of the GGNS site.

Surface Water Discharges

With the exception of storm-water runoff, does all water (sewage, air conditioning, etc) discharged by the site flow to the Mississippi River via the 54 inch pipe? If not where and how is it discharged?

Response: The 54 inch pipe receives effluents from only NPDES Outfalls 002 (cooling tower blowdown including waters from ESF Room Cooler flushes), Outfall 004 (Standby Service Water Basin A), 005 (Standby Service Water Basin B), 006 (low volume waste basin) and 011 (liquid radwaste). The remaining effluents are discharged as follows:

- Outfall 007 discharges into Sediment Basin B (administrative building drains; yard and storm drains; fire water pump house; oily waste sumps; ionics reject water; turbine building cooling water blowdown; HVAC blowdown; air conditioner once-through cooling; outage air compressor once-through-cooling; and intermittent standby service water and plant service water leakage and small releases).

- Outfall 010 discharges into Basin A (sanitary wastewater).

- Outfall 013 discharges into Hamilton Lake via an unnamed tributary (effluent from Outfalls 010 and 016, standby service water leakage and stormwater runoff).

- Outfall 014 discharges into Hamilton Lake via an unnamed tributary (effluent from Outfall 007, standby service water leakage, intermittent circulating water basin overflows and stormwater runoff).

- Outfall 016 discharges into Basin A (miscellaneous wastewaters from the Energy Services Center inclusive of water softener backwash, air conditioning cooling tower blowdown and stormwater runoff.

The NPDES Permit in Attachment C to the GGNS ER (Page i of iii) also contains the requested information. Permit limits associated with these outfalls, which were taken from the NPDES Permit, are shown in Table 3.2-2 of the GGNS ER (pages 3-24 and 3-25).

References.

- Bechtel. 1986. Bechtel, Radial Wells 1, 3, 5 - Reduction of Multiple Well Test Data (Geotech Calc G-035). Approved July 31, 1986.

- GGNS. 2010b. Grand Gulf Nuclear Station (GGNS), Water Use Program (Annual Water Use Survey - 2008 - 2009), Correspondence GEXO-2010/00492. July 28, 2010.

- GGNS. 2010e. Grand Gulf Nuclear Station, SARA/Title III 2009 Hazardous Chemical Inventory, Correspondence GEXO-2010/00131. February 26, 2010.

- GGNS. 2011k. Grand Gulf Nuclear Station, Spill Prevention, Control, and Countermeasure Plan. September 1, 2011.

- Entergy. 2008a. Entergy Nuclear Fleet Procedure EN-CY-109, Sampling and Analysis of Groundwater Monitoring Wells, Revision 2. April 1, 2008.

- Entergy. 2008b. Entergy Nuclear Fleet Procedure EN-EV-106, Waste Management Program, Revision 2. August 18, 2008.

- Entergy. 2008h. Entergy Nuclear Waste Minimization Plan, Revision 1. August 4, 2008.

- GGNS. 2006c. Grand Gulf Nuclear Station, Storm Water Pollution Prevention Plan, Revision 13. July 2006.

Response: References are included in Attachment G.