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GNRO-2012/00058

June 6, 2012

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: Response to Request for Additional Information (RAI) Environmental Review
dated May 8, 2012
Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
License No. NPF-29

REFERENCE: NRC Letter, "Request for Additional Information for the Review of the
Grand Gulf Nuclear Station, License Renewal Application
Environmental Review," dated May 8, 2012 (Accession No. ML
12123A081, GNRI-2012/00113)

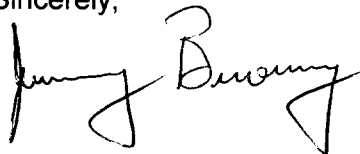
Dear Sir or Madam:

Entergy Operations, Inc is providing, in the Attachment, the response to the referenced request for additional information (RAI).

This letter contains no new commitments. If you have any questions or require additional information, please contact Christina L. Perino at 601-437-6299.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 6th day of June, 2012.

Sincerely,

 GMFO GGN's acting VP for Mike Perito
Jeremy Browning

MP/jas

Attachment: Response to Request for Additional Information (RAI)

cc: (see next page)

cc: with Attachment

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NRC Senior Resident Inspector
Grand Gulf Nuclear Station
Port Gibson, MS 39150

Attachment to
GNRO-2012/00058
Response to Request for Additional Information (RAI)

The format for the License Renewal Application (LRA) Request for Additional Information (RAI) responses below is as follows. The RAI is listed in its entirety as received from the Nuclear Regulatory Commission (NRC). This is followed by the Grand Gulf Nuclear Station (GGNS) RAI response to the question.

Meteorology and Air Quality

1. Does Grand Gulf Nuclear Station use greenhouse gases such as hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF6)? If so, provide their annual mass loss into the atmosphere.

Entergy Response

Based on a 2010 inventory conducted by Grand Gulf Nuclear Station (GGNS), there is no equipment on-site that contains perfluorocarbons. The inventory did identify three electrical disconnect switches that contain 90 pounds of sulfur hexafluoride collectively (30 pounds/device).

For hydrofluorocarbons (HFCs), GGNS is currently utilizing the freons listed below which would be classified as HFCs.

- Genetron 404A (1,1,1-Trifluoroethane / Pentafluoroethane / Norfluran)
- R-410A (Difluoromethane / Pentafluoroethane)
- SUVA 134A (1,1,1,2-Tetrafluoroethane)

40 CFR Part 82, Subpart F (Recycling and Emissions Reduction) does not require quantities of freon added to equipment containing less than 50 pounds of refrigerant to be tracked. As a result, quantities of R-410A freon added to site air conditioners were not tracked since they have a capacity of less than 50 pounds. In addition, no records of quantities of Genetron 404A were available, most likely due to it being utilized in an ice machine with a freon capacity of less than 50 pounds. The only freon listed above that was added to equipment and tracked during 2011 was SUVA 134A.

Although the Nuclear Regulatory Commission's request is related specifically to the use of greenhouse gases (GHG) and associated losses to the atmosphere, Entergy has also elected to expand quantification of GHG emissions associated with GGNS' operations, in addition to sulfur hexafluoride (SF6) and SUVA 134A (HFC), to include the following:

- Carbon dioxide emissions associated with passenger vehicles, and onsite vehicles and non-road equipment.
- Carbon dioxide emissions from diesel generators, pumps and engines listed in Table 1.
- Nitrous oxide emissions associated with the diesel generators, pumps and engines listed in Table 1.

Based on Entergy's calculations, GHG emissions during 2011 and associated carbon dioxide equivalent are included in Table 2. The basis utilized by Entergy in calculating GHG emissions resulting from GGNS' operations during 2011 is discussed below.

Sulfur Hexafluoride Emissions

For purposes of calculating losses to the atmosphere, a default emission standard of 0.5% is being utilized based on information obtained from the Intergovernmental Panel on Climate Change accessed at http://www.ipcc-nggip.iges.or.jp/public/gp/bgp/3_5_SF6_Electrical_Equipment_Other_Uses.pdf. Therefore, of the 90 pounds of SF6 present on-site, it is assumed that "0.000225 tons" ($90 \text{ pounds} \times 0.5\% \div 2,000 \text{ pounds/ton}$) was lost to the atmosphere during 2011.

Hydrofluorocarbon Emissions

Based on refrigerant maintenance records, 1,750 pounds of SUVA 134A refrigerant was added to the two plant cooling water chillers in 2011. For purposes of losses to the atmosphere, it is being assumed that the entire 1,750 pounds or "0.875 tons" was released during 2011.

Carbon Dioxide Emissions

- Passenger Vehicles

Based on information obtained from U. S. Government Statistics: Most Americans Commute to Work Alone article accessed at <http://voices.yahoo.com/u-s-government-statistics-most-americans-commute-to-430138.html>, approximately one in ten people (10.7 percent) car pool to work. As of November 2009, 690 employees were employed at GGNS. Based on the U.S. Government statistic above, it is assumed that approximately 73 of these employees would car pool ($690 \times 10.7\%$) to work every day. Therefore, a value of "617 passenger vehicles per day" was utilized, which would be considered conservative since the number of employees traveling to the site on weekends would be less than that during the normal work week of Monday – Friday.

Based on Environmental Protection Agency's (EPA's) Greenhouse Gas Equivalencies Calculator accessed at <http://www.epa.gov/cleanenergy/energy-resources/calculator.html>, the average vehicle miles traveled in 2007 was 11,720 miles per year (mi/yr) with the average combined fuel economy of cars and light trucks at 20.4 miles per gallon (mpg). Based on information obtained from the United States Energy Information Administration at <http://www.eia.gov/tools/faqs/faq.cfm?id=307&t=9>, burning a gallon (gal) of gasoline with 10% ethanol produces about 17.68 pounds (lbs) of carbon dioxide (CO₂). Therefore based on the formula below, approximately "3,134 tons" of carbon dioxide would have been generated during 2011 as a result of GGNS employees commuting to and from work.

$$617 \text{ vehicles} \times 11,720 \text{ mi/yr} \div 20.4 \text{ mpg} \times 17.68 \text{ lbs CO}_2/\text{gal} \div 2,000 \text{ lbs/ton}$$

- Vehicles and Non-Road Equipment (Gasoline)

Approximately 16,700 gallons of unleaded gasoline was delivered to the GGNS site during 2011. For purposes of this calculation, it is assumed that the entire quantity was utilized. As previously stated above, burning a gallon of gasoline with 10% ethanol produces about 17.68 pounds of carbon dioxide. Therefore utilizing the formula below, approximately "148 tons" of carbon dioxide would have been generated during 2011 as a result of vehicles and non-road equipment burning gasoline.

$$16,700 \text{ gallons of unleaded gasoline} \times 17.68 \text{ lbs CO}_2/\text{gal} \div 2,000 \text{ lbs/ton}$$

- Vehicles and Non-Road Equipment (Diesel Fuel)

Approximately 44,980 gallons of diesel fuel was delivered to the GGNS site during 2011. For purposes of this calculation, it is assumed that the entire quantity was utilized. Information obtained from the United States Energy Information administration at <http://www.eia.gov/tools/faqs/faq.cfm?id=307&t=9> shows that burning a gallon of diesel fuel produces approximately 22.38 pounds of carbon dioxide. Therefore utilizing the formula below, approximately "503 tons" of carbon dioxide would have been generated during 2011 as a result of vehicles and non-road equipment burning diesel fuel.

$$44,980 \text{ gals of diesel fuel} \times 22.38 \text{ lbs of CO}_2/\text{gal} \div 2,000 \text{ lbs/ton}$$

- Diesel Generators, Pumps and Engines

Onsite diesel generators, pumps and engines that are permitted as an emission source are listed in Table 1. Based on rated fuel consumption (gallons/hour) and operational hours, total fuel consumption in 2011 was 61,097 gallons. As previously mentioned above, burning a gallon of diesel fuel produces approximately 22.38 pounds of carbon dioxide. Therefore based on the formula below, approximately "684 tons" of carbon dioxide would have been generated in 2011 as a result of the operation of the emission sources listed in Table 1.

$$61,097 \text{ gals of diesel fuel} \times 22.38 \text{ lbs of CO}_2/\text{gal} \div 2,000 \text{ lbs/ton}$$

Nitrous Oxide Emissions

Based on operational run times for the diesel generators, pumps and engines listed in Table 1, nitrous oxide emissions totaled approximately "17.51 tons" during 2011.

Table 1
Nitrous Oxide Emissions and Fuel Usage - 2011

Emission Source	Operational Hours ¹	Fuel Consumption (gallons/hour)	Annual Fuel Consumption (gallons) ²	Emissions (pounds/hour) ³	Nitrous Oxide (tons/year) ⁴
AA-001 (Div I)	68.32	490.85	33,535	215.232	7.35
AA-001 (Div 2)	29.81	490.85	14,632	215.232	7.35
AA-001 (Div 3)	44.67	250	11,168	109.632	2.45
AA-002 (FWPH A)	14.12	23.76	335	10.432	0.07
AA-002 (FWPH B)	16.39	23.76	389	10.432	0.09
AA-002 (ESC)	9.40	41	385	17.964	0.08
AA-003 (OSC)	0	13.5	0	8.159	0
AE-003 (Water Well Engine)	60.63	6.21	377	3.749	0.11
AA-004 (Large Outage Engines)	0	580	0	254.336	0
AA-011 (Telecom Diesel)	8.89	31	276	1.852	0.01
Total			61,097		17.51
1. Hours based on 2011 Annual Synthetic Minor Operating Permit Report (GEXO-2012/00020). 2. Operational hours × fuel consumption (gallons/hour) 3. Pounds/hour based on 2008 Synthetic Minor Operating Permit No. 0420-00023 renewal application (GEXO-2008/00086). 4. Emissions (pounds/hour) × Operational Hours ÷ 2000 (pounds/ton)					

Table 2**2011 Greenhouse Gas Emissions, Global Warming Potential and Carbon Dioxide Equivalent**

Greenhouse Gas	Global Warming Potential ¹	Source of Emission	Emissions (tons)	CO₂ Equivalent (tons) ²
Sulfur Hexafluoride	23,900	Electrical Disconnect Switches	0.000225	5.4
Hydrofluorocarbons	1,300	SUVA 134A	0.875	1,138
Carbon Dioxide	1	Passenger Vehicles	3,134	3,134
Carbon Dioxide	1	Vehicles and Non-Road Equipment – Gasoline	148	148
Carbon Dioxide	1	Vehicles and Non-Road Equipment – Diesel Fuel	503	503
Carbon Dioxide	1	Diesel Generators, Pumps and Engines	684	684
Nitrous Oxide	310	Diesel Generators, Pumps and Engines	17.51	5,428
Total			4,487.4	11,040.4
<ol style="list-style-type: none"> 1. Obtained from the Intergovernmental Panel of Climate Change (Direct Global Warming Potentials) website at http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html. 2. Global Warming Potential × Emissions (tons) 				