Entergy

System Energy Resources, Inc.
1340 Echelon Parkway
Jackson, MS 39286-1995

CNRO-2004-00045

July 19, 2004

U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Attention: Document Control Desk

DOCKET: 52-009

SUBJECT: Response to Request for Additional Environmental Information Related to Early Site Permit Application (Partial Response No. 2)

REFERENCE:

1. System Energy Resources, Inc. (SERI) letter to USNRC – Early Site Permit Application (CNRO-2003-00054), dated October 16, 2003.
2. USNRC letter to SERI – Request for Additional Information Related to the Staff's Review of the Environmental Report for the Grand Gulf Early Site Permit (ESP) Application (TAC No. MC1379), CNRI-2004-00007, dated May 19, 2004.
3. SERI letter to USNRC - Followup to Early Site Permit Application Environmental Audit - Response 1 (CNRO-2004-00031), dated May 19, 2004
4. SERI letter to USNRC - Followup to Early Site Permit Application Environmental Audit - Response 2 (CNRO-2004-00032), dated May 19, 2004
5. SERI letter to USNRC - Early Site Permit - Response to Request for Additional Information Letter No. 1 (CNRO-2004-00041), dated July 1, 2004
6. SERI letter to USNRC – Response to Request for Additional Environmental Information Related to Early Site Permit Application (Partial Response No. 1) (CNRO-2004-00043), dated July 2, 2004

CONTACT:

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11 TIFF

DOCUMENT COMPONENTS:

One (1) CD-ROM is included in this submission. The CD-ROM contains the following thirty-nine (39) files:

001_2.2-2.TIF
002_2.2-4.DWG
003_2.2-4a.tif
004_2.2-4a1.tif
005_2.2-4b.tif
006_2.2-4c.tif
007_2.2-4d.tif
008_2.2-6.DWG
009_2.2-6.TIF
010_2.2-7.DWG
011_2.2-7.TIF
012_2.2-8.TIF
013_2.2-8.DWG
014_GGNS Thermal Reports.pdf
015_GGNS-NPDES-PERMIT.pdf
016_Enercon_GGNS_Site_Visit_Reports.pdf
017_Procedure_08_S_09_4.pdf
018_Ct_32_jefferson.pdf
019_Ct_11_claiborne.pdf
020_Ct_75_warren.pdf
021_ER_Rev-1draft_7-16-2004.pdf
022_Tables 2.7-1_thru_2.7-120_Draft-Rev1_7-16-2004.pdf
023_1970 Nav Map.pdf
024_1998 Nav Map.pdf
025_rating curve mod.pdf
026_Record of Conversation - Corps.pdf
027_1994 Nav Map.pdf
028_95-96 Hydrographic Survey.pdf
029_pop0601.pdf
030_Record of Comm Planning and Zoning.pdf
031_Table 4.5-1_thru_4.5-11_Draft-Rev1.pdf
032_2003_entergy_sustainability_report.pdf
033_2003_greenhouse_gas_reduction.pdf
034_Draft-R1_SSAR_Tables 2.3-1_and_2.3-2_7-16-04.pdf
035_SSAR_2.3Refs_DraftRev-1_July16-2004.pdf
036_Draft-R1_Figures_2.7-1_thru_2.7-7_7-16-2004.pdf
037_2.4-3.DWG
038_2.4-3a.tif
039_2.4-3b.tif

In the referenced May 19, 2004, letter (Reference 2) the U.S. Nuclear Regulatory Commission requested additional information to support review of the SERI ESP Application. This letter transmits information as outlined in Attachment 1 to this letter.

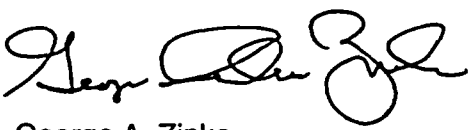
Responses to the following requests for additional information contained in Reference 2 will be submitted at a later date:

E3.7-1, E4.1-2, E7.1-1, E7.1-2, E7.1-3, E7.1-4, E7.1-5, E7.1-6, E7.1-7, E7.1-8, E7.2-1, E7.2-2, E7.2-3, E7.2-4, S2.1-1, S2.1-2

Should you have any questions, please contact me.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on July 19, 2004.

Sincerely,



George A. Zinke
Project Manager
System Energy Resources Inc.

Enclosure: One CD-ROM

Attachment: Attachment 1

cc: Mr. R. K. Anand, USNRC/NRR/DRIP/RNRP
Mr. C. Brandt, PNL
Ms. D. Curran, Harmon, Curran, Spielberg, & Eisenberg, L.L.P.
Mr. W. A. Eaton, (ECH) (w/o enclosure)
Mr. B. S. Mallett, Administrator, USNRC/RIV
Mr. J. H. Wilson, USNRC/NRR/DRIP/RLEP

Resident Inspectors' Office: GGNS

ATTACHMENT 1

The following are responses to the Request for Additional Information. Some of the responses involve updates to the application (Reference 1) which was submitted electronically (i.e. CD-ROM). NRC Guidance http://www.nrc.gov/site-help/guid-elec-submission.pdf states that updates must be submitted as total replacements. The updated total replacement application will be submitted on a schedule agreeable to the ESP NRC Project Manager in a manner in which to avoid any confusion or disruption in the NRC review process. Pages which would be included in the total replacement are included with this RAI response. The pages are labeled in a manner consistent with the ESP Project document revision control process; pages are marked "Draft Rev. 1" and dated to identify that they have not yet been submitted as part of the future total replacement submittal.

SECTION 2.2, LAND

Request:

E2.2-2 General. The ER makes use of reproductions of maps contained in the UFSAR and other black and white scans of maps. During the site audit the applicant indicated that no GIS data has been developed specific to the Grand Gulf site or the alternative sites. Please provide the following figures electronically in their native format (preferably .TIFF) and resolution:

ER Figure 2.1-1	ER Figure 2.2-2	ER Figure 2.2-5	SSAR Figure 2.2-6
ER Figure 2.1-2	ER Figure 2.2-3	SSAR Figure 2.2-2	SSAR Figure 2.2-7
ER Figure 2.2-1	ER Figure 2.2-4	SSAR Figure 2.2-4	SSAR Figure 2.2-8

Response:

(Final Response) Files for ER figures were provided in Reference 6. Files for SSAR figures are provided in this response.

See files:
001_2.2-2.TIF
002_2.2-4.DWG
003_2.2-4a.tif
004_2.2-4a1.tif
005_2.2-4b.tif
006_2.2-4c.tif
007_2.2-4d.tif
008_2.2-6.DWG
009_2.2-6.TIF
010_2.2-7.DWG
011_2.2-7.TIF
012_2.2-8.TIF
013_2.2-8.DWG

SECTION 2.3, WATER

Request:

E2.3-3 Section 2.3.1.1.1 (Mississippi River). The application states that "the river is known to have undergone shifting and continues to shift laterally." Provide the rationale and reference. Are these comments only applicable to pre-levee conditions or are they still applicable? Describe the shifting that has taken place on the east shore. Has any of the shifting encroached on the bluffs that the plant sits on?

Response:

The quoted text in the RAI is taken from the FER for the GGNS site. A more complete version of the quote is: "*The Mississippi River is known to have undergone, and is presently undergoing, lateral shifting near the Grand Gulf region. This is evidenced by the presence of oxbow lakes, low lying swamps, and sand bars.*" The rationale and reference requested is as stated in the text, that is, the evidence given is the "*presence of oxbow lakes, low lying swamps and sand bars*". The discussion of shifting of the river channel primarily applies to conditions prior to installment of the levees, dikes, and revetments. The current channel alignment is maintained by control structures installed and maintained by the Corps of Engineers. As stated in the ER Section 2.3.1.1.1 the shoreline along the GGNS property has been stabilized using revetments installed by the Corps of Engineers. From the ER Section 2.3.1.1.1:

> *The Corps of Engineers has completed revetments along the east and west river banks, including the east bank that borders the GGNS site, to maintain the river channel (Reference 4). The Grand Gulf revetments in the two sections from approximately river mile 400.5 to 405.0 and 408.5 to 409.6 were completed in the 1960s and 1970s. The intervening section, which includes the river stretch near the GGNS site, was left unprotected to undergo erosion until it attained an acceptable alignment. The section on the east bank along the GGNS site boundary was completed in stages from the mid-1970s to the early 1980s, with a small gap at the existing GGNS barge slip (References 1, 5). It is expected that these measures will stabilize the Mississippi River shoreline near the site. The Corps of Engineers has no plans for additional construction in the immediate vicinity of the site except for occasional maintenance of the existing structures (Reference 6). The Corps of Engineers continues to evaluate the need for additional shoreline work, and would be expected to make improvements as considered appropriate. However, those actions would not be expected to impact site suitability.*

Figure 2.3-1 in the Environmental Report shows "Corps of Engineers Proposed Future Shore Line" on the east bank of the MS River on the Grand Gulf property. This figure was created from the GGNS UFSAR Figure 2.4.1 which was in turn created from an AE drawing of the site layout and arrangement during construction. This figure also shows the GGNS site property line along the river shoreline. Figure 2.4-1 is a reproduction of an aerial photo of the site and surroundings which has superimposed on it the outline of the GGNS site property boundary. This aerial photo was taken in October 1971.

Figure 2.1-2 is a reproduction of an aerial photo of the site and surroundings which has superimposed on it the outline of the GGNS site property boundary. This aerial photo was taken in November 2001. As can be seen from Figure 2.1-2, the property line extends into the MS River on the north end of the property west of Gin Lake indicating approximately the shoreline erosion which has taken place.

As can be seen from these ER Figures, the shoreline remains approximately 1 mile from the proposed ESP facility power block location, and does not encroach on the bluffs which separate the flood plain from the uplands above (the aerial photograph from 1971, Figure 2.4-1, has a fairly clear outline of the bluffs through the site property).

An historical reference showing revetments and river alignment prior to construction of GGNS is U. S. Army Corps of Engineers, Mississippi Valley Division, 1970 Flood Control and Navigation Maps – Mississippi River, 1970. A copy of the map page for the GGNS site is provided. The current configuration is illustrated on the U. S. Army Corps of Engineers, Mississippi Valley Division, 1998 Flood Control and Navigation Maps – Mississippi River, 61st Edition, 1998. A copy of the map page for the GGNS site is provided.

Due to the distance of the bluffs and the proposed new facility location from the revetment line, and the fact that the bank alignment will continue to be maintained by the Corps of Engineers, further encroachment on the bluffs is not likely.

See files: 023_1970 Nav Map.pdf
024_1998 Nav Map.pdf

Request:

E2.3-4 **Section 2.3.1.1.1 (Mississippi River).** The rating curve shown in Figure 2.3-4 River Rating Curve is from 1972-1974 data and the channel has presumably changed since then. Provide a current rating curve or a justification for using the 1972-1974 version.

Response:

A current rating curve is provided for 1990-1999. This curve is based on USGS data as provided in ER Table 2.3-27 and obtained from http://waterdata.usgs.gov/nwis/qw (ER Reference 42 in Section 2.3).

See file: 025_rating curve mod.pdf

Request:

E2.3-5 Section 2.3.1.1.1 (Mississippi River). Provide a description of dredging activities in vicinity of the barge offloading area (i.e. proposed intake).

Response:

From the GGNS FER Section 4.1.4.1.2:
"Since construction of the barge slip, several dredging operations have taken place. A permit was obtained from the Corps of Engineers to remove a sand bar at the mouth of the barge slip. The operation took place at low river water stage and resulted in the removal of about 10,000 cubic yards of river sand which was spoiled at the borrow pit.

"Since the river was at low water, and the material was sand, very little turbidity or siltation occurred in the river. The barge slip has also been dredged once to enlarge it and several times to maintain it. To date, water quality of the Mississippi River has not been altered to any appreciable extent from station construction due to the large volume of the water body and the overriding influence of upstream factors on water quality."

It is believed that further dredging in this area, by Entergy, has not been conducted since the construction of the Unit 1 barge slip and the follow-on dredging activity discussed above, during construction, was completed.

The following information discussions regarding dredging activities which may be required in support of construction of an intake on the river shoreline for a new ESP facility is presented in various sections of the ER as noted:

From Section 3.4.2.1 of the ER:

"Dredging would be required to form the embayment. The embayment bottom would be at approximately elevation 15 ft msl. A typical embayment configuration and layout are shown in Figures 5.3-1 and 5.3-2; this arrangement is similar to the intake on the Mississippi River at the River Bend Station in St. Francisville, LA. The final embayment design and configuration, however, would be based on actual river conditions and final selected location.

".... The embayment would be configured to minimize the amount and rate of sediment deposition and littoral debris carried into the embayment. The base of each intake screen would be at an elevation that would give sufficient separation to the embayment dredged bottom such that dredging due to sedimentation would not be required frequently (e.g., not more frequent than once per year)."

From Section 4.2.1.1 of the ER:

"Dredging would be required to form the embayment on the Mississippi River. A temporary increase in turbidity would occur in the Mississippi River near the site during construction and dredging activities. The additional turbidity from these construction activities would likely be quickly dissipated due to the relatively high flow velocity and the large volume of water in the river. Riprap, or other appropriate means, would be used to stabilize the banks of the embayment and the river shoreline around the embayment during and following construction. These construction activities would be done in compliance with Corps of Engineer requirements, and would not affect long-term water quality."

From Section 4.2.2.1 of the ER:

"Dredging would be required to form the embayment for construction of the intake structure on the Mississippi River, and periodic maintenance dredging may also be required. A temporary increase in turbidity would occur in the Mississippi River near the site during dredging activities, but dredging operations would be in compliance with Corps of Engineer and MDEQ requirements, and would not affect long-term water quality. This temporary effect would not have a significant impact on water use or water quality."

As stated in Section 3.4.2.1 of the ER, the layout and conceptual design of the makeup water intake embayment would be similar to that utilized at the River Bend Station near St. Francisville, LA at approximately River Mile 262. The embayment at the River Bend Station is approximately 186 m (600 feet) long and 140 m (450 feet) wide with a dredged bottom at elevation (-)12 feet msl (Reference the River Bend Final Environmental Statement, NUREG-1073, Section 4.3.1.1.1). Finished grade at the River Bend intake embayment is approximately 44' 6" msl (Reference River Bend USAR, Figure 2.4-31). Details of the dredging at River Bend could not be located in the documents reviewed, except that it was stated in NUREG-1073 that the dredged material from the River Bend project was returned to the MS River in accordance with USACE requirements.

At the GGNS barge slip location finished grade is at approximately 70 ft. msl, and Figure 5.3-2 shows an embayment bottom of approximately 15 ft. msl. As stated above, from the ER, the final embayment design and configuration would be based on actual river conditions and final selected location. Dredging and/or excavation at the final location selected would, therefore, be required to create the proposed embayment and intake.

Request:

E2.3-7 Section 2.3.1.1.1 (Mississippi River). Provide data on flood frequency distributions and levee failures in the reach of the river adjacent to the plant.

Response:

Maximum daily flows observed at Vicksburg, MS are provided in ER Table 2.3-6. Flood frequency distributions are illustrated on the ESP Application Site Safety Analysis Report (SSAR) Figure 2.4-16, and in SSAR Table 2.4-11.

According to the Corps of Engineers, a levee failure in the vicinity of GGNS occurred at the Winter Quarters Crevasse in 1927, approximately 6 miles west of GGNS. No significant bluff or shoreline failures have been documented in the immediate vicinity of the GGNS site. See the record of phone conversation file below.

See file: 026_Record of Conversation - Corps.pdf

Request:

E2.3-8 Section 2.3.1.1.2 (Local Streams). For surface water bodies and wetlands on site, provide estimated erosion characteristics and sediment transport including rate, bed, and suspended load fractions.

Response:

Sedimentation Basins A and B are used to control sediment runoff from the existing Unit 1 plant area to the floodplain lakes and wetlands. Monitoring of the effluent from the basins is conducted to ensure that total suspended sediment concentrations do not exceed allowable concentrations outlined in the NPDES permit.

For the construction of a new facility, impacts from runoff would be effectively managed by development and implementation of a site-specific construction Stormwater Pollution Prevention Plan (SWPPP). SWPPPs typically address employee training; installation of silt fences, straw bales, slope breakers, and other erosion prevention measures; preventive maintenance of equipment to prevent leaks and spills; procedures for storage of chemicals and waste materials; spill control practices; revegetation; regular inspections of control measures; and visual inspections for discharges that may be detrimental to water quality.

The use of an SWPPP will help prevent sediments from reaching surface water bodies on the site (Gin and Hamilton Lake). After construction is completed, ongoing monitoring required by the NPDES permit would ensure that water quality is not adversely affected by additional sediment load. The existing

sedimentation basins will also provide secondary protection to control sediment runoff.

The following discussion regarding erosion and sedimentation/siltation of the wetlands and lakes in the site bottomlands is paraphrased from the NRC FES for the Construction Permit, NUREG-0777, and the GGNS FER.

> While erosion control methods will be employed, it is unlikely, given the amount of earth work required and the rainfall in the area, that these methods will be completely effective. Any of this silt-size sediment which is not trapped will find its way into the lakes and the bottomlands around the lakes. Lakes Hamilton and Gin are of particular significance in this regard; the effects on the Mississippi River are considered to be negligible.
>
> The bottomlands on the site are typically flooded at least once a year. The extent of flood coverage generally inundates all of the eastern bottomland and portions of the bottomland west of Hamilton Lake; as a result of high river velocity during flooding, there might be a flushing out of sediments from the bottomlands. Flooding of the lakes renews lake water by flushing. Therefore, it is believed that the construction effects on Lakes Gin and Hamilton would be temporary. The length of time required for the lakes to recover fully after construction, is not known.
>
> During flood periods, the level of suspended solids in Mississippi River water increases due to transport of silt from upstream areas. The increase in suspended solids in the river water contributes to siltation of Hamilton and Gin Lakes. Bathymetric surveys of Gin Lake (which receives insignificant runoff from the plant site) show that the lake has silted about 3 ft. to 4 ft. from 1973 to 1977. During this period, the Mississippi River floods exceeded the floodplain elevation annually. Hamilton Lake bathymetric surveys show an increase in bottom elevation of about 2 ft. to 3 ft. This change is mostly due to Mississippi River floods, since a similar increase in elevation has occurred in Gin Lake.
>
> Runoff from the plant site that discharges to Hamilton Lake first passes through sedimentation basins A and B which retain most of the sediment transported from the construction area, suspended sediment that passes from the sedimentation basins flows into Hamilton Lake, however, its contribution to the silting of Hamilton Lake is insignificant compared to the Mississippi River contribution.

It is felt that the lakes and wetlands would experience similar effects of sedimentation and siltation from runoff during construction of a new facility. However, as discussed above the effects on the bottomlands from the MS River tend to override any of these temporary construction effects in the long term. A detailed evaluation of erosion potential, sediment transport, sediment rate, and bed

and suspended load fractions would be conducted at COL, if required, when the plant layout and designated construction areas are finalized.

Request:

E2.3-9 **Section 2.3.1.1.4 (Physical Properties of Surface Waters).** Provide a list of hydrographic surveys (e.g., riverbed elevation, navigation, velocity, shoreline location, and dredge maps) of the reach of the Mississippi between Vicksburg and Port Gibson, and particularly near the proposed location of the makeup water intake and the blowdown discharge.

Response:

Hydrographic survey information is shown on maps in the following references (these are listed as References 3, 4 and 5 in the ER).

3. U. S. Army Corps of Engineers, Mississippi Valley Division, 1994 Flood Control and Navigation Maps – Mississippi River, 1994.
4. U. S. Army Corps of Engineers, Mississippi Valley Division, 1998 Flood Control and Navigation Maps – Mississippi River, 61st Edition, 1998.
5. U. S. Army Corps of Engineers, Vicksburg District, Mississippi River Hydrographic Survey 1995-1996, October 2001.

Copies of pertinent sections of these references are provided on the enclosed CD-ROM as:

027_1994 Nav Map.pdf
024_1998 Nav Map.pdf
028_95-96 Hydrographic Survey.pdf

An additional historical reference showing revetments and river alignment prior to construction of GGNS is U. S. Army Corps of Engineers, Mississippi Valley Division, 1970 Flood Control and Navigation Maps – Mississippi River, 1970. A copy of the map page for the GGNS site is provided.

See file: 023_1970 Nav Map.pdf

Verbal information from the Corps indicates no significant dredging in the GGNS site area.

Request:

E2.3-10 **Section 2.3.1.1.4 (Physical Properties of Surface Waters).** Provide monthly water temperatures for the river (maximum, average-maximum, average, average-minimum, minimum) preferably from the site temperature monitoring program.

Response:

See the response to E2.3-11 below. As noted in E2.3-11 response, the 2001 winter and summer thermal monitoring reports submitted in the 2002 GGNS NPDES renewal application to the Mississippi Department of Environmental Quality are attached.

See file: 014_GGNS Thermal Reports.pdf

Request:

E2.3-11 **Section 2.3.1.1.4 (Physical Properties of Surface Waters).** Provide a map of the temperature sampling area and sampling plan. Provide NPDES Sampling from January 2002 Reference 2 GGNS Plant Operations Manual, Environmental Instruction-NPDES Sampling, 08-S-09-4, Revision 8, January 14, 2002. Provide Entergy 2002 NPDES renewal Application Attachment C 2001 Winter and Summer Thermal monitoring reports.

Response:

Attachment III to Grand Gulf Nuclear Station (GGNS) Procedure 08-S-09-4, NPDES Sampling (see file 013_Procedure_08_S_09_4.pdf) describes the temperature sampling area and sampling plan and contains two figures that identify the temperature monitoring points (Discharge Path Locations & River Measurement Locations). Below is a brief discussion of the temperature sampling area and sampling plan obtained from the GGNS National Pollutant Discharge Elimination System Permit (NPDES) Number MS0029521 and GGNS Procedure 08-S-09-4, NPDES Sampling.

Temperature Sampling Area

As discussed in Item D.3 of Part III to GGNS NPDES Number MS0029521, the mixing zone consists of a maximum width of 60 feet from the river edge (no further east than the mouth of the barge slip) and a maximum length of 6,000 feet downstream from the point of discharge. Thermal monitoring is required to be conducted any time the Mississippi River stage is less than 5 feet (Vicksburg stage) during winter months (November – April) or is less than minus 1.2 feet (Vicksburg stage) during summer months (May – October). If these conditions occur and the plant is generating power, surface and 5 feet subsurface monitoring is to be performed at Point 1 (upstream), Discharge Outlet, Barge Slip Outlet and

Point 7 (downstream). However, once monitoring has been performed at river stages less than those cited (0.5 feet during the winter months and minus 1.2 feet during the summer), the river stage which existed at the time of thermal monitoring will then become the standard river stage during which a subsequent monitoring exercise must be performed if the river falls below that stage.

The location of the temperature sampling area as described in Attachment III to GGNS Procedure 08-S-09-4, NPDES Sampling is as follows:

- Point 1 (Upstream) - approximately 400 feet north of the barge slip outlet and not more than 60 feet from the eastern shoreline, in a depth of water approximately 5 feet.
- Discharge Outlet - at the plant discharge pipe opening into the Barge Slip Outlet.
- Barge Slip Outlet - mouth of the Barge Slip where water enter into the Mississippi River.
- Point 7 (Downstream) – approximately 100 feet south of the mouth of the Barge Slip in the mixing zone and not more than 60 feet from the eastern shoreline, in a depth of water approximately 5 feet.

Sampling Plan

As discussed above, the sampling plan which is described in Attachment III to GGNS Procedure 08-S-09-4, NPDES Sampling is based on the Mississippi River stage conditions. Daily river stages are obtained and documented from the U.S. Army Corps of Engineers or the U.S. Weather Service. If the river stage should fall below the values listed in the NPDES Permit, then thermal monitoring is performed at the locations specified in the GGNS NPDES Permit. At each location, measurements are taken at the water surface and 5 feet subsurface if possible. In addition, ambient air temperature is recorded utilizing a calibrated temperature device or determined from meteorological data and the NPDES Outfall 001 discharge temperature is recorded from an instantaneous reading from the strip chart recorder located at Outfall 001. All measurements are recorded on the data sheet shown in Attachment III to GGNS Procedure 08-S-09-4, NPDES Sampling and submitted to the Mississippi Department of Environmental Quality in accordance with the conditions outlined in the NPDES Permit.

Thermal Monitoring Reports

The 2001 winter and summer thermal monitoring reports that were submitted in the 2002 GGNS NPDES renewal application to the Mississippi Department of Environmental Quality are included as file 014_GGNS Thermal Reports.pdf.

See files: 013_Procedure_08_S_09_4.pdf
014_GGNS Thermal Reports.pdf
015_GGNS-NPDES-PERMIT.pdf

Request:

E2.3-12 **Section 2.3.1.1.4 (Physical Properties of Surface Waters).** Provide a legible figure that shows the temperature monitoring locations.

Response:

As discussed in RAI E2.3-11, Attachment III to GGNS Procedure 08-S-09-4 (NPDES Sampling) contains two figures that identify the temperature monitoring points (Discharge Path Locations & River Measurement Locations).

See file: 013_Procedure_08_S_09_4.pdf

SECTION 2.4, ECOLOGY

Request:

E2.4-1 **Section 2.4 of ER (Ecology).** Please provide a report, if available, for Enercon's reconnaissance visits to the Grand Gulf site from August 19 to 24 and October 29 to November 1, 2002.

Response:

Trip reports are attached for the site reconnaissance visits conducted August 19 to 24, 2002, and from October 29 to November 1, 2002.

See file: 016_Enercon_GGNS_Site_Visit_Reports.pdf

Request:

E2.4-2 **Section 2.4.1 of ER (Terrestrial Ecology).** During the onsite visit at Grand Gulf on April 13, Entergy Environmental Specialist, Don Crawley, referred to the Entergy Forester, Jim Monk (in Jackson), in regard to the implementation of a forest management/harvest plan on the Grand Gulf site. Please provide this plan, if available. Of specific interest are reforestation (reason, species used, and location) and harvest (harvest type [clearcut, select cut, etc.], species, approximate age, and location [specify upland bluffs or bottomlands]) efforts.

Response:

It is the policy of Entergy Corporation to:

- Understand, minimize, and responsibly manage the environmental impacts and risks of our operations, setting goals that reflect continuous improvement.
- Be a good steward of the land that we own and the wildlife and natural resources that are in our care.

Enclosed are two publicly available documents further describing Entergy Corporation's commitment to environmental responsibility (2003 Greenhouse Gas Reduction Commitment Progress Report and the 2003 Entergy Sustainability Report). Both documents discuss Entergy's Sustainable Forestry Plan.

Regarding the specific question, Entergy established a long range (80 years) timber management plan at GGNS in 1996. Since that time, the majority of the property has had a select timber cut for the upland and the river bottom. The select timber cut removed the lower grade timber which allowed the younger more valuable timber an opportunity to grow. The one exception was a clear cut next to

the river where a tornado came through and damaged all of the timber. There was not enough timber remaining to leave and have an optimal timber stand, so it was decided to take all of the timber down and start over. The site was planted with bottomland hardwood and now has planted and natural regeneration. Since this timber was never managed properly, the cutting cycle (how often the areas are cut) will vary from 8 to 15 years. The idea for the timber management plan is to prefer the higher value, faster growing hardwoods (such as oaks), and provide optimum wildlife potential. This management plan will favor the threatened Louisiana Black Bear.

The new updated timber management plan is being worked on by Wildlife Technical Services, who is in charge of managing this particular property. To complete this management plan, a timber cruise of the property must take place, and right now the river elevation height has this stopped. As soon as the river drops down, the cruise will be completed and added to the new plan.

Reforestation on the site was done to bring all marginal acres into the Entergy Carbon Sequestration Program. Part of the area planted was an old field (close to the lake) that did not have adequate fast growing, and long lasting tree species. The shorter growing species were removed and the faster growing species were planted in their place. The other site was an old pasture that had been abandoned. This pasture was planted in a combination of pine and bottomland hardwoods. The pines were planted close to the road for a wildlife screen and the oaks behind them for wildlife food.

See files: 032_2003_entergy_sustainability_report.pdf
033_2003_greenhouse_gas_reduction.pdf

Request:

E2.4-3 **Section 2.4.1.1 of ER (Terrestrial Ecology – Terrestrial Habitats).** No wildlife habitat information is provided for the existing Grand Gulf transmission line right-of-ways (ROWs), except to say that a certain percentage is forested. Please provide the same information for riparian areas, wetlands, floodplains, etc., that cross the ROWs. Please also indicate what important areas for wildlife (U.S. Fish and Wildlife Service national wildlife refuges, state wildlife or natural areas, state/municipal parks, etc.) are crossed by the transmission lines.

Response:

SERI does not have wildlife habitat information for the existing Grand Gulf transmission line right-of-ways. The transmission lines in the immediate vicinity of the existing Grand Gulf Nuclear Station are owned by Entergy Mississippi, Inc.

Request:

E2.4-4 Section 2.4.1.2.1 of ER (Terrestrial Ecology – Louisiana Black Bear). During the onsite visit at Grand Gulf on April 13, Entergy Environmental Specialist, Don Crawley, referred to the Entergy Forester, Jim Monk (in Jackson), regarding to the possibility that he and/or his forestry staff may have incidentally observed black bears on the Grand Gulf site. If such anecdotal sightings have been made, please provide any of the following information, if available (i.e. who made the observation, the date, and specific location). Please indicate whether sighting information is typically reported to the U.S. Fish and Wildlife Service or the state Natural Heritage Program office.

Response:

This Mississippi River front is one of the black bear main travel corridors. However, there have been no official black bear sightings by any Forestry personnel and no bear prints have been observed. Any sightings or evidence of black bear sign or movement is immediately relayed to the U.S. Fish and Wildlife Service and the Bear Coordinator for the Mississippi Department of Wildlife and Fisheries.

Request:

E2.4-5 Section 2.4.1.2.1 of ER (Terrestrial Ecology – Louisiana Black Bear). During the onsite visit at Grand Gulf on April 13, Entergy Environmental Specialist, Don Crawley, referred to the onsite hunting club, comprised of Entergy employees, in regard to the possibility of club members having incidentally observed black bears on the Grand Gulf site. If such anecdotal sightings have been made, please provide any of the following information, if available (i.e., who made the observation, the date, and specific location). Please indicate whether sighting information is typically reported to the U.S. Fish and Wildlife Service or the state Natural Heritage Program office.

Response:

The Grand Gulf Nuclear Station (GGNS) Bow Hunting Club was contacted regarding any sightings of the black bear on the property. Based on conversation with them, there have been no sightings. If there is a bear sighting on the property, GGNS will notify the U.S. Fish and Wildlife Service and the Bear Coordinator for the Mississippi Department of Wildlife and Fisheries since the Bow Club is aware that they are to promptly notify site management of these sightings.

SECTION 2.5, SOCIOECONOMIC

Request:

E2.5-3 Reference 3. Provide copy of front explanatory matter for tables actually used from the correct source and a correct specific citation. Provide example of applying county rates to a portion of Census block groups for two counties (Claiborne County – portion of block groups, Warren County – portion of block groups). Hard copy is preferred.

Response:

The URL in the reference directs the user to a limited access database. The public URL is: http://www.ihl.state.ms.us/urc/planning/econdept.htm. This URL is active and the referenced report, "Mississippi Population Projections 2005, 2010, and 2015" is available. The URL for the report itself is: http://www.ihl.state.ms.us/urc/planning/pop0601.pdf.

Reference 3 will be revised to correct the URL address. The referenced report is included.

See files: 021_ER_Rev-1draft_7-16-2004.pdf
029_pop0601.pdf

Request:

E2.5-12 Reference 22. Covington, Clifton, Claiborne County Extension Office, personal communication, Port Gibson, Mississippi, October 16, 2002. Based on discussion, the reference for the statement regarding the Mississippi Development Authority (MDA) helping local government should be the MDA mission statement. Provide a copy of the mission statement and the correct citation. Also provide a copy of the phone record for the personal communication with Covington.

Response:

In the process of verifying this reference, Mr. Clifton Covington was contacted again. He indicated that he is not the appropriate reference for information concerning planning and development. The Mississippi Development Authority provided a referral to Mr. James Johnston, Claiborne County Administrative Offices. Mr. Johnston is the Director of Community Development for Claiborne County and works in Port Gibson Mississippi. He was contacted and confirmed the accuracy of the information as presented in the ER. A record of that telephone conference is provided. Reference 22 of Section 2.5 will be corrected.

See files: 030_Record of Comm Planning and Zoning.pdf
021_ER_Rev-1draft_7-16-2004.pdf

SECTION 2.7, METEOROLOGY AND AIR QUALITY

Request:

E2.7-1 Section 2.7.2.1 (Wind). Compares wind speeds for the GGNS with wind speeds at Vicksburg for 1996-2001. Update the comparison using only wind data collected by the updated GGNS meteorological data systems. Include data for 2002.

Response:

The GGNS meteorological tower is believed to have incorrectly minimized the recording of wind direction from the east. This conclusion is based on a marked difference in the appearance of the wind roses from before and after the met tower replacement at the end of the year 2000. It is hypothesized that the larger previous tower structure biased the directional readings. A different sensor measures wind speed, and the wind speed data are consistent between the previous and current tower's instrumentation. The ER text of this section will be revised, along with Tables 2.7-1, -2, -15, -16, -17, -18, -19, -75, -76, -77, -78, -79, -80, -81, -82, -83, -84, -85, -86, -87, -91, -92, -93, -94, -95, -105, -106, -107, -108, -109, -110, -111, and -112, to exclude all wind direction data from prior to 2001. Figures 2.7-1 through 2.7-7 will also be revised to show the GGNS site wind roses for years 2001 through 2003.

See files: 021_ER_Rev-1draft_7-16-2004.pdf
022_Tables 2.7-1_thru_2.7-120_Draft-Rev1_7-16-2004.pdf
036_Draft-R1_Figures_2.7-1_thru_2.7-7_7-16-2004.pdf

Request:

E2.7-2 Tables. Provide updated Tables 2.7-1 and 2.7-2 and confirm that the wind directions and speeds in the tables are components of the resultant wind vector. In particular, confirm that the direction is the resultant direction, not the most common wind angle as stated in the tables.

Response:

As noted in response to RAI E2.7-1, the met tower wind direction data prior to year 2001 are suspect. Therefore, Tables 2.7-1 and 2.7-2 will be revised to provide comparison of Vicksburg and Grand Gulf site wind direction data for the years 2001, 2002, and 2003. Since the wind velocity measurements are not affected, average wind velocities are provided from 1996 through 2003. As noted in the RAI, the text of the tables is inconsistent with the table headings. To be complete,

the tables now include most common wind direction, average speed, and the resultant wind vector in terms of direction and length.

See files: 021_ER_Rev-1draft_7-16-2004.pdf
022_Tables 2.7-1_thru_2.7-120_Draft-Rev1_7-16-2004.pdf

Request:

E2.7-3 Section 2.7.4.1.2 (Grand Gulf Wind Data). Presents an analysis of the wind data from the GGNS meteorological tower for the years 1996 through 2001. Revise the analysis using only wind data from the updated GGNS meteorological system. Include data for 2002. Provide documentation on changes to the ER relative to tables that have been revised.

Response:

As noted in response to RAI E2.7-1, the met tower wind direction data prior to year 2001 are suspect. Therefore, the tables described in the response to RAI E2.7-1 and the wind roses in Figures 2.7-1, -2, -3, -4, -5, -6, and -7 will be revised to reflect only Grand Gulf site wind direction data from the years 2001, 2002, and 2003. The text of the ER will be revised as required to reflect this change.

See files: 021_ER_Rev-1draft_7-16-2004.pdf
022_Tables 2.7-1_thru_2.7-120_Draft-Rev1_7-16-2004.pdf
036_Draft-R1_Figures_2.7-1_thru_2.7-7_7-16-2004.pdf

Request:

E2.7-5 Section 2.7.4.1.3 (Wind Direction Persistence). Presents an analysis of the wind data from the GGNS meteorological tower for the years 1996 through 2001. Revise the analysis using the only wind data from the updated GGNS meteorological system. Include data for 2002. Provide documentation on changes to the ER relative to tables that have been revised.

Response:

As noted in response to RAI E2.7-1, the met tower wind direction data prior to year 2001 are suspect. Therefore, the tables described in the response to RAI E2.7-1, including the wind persistence tables, will be revised to reflect only the 2001, 2002, and 2003 data. The ER text will also be revised to reflect this change.

See files: 021_ER_Rev-1draft_7-16-2004.pdf
022_Tables 2.7-1_thru_2.7-120_Draft-Rev1_7-16-2004.pdf

Request:

E2.7-6 Section 2.7.4.6 (Atmospheric Stability). Includes tables that present the frequency of atmospheric stability classes at GGNS as a function of wind direction for an unspecified 5 years period. State what the 5 years were. If the years were prior to 1996, affirm that the wind directions used were representative. Otherwise, update the analysis using only data from the updated GGNS meteorological system.

Response:

The data used were from the GGNS data set from years 1996 through 2001. However, as noted in response to RAI E2.7-1, the met tower wind direction data prior to year 2001 are suspect. Therefore, the tables described in the response to RAI E2.7-1, including the wind persistence tables, will be revised to reflect only the data taken after the tower replacement at the end of year 2000. The ER text will also be revised to reflect this change.

See files: 021_ER_Rev-1draft_7-16-2004.pdf
022_Tables 2.7-1_thru_2.7-120_Draft-Rev1_7-16-2004.pdf

Request:

E2.7-7 Section 2.7.6.2 (Short-Term Diffusion Estimates – Calculations and Results). Presents atmospheric diffusion estimates calculated using wind data from the GGNS meteorological tower for the years 1996-2000. Redo the calculations using only data from the updated GGNS meteorological system. Update Section 2.7.6.1 to reflect the meteorological data used in the diffusion estimates.

Response:

Sections 2.7.6.1 and 2.7.6.2 will be updated to reflect the use of GGNS data from years 2002 and 2003 only. References for Section 2.6 will be updated as required. See the draft proposed changes in the files below.

See files: 021_ER_Rev-1draft_7-16-2004.pdf
022_Tables 2.7-1_thru_2.7-120_Draft-Rev1_7-16-2004.pdf

Request:

E2.7-8 **Additional data needs.** Provide updated tables presenting the short-term atmospheric diffusion estimates.

Response:

Associated tables for Section 2.7.6 will be revised; drafts are included in the file below.

See files: 022_Tables 2.7-1_thru_2.7-120_Draft-Rev1_7-16-2004.pdf

Request:

E2.7-9 **Section 2.7.7.3 (Long Term Diffusion Estimates – Calculations and Results).** Presents atmospheric diffusion estimates calculated using wind data from the GGNS meteorological tower for the years 1996-2000. Revise the calculations using only data from the updated GGNS meteorological system. Update Section 2.7.6.2 to reflect the meteorological data used in the diffusion estimates.

Response:

Sections 2.7.7.2 and 2.7.7.3 and associated tables will be updated to reflect the use of GGNS data from years 2002 and 2003 only. References for Section 2.7 will be updated as required. See the draft proposed changes in the files below.

See files: 021_ER_Rev-1draft_7-16-2004.pdf
022_Tables 2.7-1_thru_2.7-120_Draft-Rev1_7-16-2004.pdf

Request:

E2.7-10 **Additional data needs.** Provide updated tables presenting the long term atmospheric diffusion estimates.

Response:

Associated tables for Section 2.7.7 will be revised as indicated in the file below.

See file: 022_Tables 2.7-1_thru_2.7-120_Draft-Rev1_7-16-2004.pdf

Request:

E2.7-11 **Additional data needs.** Provide GG ESP site-specific input files (meteorology, population, and source terms) for the MACCS2 computer mode.

Response:

These tables will be provided in MACCS2 input file format as part of the response to RAI E7.2-3.

SECTION 3.8, TRANSPORTATION OF RADIOACTIVE MATERIALS

Request:

E3.8-1 **Radionuclide content of advanced design irradiated fuel.** For the IRIS reactor design, provide a detailed listing of all radionuclides and their inventories (e.g., Curies per metric ton uranium (Ci/MTU) or other suitable unit that can be used to calculate the inventories of each radionuclide in irradiated fuel shipments). In addition, for the ACR-700 reactor design, provide a detailed listing of all actinide radionuclides and their inventories. Explain the technical basis for the data (how the information was obtained) and the accuracy of the data.

Response:

Isotopic listings of the spent fuel inventories were not needed to conduct the comparison with Table S-4 and the reference LWR. With the exception of Kr-85, the comparison required only summary information for fission products, actinides and total activity. [See Environmental Report Section 3.8.2.] In addition to the summary information, the reactor vendors were asked the following: "Note: If available, please provide a complete set of the ORIGEN runs results (or other applicable code for the appropriate reactor type) detailing the spent fuel inventories at 5 years decay." The responses varied. Several of the vendors provided isotopic listing of the inventories; a few provided the computer runs. In all cases, what was provided by the reactor vendors can be found in the "Early Site Permit Environmental Reports Sections and Supporting Documentation" Adams Accession No. ML040580285. In the case of IRIS, only the summary information was provided. For the ACR-700, AECL provided the computer analysis for just the fission product inventory. The multiple fission product outputs occur because the ACR-700 fuel bundle has four rings.

Request:

E3.8-2 Detailed information about the advanced fuel designs. Provide information to support a preliminary comparative evaluation of the abilities of the advanced fuel designs to withstand structural and thermal accident conditions relative to current design fuel assemblies. In particular, provide the following information on the advanced fuels:

a. Fuel mechanical and thermal properties

b. For the fuel cladding:

1. material(s) used and form/manufacturing processes
2. physical dimensions
3. mechanical and thermal properties

c. Investigation/analysis of fission product transport within and out of the fuel matrix

d. Irradiation and temperature effect on the mechanical and thermal properties discussed above

e. Assumptions about packaging that would be used as inner containers (i.e. overpack) inside a conceptual shipping cask

f. Expected release fractions from the fuel during accident conditions – if this information is given as a comparison to light-water-cooled reactor (LWR) fuels release fractions, provide the basis for the comparison.

Response:

ABWR, AP1000, IRIS, ESBWR, ACR-700

As discussed in Section 3.8.1, these LWR designs satisfy the 10CFR51.52(a) conditions for use of Table S-4 or have impacts shown by sensitivity analysis to be bounded by Table S-4. The environmental impacts of transportation of fuel and radioactive wastes are represented by the values given in 10CFR51.52(c), Table 4. For this reason, no further detail on the fuel characteristics for these LWRs is provided.

GT-MHR

References 1 and 2 provide information on the GT-MHR. Spent fuel cask modeling assumptions are discussed in the response to RAI 3.8-3. Due to the high temperature capability of the GT-MHR fuel, General Atomics anticipates that the fission product release characteristics during credible transportation accidents would be less than LWR fuels. Additional information on the release

characteristics during normal operation of the MHTGR can be found in the MHTGR PSID (Reference 2).

PBMR

Reference 3 provides information on the PBMR.

References:

1. PC-000507, GT-MHR Plant Parameter Envelope Supporting Early Site Permitting, General Atomics, April 2003. Contained in Idaho National Engineering & Environmental Laboratory Engineering Design File 3747, May 2003 (NRC Accession Number ML040580285).
2. Preliminary Safety Information Document for the Standard Modular High Temperature Gas-Cooled Reactor, DOE-HTGR-86-024, General Atomics, February 1992.
3. November 29, 2002 Letter from A.P. George and F. Curtolo, Pebble Bed Modular Reactor (Pty) Ltd., to Michael J. Cambria, Parsons Energy and Chemicals, "ESP-8: Reactor Vendor Questionnaire." Contained in Idaho National Engineering & Environmental Laboratory Engineering Design File 3747, May 2003 (NRC Accession Number ML040580285).

Request:

E3.8-3 Information about the designs of shipping casks for advanced reactor irradiated fuels. Provide capacities and dimensions of the shipping casks being modeled. It is assumed that the advanced LWR irradiated fuels would be shipped in casks similar to the current generation. For advanced non-LWR irradiated fuels, provide information about irradiated fuel handling, fuel behavior regarding failure and release fractions, and shipping cask concepts. Include all references and provide the basis for all assumptions made.

Response:

ABWR, AP1000, IRIS, ESBWR, ACR-700

As discussed in Section 3.8.1, these LWR designs satisfy the 10CFR51.52(a) conditions for use of Table S-4 or have impacts shown by sensitivity analysis to be bounded by Table S-4. The environmental impacts of transportation of fuel and radioactive wastes are represented by the values given in 10CFR51.52(c), Table 4. For this reason, no further detail on the fuel characteristics for these LWRs is provided.

GT-MHR

The GT-MHR spent fuel was modeled as being shipped in a 42-element shipping cask by rail. A preliminary design of a multi-purpose canister (MPC) was initially performed for the Plutonium Consumption-Modular Helium Reactor (PC-MHR) in FY-95 for the DOE. Reference 1 is the MPC

preliminary design report. The application of the MPC design to the GT-MHR spent fuel was evaluated for DOE in Reference 2.

PBMR

The PBMR was modeled based on shipping 24,000 fuel spheres per container with two 6-m long containers per truck. The total mass of one container with fuel is 15,900 kg. This information is provided in Reference 3.

References:

1. GA/DOE-082-95, letter report from D.A. Alberstein to Howard R. Canter, "PC-MHR Spent Fuel Disposal Multipurpose Canister Preliminary Design Report, October 1995.
2. PC-000502/0, Assessment of GT-MHR Spent Fuel Characteristics and Repository Performance, General Atomics, April 2002.
3. November 29, 2002 Letter from A.P. George and F. Curtolo, Pebble Bed Modular Reactor (Pty) Ltd., to Michael J. Cambria, Parsons Energy and Chemicals, "ESP-8: Reactor Vendor Questionnaire." Contained in Idaho National Engineering & Environmental Laboratory Engineering Design File 3747, May 2003 (NRC Accession Number ML040580285).

Request:

E3.8-4 General. Provide a transportation risk assessment for gas-cooled reactor spent fuel shipments using an accepted methodology, such as RADTRAN V. Provide justification that the best available information has been used to generate the RADTRAN input values, and that those values are appropriate for gas-cooled fuel shipments. Provide a comparison of the results of that assessment with the spent fuel shipment risk estimates contained in NUREG-01780, *Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes.*

Response:

RADTRAN V highway runs were conducted for a GT-MHR and a PBMR spent fuel shipment from Maine Yankee Nuclear Plant to Yucca Mountain. The TRAGIS Routing Engine Version 1.4.15, which uses the 2000 Census data, provided the routing information and the population densities. The analysis was conservative using the 10 CFR 71 regulatory limits of 2 mrem/hr in the cab and 10 mrem/hr at 2 meters from the cask. The input values were taken primarily from the Yucca Mountain Final EIS in particular the *Transportation Health and Safety Calculation/Analysis Documentation in Support of the Final EIS for the Yucca Mountain Repository.* Specifically, the values for the high integrity high-temperature gas-cooled reactor SNF referred to a type 8 were used. The results of these runs are provided in the output files that echo the input files as well. These

files are provided as separate attachments. A comparison of the incident free results with NUREG-0170 is provided in Table 1.

Table 1. Comparison of Incident Free Results

	Per shipment person-rem from NUREG-0170 based on 1530 spent fuel truck shipments for the year 1985	RADTRAN V per shipment person-rem results for GTMHR Spent Fuel from Maine Yankee to Yucca Mountain	RADTRAN V per shipment person-rem results for PBMR Spent Fuel from Maine Yankee to Yucca Mountain	Difference between RADTRAN V results and NUREG-0170
Passengers	0	0.000	0.000	0.000
Crew	0.123	0.157	0.157	0.034
Attendants	0.000	0.000	0.000	0.000
Handlers	0.200	0.102	0.102	-0.098
Off-Link	0.015	0.012	0.012	-0.003
On-Link	0.007	0.081	0.081	0.073
Stops	0.019	0.177	0.177	0.158
Storage	0.005	0.000	0.000	-0.005
Totals	**0.369**	**0.529**	**0.529**	**0.160**

The major difference is the dose during stops. Approximately 25% of this difference is attributable to the RADTRAN V simulations included inspections at the beginning and the end of the trip. NUREG-0170 did not include these inspections. The remaining difference can be attributed to greater distance traveled, hence more refueling stops, and the different methodologies used to calculate the stop doses. This evaluation used 1996 truck stop data (*Investigation of Radtran Stop Model Input Parameters for Truck Stops,* SAND96-0714C) and modeled public doses in two concentric rings: 1 m to 14 m and 30m to 800m. The population in the inner ring used the results of the Stop Model study while the population in the outer ring used route specific 2000 Census population data weighted by a 3% urban, 26% suburban and 71% rural distribution. The NUREG-0170 study modeled just one ring, 10 to 2600 feet, and used three fixed population densities.

Factors contributing to the increased on-link population dose are NUREG-0170 assumed a 2500 km shipment distance with a 5% urban, 5% suburban and 90% rural population. This evaluation used updated 2000 census information showing a 3% urban, 26% suburban and 71% rural population and a 4,733 km shipment distance.

In addition to the incident free results, the RADTRAN V runs also include accident results. Due to the preliminary nature of the gas-cooled reactor fuel design, it is premature to provide a meaningful comparison with NUREG-0170.

The RADTRAN V runs were made with the gas-cooled fuel values in the Yucca Mountain FEIS. Specifically, the values for the high integrity high-temperature gas-cooled reactor spent nuclear fuel referred to a type 8 were used. As such, these runs give the best possible estimate at what the GT-MHR and PBMR results might look like. It is important to remember that the gas-cooled reactor spent fuel shipments are no different from other spent fuel shipments in that all shipments are required to meet NRC and DOT regulations. These regulations address design and performance standards for the casks and specify radiological performance criteria for both normal transport and severe accident conditions. Compliance with these regulations ensures the shipments will be conducted in a manner with minimal environmental impacts.

Request:

E3.8-5 **General question.** For the light water reactor designs, what is the bounding value for 1) the number of truck shipments of irradiated fuel annually per unit, and 2) MTU of spent fuel per truck cask?

Response:

The bounding value for the number of truck shipments of irradiated fuel annually is 33 for the ESBWR based on 1 MTU (7 assemblies) per truck cask.

Request:

E3.8-6 **Section 3.8.1, p. 3.8-3, (Light-Water-Cooled Reactors).** Provide justification for the statement that the Department of Energy (rather than licensees) would make the decision on transport mode.

Response:

As part of its obligations under the Nuclear Waste Policy Act [Section 302(a)(1)] and per 10CFR 961, the Department of Energy (DOE) will take title to, transport, and dispose of spent nuclear fuel. Thus, DOE is responsible for determining the transport mode.

Request:

E3.8-7 **Section 3.8.2.2, p. 3.8-6, last paragraph (Gas-Cooled Reactors – Analysis).** The ER states that adjustments have been made on the basis of electrical output, but the note to Table 3.8-2 states that results were not adjusted. Describe all adjustments or normalizations that have been made (e.g., decay time, shipment, electrical generation, etc.).

Response:

Table 3.8-2 was generated based on the standard configuration for each of the reactor technologies.

Section 3.8.2.2 describes the adjustment made to normalize the new designs to 880 MWe for comparison with the reference LWR.

The normalization to 880-MWe was the only adjustment made.

Request:

E3.8-8 **Section 3.8.2.2.3, p. 3.8-9, first paragraph (Risk Contributors – Contents).** The ER states that the reference LWR used a 90-day decay time, but 150 days is stated as the decay time prior to shipment in the Reference LWR column of Table 3.8-2. What reference LWR decay time was used for the impact evaluation? In addition, what gas-cooled reactor radionuclide inventory was used for the impact evaluation?

Response:

As was done in the WASH-1238, Table 3.8-2 uses 150 days for the reference LWR when calculating impacts. The 90-day decay time is the minimum decay time specified in 10CFR51.52.

The gas-cooled reactor radionuclide inventory is based on a five-year decay time.

Request:

E3.8-9 Section 3.8.2.2.3, p. 3.8-9, first paragraph (Risk Contributors – Contents). Justify the applicability of the depletion code used to calculate the isotopic content of spent fuel for the new reactor designs.

Explain the in-core differences between a commercial LWR and the new reactor designs and how these differences affect the performance of the depletion calculation. These differences may include: initial enrichment, fuel configuration, type of moderator, specific power, fuel temperature, moderator temperature, and the presence of soluble, burnable, and integral poisons.

Response:

ABWR, AP1000, IRIS, ESBWR, ACR-700

As discussed in Section 3.8.1, these LWR designs satisfy the 10CFR51.52(a) conditions for use of Table S-4 or have impacts shown by sensitivity analysis to be bounded by Table S-4. The environmental impacts of transportation of fuel and radioactive wastes are represented by the values given in 10CFR51.52(c), Table 4. For this reason, no further detail on the fuel characteristics for these LWRs is provided.

GT-MHR

Information on the GT-MHR is provided in Reference 1. The General Atomics (GA) methodology for computing the GT-MHR radionuclide inventories and resulting decay heat was the same as that used for the 350 MWt MHTGR submitted to the NRC in Reference 2, the MHTGR Preliminary Safety Information Document. This methodology uses a point-depletion model with 1100 nuclides including 123 heavy metal isotopes, 112 structural or impurity isotopes, and 862 fission product nuclides using cross section data from ENDF/B-V files. The model provides up to four decay and four capture parents for each nuclide, plus two (n,2n) parents, with fractional yields possible for all.

The GT-MHR model includes burnout effects for all fission products. GA expects a standard deviation of approximately 4% in the decay heat calculation consistent with the ENDF/B-IV data uncertainties in ANSI/ANS-5.1-1979.

The NRC and Oak Ridge National Laboratory reviewed the GA methodology as part of the PSID pre-application licensing activities. The review concluded that the calculated decay-heat rates were acceptable for use in conceptual design and analysis (Reference 3).

PBMR

The methodology used to generate the PBMR values is described in Reference 4 as follows.

The fission product and actinide activities have been calculated for different fuel spheres and different burn-up values. Using ORIGEN-S with the 302 MW

6 pass ORIGEN-S library, the activities were calculated for the following parameters:

Table 1. PBMR Parameters		
Parameter	**Case 1**	**Case 2**
Reactor Power (MW)	400	400
Burn-up (GWD/TU)	92	133
Reactor Fuel Spheres	451545	451545
Full Power Days	~935	~1351
Fuel Sphere U Mass (g)	9	9
Enrichment (%)	9.6	12.9
Reactor Flux <0.5 eV ($n.cm^{-2}.s^{-1}$)	6.82×10^{13}	6.35×10^{13}

Note that the ORIGEN-S cross section library was generated with the reactor spectrum calculated for the following conditions:

- Dynamic central column PBMR model.
- Equilibrium core based on 8.46% enriched fuel spheres and 80 WD/T(U) burnup.

Therefore, this ORIGEN-S cross-section library is not directly applicable for the conditions in Cases 1 and 2, but was used for scoping purposes. The neutron flux was chosen such that the spent fuel burnup was reached.

In-core differences between new reactor designs and various LWR designs have the same effects. These differences affect the neutron spectrum and resulting actinide production and fission rates between various fissile and fertile isotopes

References:

1. PC-000507, GT-MHR Plant Parameter Envelope Supporting Early Site Permitting, General Atomics, April 2003. Contained in Idaho National Engineering & Environmental Laboratory Engineering Design File 3747, May 2003 (NRC Accession Number ML040580285).
2. Preliminary Safety Information Document for the Standard Modular High Temperature Gas-Cooled Reactor, DOE-HTGR-86-024, General Atomics, February 1992.
3. NUREG-1338, Draft Preapplication Safety Evaluation Report for the Modular High-Temperature Gas-Cooled Reactor, U.S. Nuclear Regulatory Commission, March 1989.
4. Calculational Record MF100-016344-2053, "Scoping Calculation: Spent Fuel Activities After 5 Years Decay," PBMR, 6/03/2003. Enclosure to April 13, 2004 Letter from Marilyn C. Kray, Exelon Nuclear, to Document

Control Desk, U.S. Nuclear Regulatory Commission, "Submission of Requested Information" (NRC Accession Number ML041110024).

Request:

E3.8-10 **Section 3.8.2.2.3, p. 3.8-9, third paragraph (Risk Contributors – Contents).** The ER provides a comparison of reference LWR actinide and gas-cooled fuel inventories that states that the actinide inventory in Ci/MTU for the gas-cooled fuel exceeds that of the reference LWR, and that the pebble bed modular reactor (PBMR) would have essentially the same MTU per cask as the reference LWR. Provide the basis for the total actinide inventory per gas-cooled fuel truck cask. Does the increased actinide inventory call for additional cask shielding relative to that needed for reference LWR fuel? If so, does the added shielding affect cask payload and the number of shipments by truck, as shown in Table 3.8-2?

Response:

GT-MHR, PBMR

The basis for the actinide inventory for both gas-cooled reactors is provided in the response to RAI E3.8-9.

As stated in Section 3.8.2.2.3, the MTU per cask for the GT-MHR is 0.16044 MTU. This is one third of the LWR shipment capacity of 0.5 MTU per cask Based on this comparison, the actinide inventory per shipment is about half (53 percent) for the GT-MHR versus the reference LWR and there should be no need for additional cask shielding relative to the LWR.

The PBMR information is provided in Reference 1. The need for any additional shielding has not been determined at this time.

Reference:

1. November 29, 2002 Letter from A.P. George and F. Curtolo, Pebble Bed Modular Reactor (Pty) Ltd., to Michael J. Cambria, Parsons Energy and Chemicals, "ESP-8: Reactor Vendor Questionnaire." Contained in Idaho National Engineering & Environmental Laboratory Engineering Design File 3747, May 2003 (NRC Accession Number ML040580285).

Request:

E3.8-11 Section 3.8.2.3, p. 3.3-10, second paragraph (Gas-Cooled Reactors – Discussion). The ER quotes NUREG/CR-6703, *Environmental Effects of Extending Fuel Burnup Above 60 Gwd/MTU* [gigawatt days/MTU], (p.3), regarding actinide dose contribution; however, the quoted text relates to pressurized water reactor (PWR) fuels burned in the presence of burnable poison rod assemblies. Describe the relevance of this information to the type of gas-cooled reactor spent fuel shipments contemplated in the ER.

Response:

The information from NUREG/CR-6073 was intended to clarify that the issue that needs to be evaluated is the cask isotopic inventory and not how the fuel was used in the reactor. What is important for the transport is the identity of the nuclides and their quantity.

Request:

E3.8-12 Section 3.8.2.3, p. 3.8-10, second paragraph (Gas-Cooled Reactors – Discussion). For each gas cooled reactor technology proposed, demonstrate/quantify how the increased actinide activity in the fuel impacts neutron dose.

Response:

The second paragraph of Section 3.8.2.3 discusses the increased actinide activity and corresponding requirement for increased neutron shielding. It also quotes NUREG/CR-6703 "because neutrons are effectively attenuated by low-density materials such as plastics and water, it is believed that minor modifications can be made to the shipping casks to allow them to transport the higher burnup fuel at fuel load.

The neutron dose is dependent not only on the source term (cask loading) but also the cask design itself. At this time, since the cask has not been designed, quantification is not possible. The casks would be certified by the NRC prior to use and would meet applicable regulations.

Request:

E3.8-13 Section 3.8.2.3, p. 3.8-10, second paragraph (Gas-Cooled Reactors – Discussion). Justify the representation that only minor modifications to the amount of neutron shielding on the transportation packages will allow them to be used for fuel with a significantly higher neutron source term.

Address the effect of additional neutron shielding on other design aspects of the package performance such as the ability to reject the thermal heat load, the method for attaching the shielding, and the size of the impact limiter which affects the package's performance during a drop accident. Address the effect of additional shielding on package diameter, impact limiter size, rail or truck bed width, package weight, cask capacity, and number of shipments needed.

Address how the neutron source term for gas-cooled reactor fuel will be distributed when the fuel is shipped, and how that distribution might affect the shielding design of the transportation cask.

Response:

The justification for only minor modifications arises from statements made in NUREG/CR-6073, which are captured in Section 3.8.2.3 as follows:

> "From NUREG/CR-6703 'Environmental Effects of Extending Fuel Burnup Above 60 GWd/MTU,' we learn that 'none of the actinides contributes more than one percent of the external dose from an iron transportation cask, and as a group, the actinides do not contribute significantly to the dose from transportation accidents. In fact, increasing the activities of Pu-238, Pu-239, Pu-240, Pu-241, Am-241, Cm-242 and Cm-244 by more than a factor of 1000 only increased the cumulative dose for a transportation accident during shipment of 43 GWd/MTU spent fuel from the northeast to Clark County, NV from 0.0358 to 0.0359 person-mSv/shipment (3.58×10^{-3} to 3.59×10^{-3} person-rem/shipment).'"
>
> "NUREG/CR-6703 states 'because neutrons are effectively attenuated by low-density materials such as plastics and water, it is believed that minor modifications can be made to shipping casks to allow them to transport the higher burnup fuel at full load.'"

As discussed in the response to RAI E 3.8-10, the actinide inventory per shipment will be less for the GT-MHR than the reference LWR.

Details of a final cask design for PBMR fuel are not available.

SECTION 4.1, LAND-USE IMPACTS

Request:

E4.1-1 **Section 4.1 of ER (Land Use Impacts).** The following is stated: "New rail service may be required to support materials deliveries and new construction activities." Because the closest passage of a rail line is currently 28 miles to the NE, where would the potential rail corridor run and where would it junction with the KC Southern line? What information was consulted to determine that a new rail line might be required? No material is cited in this regard. During the site audit the applicant indicated that a clarification of this statement would be written and docketed.

Response:

The statement quoted from the Environmental Report is intended to identify that the precise methods of construction material transportation to the site have not been determined or projected and that rail service is not immediately available at the site. The Environmental Report does not propose, project or evaluate possible changes to rail service. Many variables could affect potential future construction material transportation modes, including the degree to which modular construction methods are to be used. Although not evaluated for the ESP, the Environmental Report does not preclude future consideration and evaluation of rail service.

SECTION 4.5, RADIATION EXPOSURE TO CONSTRUCTION WORKERS

Request:

E4.5-1 Section 4.5.4, p. 4.5-2. Provide a site map showing the locations (with respect to the existing plant) of the nine "inner ring" TLDs described in Section 4.5.3.3 and Table 4.5-4 of the ESP application.

Response:

The GGNS Annual Radiological Environmental Operating Report (AREOR) provides the location of the "inner ring" TLDs. Refer to the figure on page 17 of Reference 2 of Section 4.5.6 of the ER; the GGNS 2001 Annual Radiological Environmental Operating Report. (NRC ADAMS Accession Number ML021200537)

Request:

E4.5-2 Section 4.5.4, p. 4.5-3. Section 4.5.4 of the ER provides the expected dose rates at various locations around the existing Grand Gulf unit where construction workers will be during the construction of the first new unit. Using these expected dose rates and the estimated construction work force, provide a table (similar in format to Table 4.5-6) showing the expected dose to construction workers from the construction of the first new unit. Include all dose contributions from N-16 shine, the condensate storage tank, and any other radiation sources.

Response:

The proposed location of the power block and normal heat sink cooling towers are shown on Figure 2.3-1 of the ER. These areas are to the west of the existing unit; the power block area is several hundred ft. from the GGNS Unit 1 Protected Area (PA) fence, and to the cooling tower location from the PA is over 1000 ft. Other proposed construction areas are indicated to the south of the proposed power block location, to the east of the existing GGNS Unit 1 facility, and at the Mississippi River east shore. Each of these proposed construction areas to the south and east are more than 250 ft. from the nearest PA_TLD location (see ER Fig. 4.5-1 – grid shown on the figure is in 1000 ft. increments).

Table 4.5-5 indicates a maximum TLD reading on the PA fence of about 106 mrem/qtr. This includes a background average of approximately 10-12 mrem/qtr. as noted in Section 4.5.4. Given that the construction areas are spread around the existing facility, and that the majority of work is estimated to be done on the west side of GGNS Unit 1 in the lower dose areas, it is considered reasonable to use an average of all the TLDs (approximately 37.5 mrem/qtr.) to determine dose for all areas proposed for new construction. Considering an occupational exposure period of 2080 hours per year, and a construction work force of 3,150 (see Table 3.0-1),

the estimated annual construction work force dose is approximately 112 Person-Rem. Considering the large distance from the TLD locations to the proposed construction areas, actual worker dose would be expected to be much less.

The GGNS Unit 1 Condensate Storage Tank is within the PA fence, so the TLD readings account for this source term. The maximum quarterly total body dose rates from airborne releases is given in the 2001 GGNS Annual Radiological Effluent Release Report (Reference 3 of the ER Section 4.5.6; NRC ADAMS Accession Number ML021150807) as 1.32E-01 mrem/yr. This dose rate results in insignificant dose to a similar size construction force by comparison to the direct radiation dose estimated using the TLD readings along the PA (approximately 0.1 Person-Rem annually).

Liquid effluents are released to the MS River via the discharge at the existing barge slip. Whole body dose reported in the 2001 GGNS Annual Radiological Effluent Release Report (Reference 3 of the ER Section 4.5.6; NRC ADAMS Accession Number ML021150807) on an annual basis is 1.80E-02 mrem. Again this results in an insignificant contribution of approximately 0.06 Person-Rem on an annual basis for a work force of 3,150 people.

Request:

E4.5-3 **Section 4.5.5, p. 4.5.3.** Section 4.5.5 of the ER state that the information in Table 4.5-6 (estimated dose to construction workers from skyshine dose rates) is based on a study done of the estimated exposure of construction workers on GGNS Unit 2 from radiation emitted from GGNS Unit 1. Because GGNS Unit 1 first began operation in the mid 1980s and this study is probably at least 20 years old, justify the use of data from that study.

a) Verify that the number of person-hours and the representative dose rates from this study (and listed in Table 4.5-6) are still valid and can be used to accurately estimate the dose received by construction workers working on a second new unit from the first new unit.

b) In addition to the contribution from skyshine, verify that the dose rates listed in Table 4.5-6 include any contribution from airborne and liquid releases as well as from other contained sources from the first new unit.

The estimated doses to construction workers at a second new unit should also reflect the contribution of any radiation sources from the existing Grand Gulf unit.

Response:

Using the direct radiation dose rate data from the GGNS Protected Area TLDs cited in the ER and in RAI 4.5-2 above, a comparison is made to the dose rates

given in Table 4.5-6 for areas in the table that correspond to the proposed new facility construction areas.

Area	GGNS Study Dose Rate (mrem/hr)	Dose Rate from PA TLDs (mrem/hr)	Comments
Administration Building	0.025	0.0052	Located in Sector R in Fig. 4.5-1 at approx. coordinates 10,500 N and 9,500 E. TLD in Sectors A, Q and R read approx. background.
Switchyard	0.056	0.037	East of GGNS Unit 1. Use avg. of TLDs of Sectors E, F, G, at 82 mrem/qtr above background.
Batch Plant	0.0086	0.037	Use avg. of TLDs of Sectors G, & H at 83 mrem/qtr above background – conservative.

Other areas in Table 4.5-6 that are inside the GGNS U1 protected area (Main Transformer, warehouse, and the last four line items) are included in the table for information only; that is, there would be no new facility construction activities inside the U1 protected area. As can be seen from the table above, the dose rates in the proposed construction areas of the switchyard and the Administration Building area are much less than those in the previous study. The batch plant area is higher, but no credit is taken for distance, which would reduce the dose rate to much less than the value in Table 4.5-6 of the ER, probably near background. Therefore, the GGNS Unit 1/2 study results are considerable reasonable indicators for the construction areas which coincide to those proposed for new construction. As shown in the response to RAI E4.5-2, the total annual estimated dose to the construction work force, conservatively using the average of all TLD readings, is about 112 Person-Rem.

Sub-item a) Response:

The data shown in the table was considered reasonable for the purposes of illustrating that the total dose to a construction work force would be reasonably low. However, the data as presented do not directly relate to the construction of a new facility as discussed above. Occupational dose to construction workers is provided as a part of the response to E4.5-6 below, and therefore, Table 4.5-6 will be deleted.

Sub-item b) Response:

As discussed in the GGNS Unit 1 UFSAR, Section 12.4, skyshine is the predominant contributor to construction worker dose; other sources are insignificant. Thus Table 4.5-6, replicated from the GGNS Unit 1 UFSAR Table 12.4.10, includes only the dose contribution from skyshine. As noted in the UFSAR, and as shown in the response to RAI E4.5-2 above, contributions from the Condensate Storage Tank and from airborne and liquid releases are insignificant. Contained sources from a "first new unit" would not be included

since the table is based on GGNS Units 1 and 2 only and was not modified for use in the application.

Doses to workers on a "second new unit" are discussed qualitatively in the ER to illustrate that it is expected that the dose would be low, as was demonstrated in the GGNS UFSAR for GGNS Unit 2 construction. Since the type of reactor unit to be constructed as the "first new unit" is not defined, speculation about dose from a "second new unit" can be only that. Therefore, to prevent further confusion about this, this discussion will be deleted. Should it be necessary to evaluate occupational dose to construction workers due to operation of a new facility (i.e., a multi-unit facility is planned with operation of the first unit before construction completion of all units), this would be done at COL. Coincident effects from GGNS Unit 1, if required, would also be considered.

Request:

E4.5-4 Table 4.5-1. Verify why the units for total body dose and skin dose are given in mrem/yr instead of in mrem. In this section of the same table, what is the source of the direct radiation measurements given?

Response:

See Cover Letter Reference 4, Radiological/Severe Accidents/Transportation Issues, Item 3.

Request:

E4.5-5 Section 4.5.3.3, p.4.5-2. In the ESP application it is stated that the TLD data for the year 2001 (as shown in Tables 4.5-3 through 4.5-5) was used to estimate the direct radiation dose at locations surrounding GGNS Unit 1. Justify the reasons for using the four quarters of TLD data for 2001 (as opposed to using TLD data from other recent years) as bounding data for estimating the direct radiation dose around GGNS Unit 1. Because the TLD readings at the protected area boundary (listed in Table 4.5-5) are especially dependant on the plant power level due to their proximity to the plant, revise Table 4.5-5 to indicate the average plant capacity factor of GGNS Unit 1 during each of the calendar quarters listed.

Response:

More recent data than for year 2001 was not available at the time this analysis was prepared; thus year 2001 data were used. These data are considered reasonable for the intended use in support of the ESP Application. The table below includes data (annual averages) from the GGNS Annual Radiological Environmental Operating Report (AREOR) for year 2002 (NRC ADAMS Accession Number ML031120162), and also includes similar data for years 1999 and 2000. The average of all four years, and the average of years 2000, 2001 and 2002, are shown in the table. The average for years 2000, 2001 and 2002 is about the same as the year 2001 data (see last column in the table for difference between year 2001 data

and the 3 years average); therefore, year 2001 data is considered representative for the site for the purposes of the ESP evaluations.

		Annual Mean						
TLD Station	Figure 4.5-1 Sector	1999 (mrem/ qtr)	2000 (mrem/ qtr)	2001 (mrem/ qtr)	2002 (mrem/ qtr)	Annual Average 1999 - 2002	Annual Average 2000 – 2002	Difference - 2001 to Annual Avg. of 2000-2002
M-61	D	40.6	64.6	54.7	53.9	53.5	57.7	-3.0
M-62	E	47.5	86.7	75.5	78.2	72.0	80.1	-4.6
M-63	N	13	16.7	16.3	17.1	15.8	16.7	-0.4
M-64	M	15.9	21.9	19.8	19.6	19.3	20.4	-0.6
M-65	L	13.5	18.1	17.3	16.8	16.4	17.4	-0.1
M-66	K	16.2	23.2	20.1	20.4	20.0	21.2	-1.1
M-67	J	17	23.8	20.9	19.4	20.3	21.4	-0.5
M-68	H	5.3	97.9	82.2	82.6	67.0	87.6	-5.4
M-69	G	71.3	123.7	106.1	101.5	100.7	110.4	-4.3
M-70	F	63.9	112.5	95.8	96.5	92.2	101.6	-5.8
M-71	C	19.7	31.6	25	22.1	24.6	26.2	-1.2
M-72	B	15.5	22.3	19	17.2	18.5	19.5	-0.5
M-74	Q	9.2	10.9	9.9	10.1	10.0	10.3	-0.4
M-76	A	11.9	16.8	14.9	13.7	14.3	15.1	-0.2
M-77	R	8.3	10.2	9.7	8.5	9.2	9.5	0.2
M-81	P	10.1	9.7	10.2	8.4	9.6	9.4	0.8
Average All		23.7	43.2	37.3	36.6	35.2	39.0	-1.7

The data by quarter is not used; rather, the annual average data are used for the evaluations. As stated above, the average for the three years 2000, 2001 and 2002 approximately equals the year 2001 data.

From the web site:
http://www.eia.doe.gov/cneaf/nuclear/page/at_a_glance/reactors/grand_gulf.html information relative to GGNS capacity factor is provided.

"In 2001, the plant .... achieved a 93.6 percent average annual capacity factor."

Also, Revision 15 of NUREG-1350, Appendix A, page 105, indicates average capacity factor for Grand Gulf for years 1997 through 2002 as follows: 102.9%, 82.0%, 79.9%, 100.6%, 93.6% and 95.1%, respectively. Average for years 2000 through 2002 is 96.4%. Adjusting the 2001 data for capacity factor would increase the readings by only about 7%, which is not significant. Year 2000 TLD readings are highest, consistent with the higher capacity factor; however, 100% capacity factor is not typical and, therefore, use of the unadjusted 2001 data, which approximates the three-year average, is considered reasonable and justified.

Request:

E4.5-6 **Section 4.5.4.** Section 4.5.4 of the ER states that the annual construction worker doses attributable to the operation of GGNS Unit 1 for the proposed construction areas for a new facility would be a small fraction of the 10 CFR 20 or 10 CFR 50 Appendix I limits. Include tables at the end of Section 4.5 that provide the following information to verify this statement:

a. The annual estimated construction worker doses to an individual. This table should contain the contributions to the whole body dose, critical organ dose, and TEDE for each of the contributing sources of radiation (i.e. direct radiation, and gaseous and liquid effluents).

b. Comparison of the construction worker public does to 10 CFR 20.1301 criteria.

c. Comparison of the construction worker occupational dose to 10 CFR 20.1201 criteria.

d. Comparison with 10 CFR50, Appendix I criteria for effluent doses.

Response:

Tables will be added to Section 4.5 to show the comparison of estimated construction worker dose to the appropriate limits. Dose is calculated from the cited reference in Section 4.5; i.e., the GGNS Annual Radioactive Effluent Release Report (2001) (NRC ADAMS Accession Number ML021150807) and the GGNS Annual Radiological Environmental Operating Report (2001) (NRC ADAMS Accession Number ML021200537).

Draft revised text of ER Section 4.5, and draft new tables for Section 4.5 are included on the enclosed CD-ROM. A copy of the GGNS reports used as input to determine the above doses is also included.

See files: 021_ER_Rev-1draft_7-16-2004.pdf
031_Table 4.5-1_thru_4.5-11_Draft-Rev1.pdf

SECTION 5.2, WATER-RELATED IMPACTS

Request:

E5.2-1 Section 5.2.3 (Water Use/Water Quality Regulations). Provide documentation of any consultations regarding CWA Section 404 certifications.

Response:

There was no consultation with any agency concerning a CWA Section 404 permit. Since no construction activities were planned as a part of the ESP evaluation of the site, it is premature to enter into consultation at this time. The USACE expressed their agreement in a conversation concerning wetlands and the NRC site audit. Any consultation, including wetlands delineation is only good for a 2-year period, after which the process must be repeated. As stated in Section 1.2 of the ER, the consultations and permitting activities will take place at COL.

Request:

E5.2-2 Section 5.2.3 (Water Use/Water Quality Regulations). Provide documentation of any consultations regarding CWA Section 401 certifications.

Response:

There was no consultation with any agency concerning a CWA Section 401 permit. Since no construction activities were planned as a part of the ESP evaluation of the site, it was considered premature to enter into consultation at this time. The USACE expressed their agreement in a conversation concerning wetlands and the NRC site audit. As stated in Section 1.2 of the ER, the consultations and permitting activities will take place at COL.

Request:

E5.2-3 Section 5.2.3 (Water Use/Water Quality Regulations). Provide documentation of any consultations regarding CZMA.

Response:

No formal consultation regarding Coastal Zone Management Act (CZMA) was conducted.

Request:

E5.2-4 Section 5.2.3 (Water Use/Water Quality Regulations). Provide documentation of any consultations regarding NPDES permitting.

Response:

No formal consultation regarding National Pollutant Discharge Elimination System (NPDES) permitting was conducted.

Request:

E5.2-5 Section 5.2.1.3 (Water Returns/Discharges). The application states the new outfall will be surface discharge. Provide the rationale for selecting a shoreline surface discharge in lieu of an offshore submerged discharge.

Response:

The rationale for selecting a shoreline surface discharge in lieu of an offshore submerged discharge is similar to that presented in the GGNS FER, Section 10.3, included as an attachment to this response. The proposed discharge for the ESP facility is similar to that described in the GGNS FER for a single port shoreline discharge, in that it would be discharging to an open free-flowing discharge during low river levels, and would be submerged at times of high river levels.

From 3.4.2.2 of the ESP ER:
"An effluent (cooling tower(s) blowdown, excess service water return, etc.) discharge would be located downstream from the embayment and inlet screens to avoid recirculation of effluents into the river water intake. An outfall diffuser, located at the termination point of the discharge line, would be used to enhance distribution and cooling of the effluent, and to minimize thermal impacts to the river in the area of the discharge outfall. Dilution and dissipation of the discharge heat as well as other effluent constituents are affected by both the design of the discharge structure and the flow characteristics of the receiving water (river). For this evaluation it was assumed that the effluent discharge outfall would be located approximately 500 to 600 ft downstream of the intake screens, and at approximately 30 ft above the low water reference plane for the Mississippi River (Figure 2.3-21)."

A surface discharge is consistent with regards to the design of the existing plant's discharge to the river, and is conservative with regards to thermal impacts on the river environment.

SECTION 5.3, COOLING SYSTEM IMPACTS

Request:

E5.3-1 **Section 5.3.2.1 (Thermal Description and Physical Impacts).**
Provide input files (electronic) for CORMIX model simulations.

Response:

See Cover Letter Reference 4, Hydrology Issues, Request Item 1.

SECTION 5.4, RADIOLOGICAL IMPACTS OF NORMAL OPERATIONS

Request:

E5.4-1 **Section 5.4.2, p. 5.4-3 (Radiation Doses to Members of the Public).** ESRP Section 5.4.2 identifies the need for information on occupational radiation dose estimates. Provide occupational dose estimates for the plant parameter envelope reactor designs.

Response:

Refer to the responses to E4.5-x RAIs regarding estimated dose to construction workers. Section 5.4.2 will be revised to provide cross-reference to Section 4.5 for occupation doses.

See file: 021_ER_Rev-1draft_7-16-2004.pdf

Request:

E5.4-2 Provide data for milk production that were used in the GASPAR runs for miles 0-1, 1-2, 2-3, 3-4, 4-5, 5-10 (see Table 5.4-5 of the Grand Gulf ER). If there is no production in these areas, so state.

Response:

See Cover Letter Reference 4, Radiological/Severe Accidents/Transportation Issues, Request Item 1.

Request:

E5.4-3 Provide the site-specific values used in the GASPAR run for the following:

a. Distance to N.E. Corner of US (Maine) in miles

b. Fraction of year leafy vegetables are grown

c. Fraction of year cows are on pasture

d. Fraction of crop from garden

e. Fraction of daily intake of cows derived from pasture while on pasture

f. Humidity over growing season

g. Average Temp over growing season

h. Fraction of year goats are on pasture

i. Fraction of daily intake of goats derived from pasture on pasture

j. Fraction of year beef cattle on pasture

k. Fraction of daily intake of beef cattle derived from pasture while on pasture.

If default values were used, so state.

Response:

See Cover Letter Reference 4, Radiological/Severe Accidents/Transportation Issues, Request Item 1.

Request:

E5.4-4 Provide Special Location Parameters, if any additional to Tables 2.7-117 and 5.4-11 A in the environmental report.

Response:

See Cover Letter Reference 4, Radiological/Severe Accidents/Transportation Issues, Request Item 1.

Request:

E5.4-5 Provide Reconcentration data used as input for LADTAP runs to include: 1) effluent discharge rate from impoundment receiving water body; 2) total impoundment volume; 3) model used (completely mixed, plug-flow or partially-mixed).

Response:

See Cover Letter Reference 4, Radiological/Severe Accidents/Transportation Issues, Request Item 1.

Request:

E5.4-6 Provide ALARA Analysis Information used in LADTAP runs to include: shore-width factor, dilution factors and transit times.

Response:

See Cover Letter Reference 4, Radiological/Severe Accidents/Transportation Issues, Request Item 1.

Request:

E5.4-7 Provide Population Usage information used in LADTAP runs for determining population dose estimates in Table 5.4-10 of the Environmental Report. This information should include annual usage estimates (person-h/y), dilution factors and transit times for the drinking water, shoreline, swimming and boating pathways.

Response:

See Cover Letter Reference 4, Radiological/Severe Accidents/Transportation Issues, Request Item 1.

Request:

E5.4-8 For biota calculation in LADTAP, provide the dilution factor and transit time to the release location used in LADTAP runs.

Response:

See Cover Letter Reference 4, Radiological/Severe Accidents/Transportation Issues, Request Item 1.

SECTION 5.8, SOCIOECONOMIC IMPACTS

Request:

E5.8-1 Section 5.8.3, Reference 3. Mosby, Waldron A, GGNS Unit 1, 2003, Distribution of GGNS Employees, Email to Michael D. Bourgeois, Entergy Nuclear Potomac, Inc., April 3, 2003. Provide a copy of the record of this communication.

Response:

See Cover Letter Reference 3, Socioeconomic Issues, Request Item 22.

Request:

E5.8-2 General. Provide the basis for the assumption in the ER that 50% of the plant workforce at a new nuclear plant at the Grand Gulf site would come from the 50 miles surrounding Grand Gulf.

Response:

"The peak construction work force for a new facility is estimated to be 3,150 workers. The majority of construction worker in-migrants and their families would settle into developed metropolitan areas, or the associated suburbs, such as Vicksburg (Warren County), Natchez (Adams County), and Clinton/Jackson (Hinds County). These three counties have a combined year 2000 population of over 300,000 people. Assuming that 50 percent of the construction workforce would move into the region, with an average family size of four (4), an estimated 6,300 people would move to within 50 miles of the GGNS site. This represents approximately 2 percent of the year 2000 population for Warren, Adams, and Hinds Counties." (ESP ER Section 4.4.2, page 4.4-3)

The in-migration estimate of 50 percent of the construction workforce was based on professional judgment. The estimate was arrived at considering the following:

- The total population of the three county area was over 300,000 people according to the 2000 census.
- It is reasonable to assume that some portion of the required work force would come from local area residents already integrated into the current population residing in a 50 mile radius about the site.
- Given the distribution of the current GGNS work force, one can assume that the bulk of the in-migrating workforce would locate their residences in the more populated areas. As discussed in the ER, the impacts would be expected to be distributed and small.

- The area includes developed metropolitan areas, including Vicksburg, Natchez, Clinton, and Jackson, Mississippi. Workers with basic construction skills (heavy equipment operators, carpenters, electricians, plumbers, etc.) and some contingent of specialized skilled workers would be available from these areas.
- Skilled workers available from the areas around the site that support outages for GGNS Unit 1 would be available to support the construction efforts also.
- Workers with the specialized skills required for construction of a nuclear reactor and associated facilities would be the most probable in-migrants.

It is our professional judgment that this in-migration fraction is acceptable for the purposes of the ESP ER; it is felt that the 50% fraction is not likely to be significantly different. More importantly, if a larger portion of the required work force were in-migrating, the resultant incremental population change would still remain a relatively small percentage of the population within 50 miles of the GGNS site, and the resulting socioeconomic impacts would be expected to be small and distributed throughout the region. The transportation infrastructure near the GGNS site in Claiborne County may experience a greater impact with a large in-migrating workforce, however, the road system in the vicinity of the GGNS site has been substantially upgraded in recent years (for example, the four-lane improvements to US Highway 61).

SECTION 9.0, ALTERNATIVE SITES

Request:

E9.2-2 Section 9.2.2.5.2. Would disposal of wastes from a coal plant on the Grand Gulf property be feasible and acceptable given the close proximity of floodplain and the Mississippi River?

Response:

The solid wastes generated by a conventional coal-fired plant would be fly ash, bottom ash, selective catalytic reduction (SCR) catalyst (used for control of oxides of nitrogen [NO_x]), and SO_2 scrubber sludge/waste. A coal facility equivalent in size to the nuclear facility(s) evaluated in the ESP Environmental Report would generate significant amounts of ash on an annual basis. The SCR would generate spent catalyst material that would have high concentrations of metals that are removed from the fly ash. A new coal-fired facility would also result in the generation of significant amounts of scrubber sludge on an annual basis. Facilities would have to be constructed to control and treat leachate from ash and from scrubber waste-disposal areas and runoff from coal-storage areas.

Due to the significant acreage generally required for coal-fired plant waste, disposal would be problematic at the Grand Gulf site given the close proximity of the floodplain and the Mississippi River. SERI has not evaluated whether such a proposition could be feasible or acceptable under current federal and state licensing and permit regulations.

Request:

E9.2-3 Section 9.2.2.6.1. The ESP application states that the closest natural gas line is 4.75 miles from the Grand Gulf site. Does this line carry sufficient natural gas to provide fuel for a 2000 MWe natural gas-fired plant sited at Grand Gulf? If not, how far would it be to the nearest source of an adequate natural gas supply?

Response:

SERI has not thoroughly investigated the resources necessary or available to construct a natural gas-fired plant at the Grand Gulf site. Studies similar to those for transmission line evaluations would be necessary and would be outside the business objectives of SERI (see cover letter Reference 6, response to RAI 9.0-1).

Enclosed are more specific drawings showing the gas lines in the vicinity of the Grand Gulf site. Entergy Mississippi owns and operates Baxter Wilson Units 1 and 2 (550 and 771 MWe respectively) which are natural gas-fired plants (primary fuel) located in Vicksburg, MS.

See files: 018_Ct_32_jefferson.pdf
019_Ct_11_claiborne.pdf
020_Ct_75_warren.pdf

Request:

E9.3-1 Section 9.3. During the onsite visit at Grand Gulf of April 13, Entergy Environmental Specialist, Don Crawley, referred to the Entergy Forester, Jim Monk (in Jackson), regarding to the possibility that he and/or his forestry staff may have incidentally observed black bears on the River Bend site. If such anecdotal sightings have been made, please provide any of the following information, if available (i.e. who made the observation, the date, and specific location). Please indicate whether sighting information is typically reported to the U.S. Fish and Wildlife Service or state Natural Heritage Program office.

Response:

There have been no official black bear sightings made by any Forestry personnel and no bear prints have been observed on the River Bend Station (RBS) property. As with Grand Gulf Nuclear Station, all information is relayed to the appropriate State or Federal agencies. There have been sightings on other properties of Entergy (Ft. Adams), not too far from RBS. One of the collared females that was released last year in Louisiana, across the river, is reported to be in the area of Ft. Adams/Angola. However, this will not be confirmed until later in the year when an aerial flight takes place.

Request:

E9.3-2 Section 9.3. During the onsite visit at River Bend April 15, Entergy Environmental Specialist, Buddy Michure, reported that he and/or his staff had seen one or more black bear and panther on the River Bend site, and requested that he be contacted for the specific sighting information. Provide any of the following from these sightings, if available (i.e. the species, who made the observation, the date, and specific location). Please indicate whether sighting information is typically reported to the U.S. Fish and Wildlife Service or the state Natural Heritage Program office.

Response:

Several personnel involved with hunting clubs were contacted regarding any sightings of the black bear on the River Bend Station (RBS) property. Based on conversation with them, there have been no sightings. If there is a bear sighting on the property, RBS will notify the U.S. Fish and Wildlife Service since personnel are aware that they are to promptly notify site management of these sightings.

Request:

E9.3-3 Section 9.3. Provide copies of the two Site Selection Committee Meeting reports, one from September and one from December 2001.

Response:

See Cover Letter Reference 3, Alternatives Issues, Request Item 1 through 4.

Request:

E9.3-3 Section 9.3.4. During the NRC site visit, Entergy personnel indicated they could provide a summary flow chart showing how its various siting screening criteria were applied to eliminate candidate sites. Provide this chart if possible.

Response:

See Cover Letter Reference 3, Alternatives Issues, Request Item 3.

Request:

E9.3-4 Section 9.3.4. During the NRC site visit, Entergy personnel explained that the company's original intention was to submit an early site permit application for both a northern and a southern site and that, consequently, both northern and southern sites were included in the region of interest. Subsequently, Entergy decided to apply for an early site permit only for a southern site, with Grand Gulf as the company's preferred site. Nevertheless, two northern plants (FitzPatrick and Pilgrim) were included as candidate sites in the site screening process. Provide further rationale why the two northern sites were included as candidate sites, given the company's decision to only submit one early site permit application for a southern site.

Response:

See Cover Letter Reference 3, Alternatives Issues, Request Item 1 & 2.

Request:

E9.3-5 Section 9.3.4. The results of Entergy's preliminary site screening are shown in Table 2 of Section 1 of the Entergy "Early Site Permit Selection Committee Notebook." The Arkansas Nuclear One and the Waterford 3 sites had a higher composite rating than the Pilgrim site, yet both Arkansas Nuclear One and Waterford were eliminated at the preliminary screening stage. The Pilgrim site was retained for detailed site screening in spite of its lower composite rating and even though Entergy found "that population data for Pilgrim indicates that there may be population densities around the site that exceed the NRC guideline of 500 persons/square mile within 20 miles of the plant." Provide further rationale, beyond the fact that Entergy originally intended to submit an ESP application for both a northern and southern site, for including Pilgrim in the detailed site screening while excluding the Arkansas Nuclear One and Waterford 3 sites.

Response:

See Cover Letter Reference 3, Alternatives Issues, Request Item 1 through 3.

Request:

E9.3-6 Section 9.3. ESRP Sections 9.3 and 9.4.3 identify the need for information regarding presence of habitats, including wetlands, on each of the alternate sites and their transmission line corridors, and potential impacts to the same for each of the alternate sites. None of this information is currently provided in Section 9.3 of the ER. Please provide an estimate of the number of acres of each habitat type that would be disturbed at each alternate site. (Alternatively, provide electronic versions of aerial photos that display the habitats on each alternate site and a GIS layer of polygons representing Grand Gulf ESP facilities and laydown yards, etc. that can be superimposed on the aerial photos to derive the above estimates.)

Response:

SERI does not have wildlife habitat information for the existing Grand Gulf transmission line right-of-ways. The transmission lines in the immediate vicinity of the existing Grand Gulf Nuclear Station are owned by Entergy Mississippi, Inc.

ADDITIONAL INFORMATION AND UPDATES

1. Figure 2.4-3 of the Environmental Report contains a description of the types of terrestrial habitat on the GGNS site. Bottomland and upland habitat are indicated. During the Environmental Site Visit on April 12 and 13, it was pointed out that the legend descriptions on the figure that indicate acreage for "Bottomland Palustrine, Scrub-Shrub, Seasonally Flooded – 10 Acres" and "Bottomland Palustrine, Emergent, Seasonally Flooded – 30 Acres" appeared to be reversed. Review of the figure confirmed the editorial error. Figure 2.4-3 will be revised to correct this editorial error. Included on the CD-ROM are the draft figure changes.

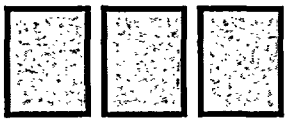
   See files: 037_2.4-3.DWG
   038_2.4-3a.tif
   039_2.4-3b.tif

2. Based on the question provided in RAI E2.7-2 above and a review of the corresponding data tables in the ESP Site Safety Analysis Report (SSAR), it was determined that changes are required to Tables 2.3-1 and 2.3-2 of the SSAR similar to those which will be made to ER Tables 2.7-1 and 2.7-2; see attached files for draft changes to SSAR Tables 2.3-1 and 2.3-2. Additionally, Reference 3 in the SSAR for Section 2.3 will be updated to indicate Vicksburg data through year 2003 as shown in the attached file

   See files: 034_Draft-R1_SSAR_Tables 2.3-1_and_2.3-2_7-16-04.pdf
   035_SSAR_2.3Refs_DraftRev-1_July16-2004.pdf

3. Based on meteorological section RAIs on the SSAR, Section 2.3, several tables were revised as indicated in CNRO-2004-0041 (Cover Letter Reference 5). Some of these same tables exist in the ER, and therefore, are included on the CD-ROM enclosed herewith. This includes ER Tables 2.7-3, 2.7-4, 2.7-8 and 2.7-13.

   See file: 022_Tables 2.7-1_thru_2.7-120_Draft-Rev1_7-16-2004.pdf



XEROX

Administrator

Document Name:	Untitled
Printing Time:	10/20/04 08:50:34
Copies Requested:	1
Virtual Printer:	dt6180/6180hold
Printed For:	Administrator

Job Messages

XEROX

Administrator

Document Name: Untitled

%%[Error: ioerror; OffendingCommand: image]%%

Enhanced Xerox PostScript Error Handler v1.5 Thu Apr 29 3:52 pm 1993

ERROR: ioerror
OFFENDING COMMAND: image

THE OBJECTS ON THE TOP OF THE OPERAND STACK WERE:
—nostringval—

THE SOURCE LINES FOLLOWING THE ERROR ARE:
grestore

myfile closefile

grestore

showpage

%%Page: 3

EXTRA INFORMATION TO AID IN DEBUGGING THIS ERROR:

PostScript: ioerror:

An error has occurred during some attempt to access a file.

Details:

An exception other than end-of-file has occurred during execution of one of the file operators. The nature of the exception is environment dependent, but may include such events as parity or checksum errors, or broken network connections. Attempting to write to an input file or to a file that has been closed will also cause an ioerror. Occurrence of an ioerror does not cause the file to become closed unless it was already closed or the error occurs during closefile.

Recovery:

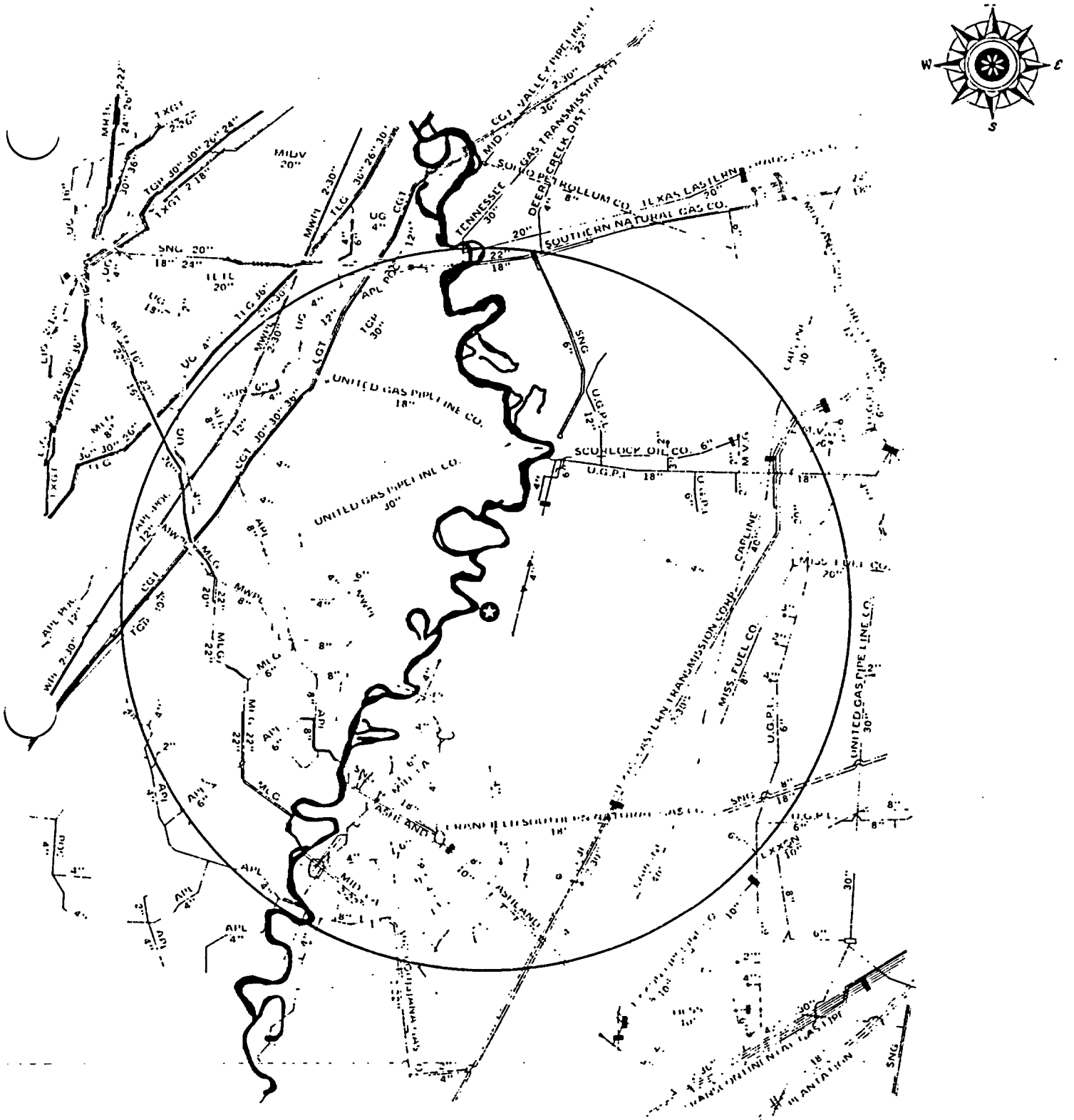
1. Use the bytesavailable operator on the file to the file's existence and confirm that its size is not zero.

Job Messages

2. Use the status operator to confirm that the file is still valid.

3. Check issues external to PostScript interpreter (such as network connection and hardware integrity).

%%[Flushing: rest of job (to end-of-file) will be ignored]%%



▲ — ISOLATION VALVES - ROCKWELL TYPE

0 6 12 18 24 30

SCALE IN MILES

Volume 08
Section 09

08-S-09-4
Revision: 9
Date: 8/18/03

ENVIRONMENTAL INSTRUCTION

NPDES SAMPLING

NON-SAFETY RELATED

Prepared: _____

Reviewed: _____
Technical

Approved: _____
Chemistry Superintendent

This procedure has been reviewed for 10CFR50.59 applicability (Reference GIN96/00872). The review concluded that further review of changes to this procedure under 10CFR50.59 is not necessary."

List of Effective Pages:

Pages 1-10

Attachments I, II, III

List of TCNs Incorporated:

Revision	TCN
0	None
1	None
2	None
3	None
4	None
5	None
6	None
7	None
8	1
9	None

Title: NPDES Sampling	No.: 08-S-09-4	Revision: 9	Page: i

RPTS FORM

10CFR50.59 Review Required?	( ) Yes	If Yes, attach 50.59 Review Form
	(✓) No	Not required per LI-101

Cross-Discipline review required?	( ) Yes	(Note affected Departments Below)
	(✓) No	
Preparer Initials>>>	CG	

Department Cross-Discipline Reviews Needed	**Signoff** (signed, electronic, telcon)

Does this directive contain Tech Spec Triggers? ( ) YES (✓) NO

REQUIREMENTS CROSS-REFERENCE LIST

Requirement Implemented by Directive		Directive Paragraph Number
Name	Paragraph Number	That Implements Requirement
(LCTS 32477)	GEXO-95/00490, Pg 2 of 4, Action 2	1.1
NPDES Permit	Part 1	*
CR-GGN-1999-0486	Corrective Action 1	6.6.1a.(3)
CR-GGN-1999-0486	Corrective Action 3	6.6.1
CR-GGN-1999-0486	Corrective Action 2	6.7
40 CFR 136.3	Table II	Att. II

* Covered by directive as a whole or by various paragraphs of the directive.

NOTE

The Component Data Base Change Request statement is applicable only to Volume 06 and 07 maintenance directives.

Component Data Base Change Request generated and the backup documentation available for setpoint and/or calibration data only ☐ Yes ☑N/A CDBCR # _____

Current Revision Statement

Revision 9 incorporates NPDES permit renewal changes an makes editorial changes for clarity.

1.0 SAMPLING REQUIREMENTS

1.1 Collect and analyze water samples according to NPDES requirements. Effluent sampling is limited to those required and described in the GGNS NPDES Permit (LCTS 32477), unless directed otherwise by MDEQ or Chemistry Superintendent.

2.0 REFERENCES

2.1 National Pollutant Discharge Elimination System (NPDES) Permit No. MS0029521

2.2 Section Instruction 08-S-04-343, Free and Total Chlorine

2.3 Section Instruction 08-S-04-346, Total Suspended Solids

2.4 ISCO Open Channel Flow Measuring Handbook, 1st Ed., Douglas M. Grant, Instrumentation Specialities Company, Lincoln, Nebraska, 1978

2.5 Chemical Engineers' Handbook, 5th Ed., Perry & Chilton, McGraw-Hill, Inc., 1973

2.6 Administrative Procedure 01-S-08-12, Monitoring and Control of Non-Radiological Discharges

2.7 Spencer Engineer's "Discharge Characteristics for Sedimentation Basins A and B at GGNS", February 1991

2.8 Metcalf & Eddy, Inc., Wastewater Engineering, McGraw-Hill Book Co., New York, 1972

2.9 Shelley, P.E. and G. A. Kirkpatrick, Sewer Flow Measurement, U.S. EPA (EPA-600/2-75-027), 1975

2.10 Section Instruction 08-S-09-03, Chlorine Analysis

2.11 pH Meter Operation Lab Guide #2001-055-01, or current revision

2.12 Section Procedure 08-S-08-5, Environmental Reporting

3.0 DEFINITIONS

3.1 Commonly Used Terms:

3.1.1 Composite Sample - A mixture of grab samples collected at the same sampling point at different times, typically 24 hours. This may be done using an automatic mechanical sampler or by manually collecting grab samples.

3.1.2 Grab Sample - Individual samples collected from an effluent stream at a particular time and place and can represent only the composition of the source at that time and place.

3.1.3 DMR - Discharge Monitoring Report. Data sheet supplied to the State listing analytical results and monitoring requirements for each Outfall.

3.1.4 Field Sheet - Any forms used to collect or document measurements at an outfall. These may include notesheets, logbooks, roundsheets or other materials. See Section 6.6.

3.1.5 Manual Composite - A specified number of grab samples collected in a sequence defined by the NPDES Permit.

3.1.6 MDEQ - Mississippi Department of Environmental Quality.

3.1.7 NPDES - National Pollutant Discharge Elimination System.

3.1.8 PDS - The PDS is a computerized data acquisition and information processing system. Its primary purpose it to provide information about various plant systems by sensing the output of numerous field instruments and converting organizing that information into useful user-oriented displays.

3.1.9 Outfall - Effluent with monitoring requirements determined by NPDES permit. May be a body of water, a drain or a sewer. These are typically identified using a three digit number and referred to as Outfall Serial Number (OSN).

3.1.10 Thermal Monitoring - Measurement of temperatures of the Mississippi River within and surrounding the plant discharge and mixing zone.

3.1.11 Wing Wall - The outlet for the storm drain system into Sedimentation Basin B.

3.1.12 Weir - An obstruction built across an open channel over which water flows, usually through an opening or a notch, used to measure flow.

4.0 PREREQUISITES

4.1 Attachment I, II, or III, or similar

4.2 Calibrated temperature detector, if required

4.3 Boat and related safety equipment [see Operational Checklist Attachment III, Pg. 5], if required

4.4 Portable sampler, if required, [ISCO sampler, or similar]

4.5 Sample containers and permanent markers

4.6 Shipping containers and supplies such as labels and tape, if required

4.7 Chlorine and pH instruments

4.8 Ruler or other flow measuring device, if required

4.9 Disposable gloves, if required

4.10 Field Sheet, logbooks or similar documentation for measurements.

5.0 PRECAUTIONS

5.1 Precautions applicable to all outfalls:

5.1.1 When shipping samples, especially those preserved with acid, Department of Transportation regulations may apply. (See Attachment II)

5.1.2 Use a radio or other means of communication when performing field work. Establish communications before traveling in remote areas or before traversing ladders, scaffolding or other equipment/areas of potential risk and where assistance may be required. Use caution during wet or icy conditions.

5.1.3 Radio communications are not allowed in the immediate proximity of continuous flow and temperature monitoring instrumentation.

5.1.4 Plant must be in power operations (mode 1) when thermal monitoring is performed.

5.1.5 Continually observe gratings, pipes, rocks and other areas for snakes, spiders, alligators or other hazards, during sampling.

5.1.6 There shall be no discharge of floating solids or visible foam other than trace amounts and no visible oil or chemical sheen on the surface of receiving waters.

> NOTE
>
> Each Outfall has specific discharge limitations and conditions. The NPDES permit should be reviewed before sampling and when interpreting results.

5.2 Precautions applicable to specific outfalls:

5.2.1 Outfall 001:

a. Because of potential low level radioactivity in Discharge Basin samples during a liquid Radwaste discharge:

(1) Gloves may be worn when collecting or handling the sample.

(2) Samples should not be stored in Environmental Laboratory and should be carefully handled to prevent spills.

b. When using a sample pump ensure representative samples are collected by allowing the lines to flush approximately three volumes prior to collecting sample.

c. Due to possible presence of explosive gases, open flames, sparks and smoking are not permitted in the vicinity of the Discharge Basin Outfall building. (This is a small area with a lot of equipment. Use caution and watch for hazards, such as tripping).

5.2.1 (Cont.)

d. Samples may be bailed from the Discharge pipe manhole or collected at the discharge pipe outlet (if accessible). When bailing through the man hole take precautions to minimize the loss of sampling equipment in the swift current.

5.2.2 Outfall 007:

a. Wet areas of the ditch are very slick with algae and are a serious fall hazard.

b. Lower equipment down with a rope if using the ladder.

5.2.3 Outfall 010:

a. Because of the potential bio-hazards from human wastes, precautions including personal protective equipment (gloves) should be used when sampling the sewage treatment plant effluent.

6.0 INSTRUCTIONS

6.1 Label sample container using the following guidelines:

6.1.1 OUTFALL NUMBER (as applicable)

6.1.2 COLLECTION TIME/DATE - Enter sample collection time and date.

6.1.3 COLLECTED BY - Enter sample collector's initials.

6.1.4 Indicate if the sample is chemically preserved, "Fixed".

6.2 Sampling Locations:

6.2.1 001: Discharge Basin. Parking lot A, Yard elevation 133'. NPDES samples may be collected from the manhole or the discharge pipe at the barge slip, if accessible. Also, a pump may be used, when practical.

6.2.2 002: Unit 1 Cooling Tower blowdown. Cooling tower blowdown discharge line.

6.2.3 004 and 005: Standby Service Water (SSW) A and B, respectively. Samples may be collected from the basins or recirculation/discharge pumps.

6.2.4 006: Low Volume Waste Basin (Settling Pond). Samples may be collected from the basin or from the sample point on the recirculation line. The preferred location is the recirculation line.

6.2.5 007: Storm Water. Weir wall and/or Storm Drain as directed by the Chemistry Superintendent or Designee.

6.2.6 010: Sewage Treatment Plant. Near effluent weir as directed by the Chemistry Superintendent or Designee.

6.2.7 011: Liquid Radwaste. Sample is collected by Plant Chemistry personnel and data is forwarded to the NPDES Specialist.

6.2.8 013 and 014: Sedimentation Basins A and B, respectively. Samples are collected at the weir of each basin.

6.2.9 016: Energy Services Center (ESC) wastewater. Effluent pipe at top of flume adjacent to helipad.

6.2.10 Thermal monitoring: See attachment III.

6.3 Sample Frequencies

6.3.1 Required sample frequencies and parameters are listed for each outfall in the NPDES Permit. Parameters and limits may also be referenced on field sheets, discharge permits or similar documentation. Additional samples may also be required. Consult the Chemistry Superintendent or NPDES specialist before sampling to verify requirements.

6.4 Sample Collection

6.4.1 Continuous Flow and Temperature Monitoring

a. Outfall 001 requires continuous monitoring of flow and temperature. Information is documented on strip charts. The paper is changed as needed. Replacement paper is stock number GG89220004 (paper, chart tracor, Westronics) or equivalent. In addition, the PDS system may also be used to document flow and temperature. Documentation from these various sources must be retained in the NPDES files for inspection.

b. Outfall 010 requires continuous flow monitoring. These recorders are maintained by Treatment Plant operators. Data is distributed monthly to Plant Chemistry for inclusion into DMRs.

c. If any of these recorders fail or provide suspect data, inform the Chemistry Superintendent or the NPDES Specialist.

6.4.2 Instantaneous Flow and Temperature Monitoring

a. Other outfalls require periodic flow determinations, as specified by the NPDES Permit. These may include weirs, flumes, flow monitors, pump logs, manual measurements in pipes, or other accepted practice. Attachment I provides additional guidance for determining flow.

b. Temperature monitoring, when required, is as directed by the NPDES Permit, MDEQ, the Chemistry Superintendent, or designee.

c. Enter data collected from instantaneous measurements on field sheet or logbook.

6.4.3 pH

a. Ensure meter performance is acceptable by performing a functional check and standardization as directed in Reference 2.11 before sampling. Document all measurements in the appropriate log book.

b. Analyze in accordance with applicable chemistry directives and:

(1) Measure by immersing probe in effluent stream provided there is sufficient flow, otherwise collect the sample in a clean container and cap tightly.

(2) Analyze sample within 30 minutes or collect and analyze another sample.

c. Enter data on field sheet and logbook.

6.4.4 Chlorine (Cl^-)

a. Chlorine in aqueous solutions is not stable and exposure to light or agitation accelerates reduction of chlorine, determinations should be made in accordance with Reference 2.2 or 2.10 as soon as possible after sampling. If sample is not analyzed within 30 minutes, collect and analyze another sample.

b. Enter data on field sheet and logbook.

6.4.5 Total Suspended Solids (TSS)

a. Sample container may be a glass or plastic bottle varying in volume from 250 ml to 1,000 ml.

b. Rinse container and empty.

c. Fill container, cap tightly, and secure cap with tape before shipping.

d. Cool sample(s) to $\leq 4°C$.

e. Analyze sample(s) within 7 days. Ship sample(s) to a vendor or offsite lab for analysis (See Step 6.5).

6.4.6 Oil and Grease (O&G)

a. Use only a 1 liter amber glass sample container and caps lined with teflon, unless directed otherwise by laboratory.

b. Rinse sample container and empty, unless container is pre-rinsed and fixed by the lab. In this case rinsing is optional.

c. Fill container with sample, cap tightly, and secure cap with tape before shipping.

6.4.6 (Cont.)

d. Preserve sample(s) using sulfuric acid to a pH ≤ 2.0 unless otherwise directed by offsite vendor laboratory. Typically 1.0 ml H_2SO_4 per 1,000 ml of sample is sufficient.

e. Cool sample(s) to ≤ 4°C.

f. Analyze sample(s) within 28 days. Ship sample(s) to a vendor or offsite lab for analysis (See Step 6.5).

6.4.7 Biochemical Oxygen Demand (BOD_5)

a. For 24-hour composite:

(1) Install and place into operation a portable composite sampler.

(2) Temperature of sampler reservoir must be maintained at no greater than 40°F(4°C) throughout sampling period. Ice may be added to cool reservoir.

(3) After 24 ±2 hours of operation, collect sample as follows:

(a) Rinse a one liter plastic sample container and empty.

(b) Fill container with sample, cap tightly and secure cap with tape before shipping.

b. For grab samples:

(1) Rinse container and empty.

(2) Fill container with sample and cap tightly.

c. After collection:

(1) Cool sample(s) to ≤ 4°C.

(2) Analyze sample(s) within 48 hours. Ship sample(s) to a vendor for analysis (See Step 6.5).

6.4.8 Fecal Coliform Bacteria (FCB)

a. Sample must be collected in a sterilized container.

b. Sample container should contain a sterilized dechlorinating agent such as sodium thiosulfate.

> NOTE
>
> Do not handle inside of cap or neck of bottle while sampling. Avoid contamination.

c. Hold container near base, fill without rinsing or overflowing.

6.4.8 (Cont.)

d. Collect to the fill line or as directed by the vendor. Replace cap immediately, and secure.

e. Cool sample to ≤ 4°c.

f. Analyze sample(s) within 6 hours. Ship sample(s) to a vendor for analysis (See Step 6.5).

6.4.9 Metals (Fe, Cu, Zn, etc.)

a. Sample container may be a glass or plastic bottle varying in volume between 250ml and 1,000ml.

b. Rinse container and empty, unless container is pre-rinsed and fixed by the lab. In this case rinsing is optional.

c. Fill container with sample, cap tightly.

d. If needed, acidify sample(s) using nitric acid to pH ≤ 2.0, cap tightly, and secure with tape before shipping. Acid may be added to sample bottle prior to collecting sample provided the bottle is pre-rinsed using polished water. In this instance, omit Step b.

e. Analyze within 6 months for zinc. Consult Chemistry Superintendent or NPDES Specialist for holding times and precautions for metals other than zinc.

f. Ship sample(s) to a vendor for analysis (See Step 6.5).

6.4.10 Thermal Monitoring - When required, and plant is in normal power operation (mode 1), see Attachment III.

6.5 Sample Shipment

6.5.1 Ensure samples are properly labeled and prepared for shipment.

a. Lids should be secured using tape or other material to prevent leakage during shipment.

b. Glass bottles may be wrapped in "bubble wrap" or other protective covering to prevent breakage during shipment.

6.5.2 If required, cool samples during shipment by:

a. Ship containers in an insulated cooler or box.

b. Place bagged ice, frozen ice packs, or other cooling medium along with samples in cooler or insulated box.

6.5.3 Complete Chain of Custody and other shipping forms. (Place copy of shipping paper with samples or affix in an obvious place on the outside of the shipping container.) All NPDES compliance samples require a signed chain of custody form.

a. Sample type

b. Location

c. Date/Time

d. Required analysis

e. Collected by

f. Sample number (if required)

g. Holding Time (if applicable)

6.5.4 Ensure shipping container is labeled with:

a. The proper return and shipping address.

b. Any other labels or marking necessary to inform the shipper of holding times or other particulars that may be vital to preserving sample.

c. Copies of shipping papers, chain of custody forms (if applicable).

6.5.5 Ensure samples and shipping containers meet any applicable State or Federal D.O.T shipping requirements before release. (See Attachment II)

6.6 Records and Reporting

6.6.1 Field Sheets

NOTE
Field sheets should be revised whenever needed and when permit limitations and conditions are modified.

a. Field sheets may be any forms used to document measurements at outfalls. These may include Laboratory logbooks, specially prepared "roundsheets" or other materials. All data should be forwarded to the NPDES Specialist as soon as possible, after collection. (Copies of laboratory logbooks may be obtained by the NPDES Specialist as needed.)

(1) Entries should be made on sheets or logbooks as soon as possible to prevent losing data and requiring a re-sample.

(2) Entries should reflect the actual measurement taken (i.e., 5 ml/second flow).

6.6.1 (Cont.)

(3) Entries should be compared to permit limitations to verify compliance as soon as possible after the measurement is taken.

b. Any analytical data sheets received from vendor or offsite labs should be forwarded to the NPDES Specialist upon receipt.

c. Data is transferred to NPDES data sheets and DMRs. NPDES data sheets may be computerized forms or other forms necessary to organize data in the proper format for transfer to DMRs.

d. Data and DMRs should receive a peer review before forwarding the DMRs for signature and transmittal.

e. All DMR data should be organized and available for inspection at any time.

6.6.2 Reporting

a. Analytical results that do not comply with NPDES Permit limits should be reported to the Chemistry Superintendent.

b. Non-compliance notification should be made as directed in Part II, Section A.3 of the NPDES Permit. (See Reference 2.12)

c. Monitoring results shall be reported as directed in Part I, Section D of the NPDES Permit. (See Reference 2.12)

6.7 Training and Task Performance

6.7.1 Whenever the NPDES Permit is renewed or modified, perform the following actions (Reference PMRQ 50018662):

a. Provide training to personnel involved in measuring compliance limits, or other interested persons, to acquaint them with regulatory changes and new monitoring requirements. This may be documented as directed by the Chemistry Superintendent, or designee.

b. Review tasks associated with NPDES sampling and reporting and verify they are applicable or revise them, as necessary.

7.0 ATTACHMENTS

7.1 Attachment I - Flow Determinations and Conversion

7.2 Attachment II - Dot Shipping Requirements

7.3 Attachment III - Thermal Monitoring Requirements

FLOW DETERMINATIONS AND CONVERSION

If flow data cannot be obtained by described method, use other approved engineering method to calculate or estimate flow.

OUTFALL

001 a. Flow is determined using the strip chart recorder. This is the preferred method for determining average and maximum flow. These measurements are printed on the strip chart every 24 hours. The average 24 hour flow is transferred to a field sheet when the recorder is inspected. Typically, inspections are performed on a daily basis to ensure that the recorder is functioning properly and the continuous monitoring requirement is maintained. These inspections may not be performed on holidays or weekends, but the number for these periods may be obtained by removing and inspecting the strip chart.

b. Average Flow may also be determined using totalizer numbers from the flow monitor. This is the preferred method if the strip chart recorder is inoperable or malfunctioning. These values are also transferred to a field sheet during daily inspections. Because the flow monitor totalizes flow in million gallons, simply subtract the values for any 24 hour period to determine million gallon per day flow:

EXAMPLE

DATE	TIME	TOTALIZER
8/4/97	07:02	647.583 MG
8/5/97	07:02	659.302 MG

659.302 - 647.583 = 11.72 MGD

c. Computer points flow may be calculated using:

(RWPD + BD) - MU = Flow

Where:

RWPD - Radial Well Pump Discharge
BD - Blowdown Flow
MU - Makeup Flow

These values may be obtained from Balance of Plant (BOP) computer points, BOP Computer Point Record Sheet,or Control Room:

RWPD	P475009
BD	N71N031 or N71G031
MU	N71N019 or N71G019

NOTE:

Or add flow from each pump (P47N009A-F,J,K).

d. If flow cannot be obtained from above sources, contact Chemistry Superintendent or designee for alternate method.

FLOW DETERMINATIONS AND CONVERSION

OUTFALL

002 Obtain flow from BOP Computer Point N71N031 (or equivalent) or use equation for Outfall 001 flow and solve for blowdown.

004 Discharge Permit Data
005 Discharge Permit Data
006 Typically flow is determined from pump logs or may be based on volume of basin.
007 Convert measurement to flow using Page 15. At low flow (< 1") flow may be timed and measured.
010 Determined from flow recorder or weir/flume readings. Typically flow data is supplied by Sewage Treatment Plant Operator. Weir and flume readings, if used, can be converted using this attachment.

011 Determined from pump logs. Discharge Permit Data.

013 Convert gauge readings to flow using Pages 5 through 10.

014 Convert gauge readings to flow using Pages 11 through 12.

016 a. Determine flow by timing how long it takes to fill a container of known volume.

Flow in MGD = (ml/min)* (3.8041 x 10 E-7)

b. Estimate flow using known values such as process design discharge value or using land surface area and amount of water on surface.

c. California Pipe - Estimate Flow (Q) in gpm for Outfall 016

Where d = pipe diameter,
a = d minus water depth
Use Page 13, to convert $\frac{a}{d}$ to T
Use Page 14, to convert d to W

$$Q = TW$$

Example: Flow (gpm) 30" pipe* = T x 9.7, where W(30") = 9.7
Let water depth = 2"
d = 30"
Then a = 30" - 2" = 28" and $\frac{a}{d} = \frac{28}{30} = 0.933$

Therefore T = 26
Q = T x 9.7 = 26 x 9.7 = 252.2 gpm

Convert flow from gpm to MGD, MGD = (1440) gpm (E^{-6})

$Q = 252.2 \times 1440 \times E^{-6} = 0.36$ MGD

*For other pipe diameters substitute d measurement for 30". (References 2.8 and 2.9)

FLOW DETERMINATIONS AND CONVERSION
FLOW CONVERSION - DISCHARGE FROM TRIANGULAR V-NOTCH WEIRS

Head (H) in Inches	90° Notch gpm *	MGD	Head (H) in Inches	90° Notch gpm	MGD
1	2.19	0.003	6-3/4	260	0.374
1-1/4	3.83	0.005	7	284	0.409
1-1/2	6.05	0.009	7-1/4	310	0.446
1-3/4	8.89	0.013	7-1/2	338	0.487
2	12.4	0.018	7-3/4	367	0.528
2-1/4	16.7	0.024	8	397	0.572
2-1/2	21.7	0.031	8-1/4	429	0.618
2-3/4	27.5	0.040	8-1/2	462	0.665
3	34.2	0.049	8-3/4	498	0.717
3-1/4	41.8	0.060	9	533	0.768
3-1/2	50.3	0.072	9-1/4	571	0.822
3-3/4	59.7	0.086	9-1/2	610	0.878
4	70.2	0.101	9-3/4	651	0.937
4-1/4	81.7	0.118	10	694	0.999
4-1/2	94.2	0.136	10-1/2	784	1.129
4-3/4	108	0.156	11	880	1.267
5	123	0.177	11-1/2	984	1.417
5-1/4	139	0.200	12	1,094	1.575
5-1/2	156	0.225	12-1/2	1,212	1.745
5-3/4	174	0.251	13	1,337	1.925
6	193	0.278	13-1/2	1,469	2.115
6-1/4	214	0.308	14	1,609	2.317
6-1/2	236	0.340	14-1/2	1,756	2.529

* gpm = gallons per minute

FLOW DETERMINATIONS AND CONVERSION
FLOW CONVERSION - DISCHARGE FROM PARSHALL FLUME*

Head (H) in Feet	gpm **	MGD	Head (H) in Feet	gpm	MGD
0.01	0.359	0.0005	0.26	55.40	0.0798
0.02	1.046	0.0015	0.27	58.73	0.0845
0.03	1.962	0.0028	0.28	62.13	0.0895
0.04	3.062	0.0044	0.29	65.60	0.0945
0.05	4.324	0.0062	0.30	69.13	0.0996
0.06	5.733	0.0083	0.31	72.73	0.1047
0.07	7.277	0.0105	0.32	76.39	0.1100
0.08	8.946	0.0129	0.33	80.11	0.1154
0.09	10.73	0.0155	0.34	83.90	0.1208
0.10	12.63	0.0182	0.35	87.75	0.1264
0.11	14.64	0.0211	0.36	91.66	0.1320
0.12	16.75	0.0241	0.37	95.63	0.1377
0.13	18.96	0.0273	0.38	99.65	0.1435
0.14	21.26	0.0306	0.39	103.7	0.1494
0.15	23.66	0.0341	0.40	107.9	0.1554
0.16	26.14	0.0376	0.41	112.1	0.1614
0.17	28.71	0.0413	0.42	116.3	0.1675
0.18	31.37	0.0452	0.43	120.7	0.1737
0.19	34.10	0.0491	0.44	125.0	0.1800
0.20	36.92	0.0532	0.45	129.4	0.1864
0.21	39.81	0.0573	0.46	133.9	0.1929
0.22	42.79	0.0616	0.47	138.5	0.1994
0.23	45.83	0.0660	0.48	143.0	0.2060
0.24	49.95	0.0705	0.49	147.7	0.2127
0.25	52.14	0.0761	0.50	152.4	0.2194

* Parshall measuring flume with 3" throat width (see Reference 2.7)

** gpm = gallons per minute

FLOW DETERMINATIONS AND CONVERSION
FLOW CONVERSION* FOR OUTFALL 013 USING 6' RECTANGULAR WEIR GAUGE

WEIR GAUGE ELEVATION (FT)	CFS	FLOW GPM	MGD	WEIR GUAGE ELEVATION (FT)	CFS	FLOW GPM	MGD
70.00	0	0	0	70.65	10.0	4488	6.5
70.01	0.02	9	0.01	70.70	11.2	5027	7.2
70.02	0.06	27	0.04	70.75	12.5	5610	8.1
70.03	0.10	45	0.06	70.80	13.1	5880	8.5
70.04	0.16	72	0.10	70.85	11.0	6733	9.7
70.05	0.22	99	0.14				
70.06	0.29	130	0.19	70.90	16.4	7361	10.6
70.07	0.37	166	0.24	70.95	17.7	7944	11.4
70.08	0.45	202	0.29	71.00	19.0	8528	12.3
70.09	0.54	242	0.35	71.05	20.5	9201	13.3
70.10	0.63	283	0.41	71.10	22.0	9874	14.2
70.15	1.2	539	0.8	71.15	23.5	10548	15.2
70.20	1.8	808	1.2	71.20	25.0	11221	16.2
70.25	2.5	1122	1.6	71.25	26.5	11894	17.1
70.30	3.3	1481	2.1	71.30	28.0	12567	18.1
70.35	4.0	1795	2.6	71.35	29.9	13420	19.3
70.40	4.9	2199	3.2	71.40	31.3	14048	20.2
70.45	5.8	2603	3.8	71.45	33.0	14811	21.3
70.50	6.8	3052	4.4	71.50	34.6	15530	22.4
70.55	7.9	3546	5.1				
70.60	8.9	3995	5.8				

*CFS values obtained from Reference 2.7

FLOW DETERMINATIONS AND CONVERSION
FLOW CONVERSION* FOR OUTFALL 013 USING BASIN "A" POOL GAUGE

POOL GAUGE ELEVATION (FT)	FLOW CFS	FLOW MGD	POOL GUAGE ELEVATION (FT)	FLOW CFS	FLOW MGD
78.0	0	0	82.8	136	87.9
78.5	0	0	82.9	155	100.2
79.0	0.5	0.3	83.0	173	111.8
79.5	2	1.3	83.1	195	126.0
80.0	4	2.6	83.2	212	137.0
80.5	7	3.2	83.3	235	151.9
81.0	9.5	6.1	83.4	256	165.5
81.5	11.8	7.6	83.5	280	181.0
81.6	12.0	7.8	83.6	304	196.5
81.7	12.1	7.8	83.7	328	212.0
81.8	13.5	8.7	83.8	352	227.5
81.9	17	11.0	83.9	375	242.4
82.0	25	16.2	83.0	396	256.0
82.1	34	22.0	83.1	420	271.5
82.2	44	28.4	83.2	445	287.6
82.3	57	36.8	84.3	464	299.9
82.4	70	45.2	84.4	488	315.4
82.5	85	54.9	84.5	512	330.9
82.6	102	65.9	84.6	535	345.8
82.7	120	77.6	84.7	558	360.6

*CFS values obtained from Reference 2.7

FLOW DETERMINATIONS AND CONVERSION
FLOW CONVERSION* FOR OUTFALL 013 USING BASIN "A" TAILWATER GAUGE AND BASIN "A" POOL GAUGE

TAILWATER GAUGE ELEVATION (FT)	BASIN "A" POOL GAUGE ELEVATION (FT)	FLOW (CFS)	FLOW (MGD)
73.0	84.0	396	255.9
	84.1	404	261.1
	84.2	412	266.3
	84.3	424	274.0
	84.4	438	283.1
	84.5	452	292.1
	84.6	468	302.5
	84.7	486	314.1
	84.8	506	327.0
	84.9	525	339.3
	85.0	544	351.6
	85.1	567	366.5
	85.2	588	380.0
74.0	83.9	376	243.0
	84.0	381	246.3
	84.1	386	249.5
	84.2	396	255.9
	84.3	402	259.8
	84.4	416	268.9
	84.5	442	285.7
	84.6	450	290.8
	84.7	468	302.5
	84.8	488	315.4
	84.9	508	328.3
	85.0	524	338.7
	85.1	544	351.6
	85.2	564	364.5
75.0	83.8	356	230.1
	83.9	360	232.7
	84.0	368	237.8
	84.1	376	243.0
	84.2	384	248.2
	84.3	400	258.5
	84.4	415	268.2
	84.5	432	279.2
	84.6	448	289.6
	84.7	468	302.5
	84.8	488	315.4
	84.9	508	328.3
	85.0	526	340.0
	85.1	544	351.6
	85.2	554	358.1
76.0	83.7	324	209.4
	83.8	334	215.9
	83.9	336	217.2
	84.0	338	218.5
	84.1	346	223.0
	84.2	352	227.5
	84.3	364	235.3
	84.4	376	243.0
	84.5	392	253.4
	84.6	408	263.7
	84.7	424	274.0
	84.8	444	287.0
	84.9	464	300.0
	85.0	484	312.8
	85.1	508	328.3
	85.2	525	339.3

*CFS values obtained from Reference 2.7
Use only when backwaters from Mississippi River are above 6' Rectangular Weir

FLOW DETERMINATIONS AND CONVERSION
FLOW CONVERSION* FOR OUTFALL 013 USING BASIN "A" TAILWATER GAUGE AND BASIN "A" POOL GAUGE (Continued)

TAILWATER GAUGE ELEVATION (FT)	BASIN "A" POOL GAUGE ELEVATION (FT)	FLOW (CFS)	FLOW (MGD)
77.0	83.6	300	193.9
	83.7	311	201.0
	83.8	312	201.7
	83.9	314	202.9
	84.0	316	204.2
	84.1	325	210.1
	84.2	335	216.5
	84.3	347	224.3
	84.4	360	232.7
	84.5	376	243.0
	84.6	392	253.4
	84.7	410	265.0
	84.8	428	276.6
	84.9	448	289.6
	85.0	468	302.5
	85.1	492	318.0
	85.2	514	332.2
78.0	83.5	280	181.0
	83.6	283	182.9
	83.7	286	184.8
	83.8	288	186.1
	83.9	290	187.4
	84.0	292	188.7
	84.1	300	193.9
	84.2	312	201.7
	84.3	324	209.4
	84.4	336	217.2
	84.5	352	227.5
	84.6	364	235.3
	84.7	388	250.8
	84.8	404	261.1
	84.9	424	274.0
	85.0	444	287.0
	85.1	466	301.2
	85.2	488	315.4
79.0	83.3	232	149.9
	83.4	251	162.2
	83.5	254	162.9
	83.6	257	166.1
	83.7	260	168.0
	83.8	262	169.3
	83.9	265	171.3
	84.0	268	173.2
	84.1	275	177.7
	84.2	284	183.6
	84.3	297	192.0
	84.4	312	201.7
	84.5	326	210.7
	84.6	344	222.3
	84.7	364	235.3
	84.8	384	248.2
	84.9	396	255.9
	85.0	404	261.1
	85.1	424	274.0
	85.2	468	302.5
80.0	83.2	212	137.0
	83.3	215	139.0
	83.4	217	140.3
	83.5	220	142.2
	83.6	223	144.1
	83.7	226	146.1
	83.8	229	148.0
	83.9	232	150.0
	84.0	237	153.2
	84.1	244	157.7
	84.2	256	165.5
	84.3	270	174.5
	84.4	284	183.6
	84.5	300	193.9
	84.6	316	204.2
	84.7	332	214.6
	84.8	352	227.5
	84.9	376	243.0
	85.0	396	255.9
	85.1	416	268.9

*CFS values obtained from Reference 2.7
Use only when backwaters from Mississippi River are above 6' Rectangular Weir

FLOW DETERMINATIONS AND CONVERSION
FLOW CONVERSION* FOR OUTFALL 013 USING BASIN "A" TAILWATER GAUGE AND BASIN "A" POOL GAUGE (Continued)

TAILWATER GAUGE ELEVATION (FT)	BASIN "A" POOL GAUGE ELEVATION (FT)	FLOW (CFS)	FLOW (MGD)
81.0	83.0	170	109.9
	83.1	173	111.8
	83.2	178	115.0
	83.3	182	117.6
	83.4	185	119.6
	83.5	188	121.5
	83.6	191	123.4
	83.7	196	126.7
	83.8	200	129.3
	83.9	204	131.8
	84.0	208	134.4
	84.1	216	139.6
	84.2	228	147.4
	84.3	240	155.1
	84.4	256	165.5
	84.5	270	174.5
	84.6	288	186.1
	84.7	308	199.1
	84.8	328	212.0
	84.9	350	226.2
	85.0	372	240.4
	85.1	396	255.9
	85.2	416	268.9
82.0	82.5	84	54.3
	82.6	92	59.5
	82.7	100	64.6
	82.8	108	69.8
	82.9	112	72.4
	83.0	120	77.6
	83.1	126	81.4
	83.2	131	84.7
	83.3	136	87.9
	83.4	141	91.1
	83.5	146	94.4
82.0 (Cont.)	83.6	151	97.6
	83.7	156	100.8
	83.8	160	103.4
	83.9	164	106.0
	84.0	169	109.2
	84.1	176	113.8
	84.2	188	112.5
	84.3	204	131.8
	84.4	220	142.2
	84.5	236	152.5
	84.6	255	164.8
	84.7	275	177.7
	84.8	296	191.3
	84.9	317	240.9
	85.0	338	218.5
	85.1	359	232.0
	85.2	384	248.2

*CFS values obtained from Reference 2.7
Use only when backwaters from Mississippi River are above 6' Rectangular Weir

FLOW DETERMINATIONS AND CONVERSION
FLOW CONVERSION* FOR OUTFALL 013 USING BASIN "A" TAILWATER GAUGE AND BASIN "A" POOL GAUGE (Continued)

TAILWATER GAUGE ELEVATION (FT)	BASIN "A" POOL GAUGE ELEVATION (FT)	FLOW (CFS)	FLOW (MGD)
83.0	83.0	0	0
	83.1	39	25.2
	83.2	54	34.9
	83.3	64	41.4
	83.4	75	48.5
	83.5	84	54.3
	83.6	93	60.1
	83.7	100	64.6
	83.8	107	69.2
	83.9	114	73.7
	84.0	120	77.6
	84.1	126	81.4
	84.2	144	93.1
	84.3	158	102.1
	84.4	175	113.1
	84.5	192	124.1
	84.6	212	137.0
	84.7	234	151.2
	84.8	256	165.5
	84.9	276	178.4
	85.0	300	193.9
	85.1	326	210.7
	85.2	344	222.3
84.0	**		

*CFS values obtained from Reference 2.7
Use only when backwaters from Mississippi River are above 6' Rectangular Weir

**Spillway Crest Elev 84.0

FLOW DETERMINATIONS AND CONVERSION
FLOW CONVERSION* FOR OUTFALL 014 USING 4' RECTANGULAR WEIR GAUGE

WEIR GAUGE ELEVATION (FT)	CFS	FLOW GPM	MGD	WEIR GUAGE ELEVATION (FT)	CFS	FLOW GPM	MGD
84.40	0	0	0	85.30	10.8	4847	7.0
84.41	0.01	5	0.01	85.35	11.7	5251	7.6
84.42	0.04	18	0.03	85.40	12.6	5655	8.1
84.43	0.07	31	0.05	85.45	13.6	6104	8.8
84.44	0.11	49	0.07	85.50	14.5	6508	9.4
84.45	0.15	67	0.10				
84.46	0.20	90	0.13	85.55	15.5	6957	10.0
84.47	0.25	112	0.16	85.60	16.5	7406	10.7
84.48	0.30	135	0.19	85.65	17.5	7855	11.3
84.49	0.36	162	0.23	85.70	18.5	8303	12.0
84.50	0.42	188	0.27	85.75	19.5	8752	12.6
84.55	0.7	314	0.45	85.80	20.5	9201	13.2
84.60	1.1	494	0.7	85.85	21.5	9650	13.9
84.65	1.6	718	1.0	85.90	22.6	10144	14.6
84.70	2.1	943	1.4				
84.75	2.7	1212	1.8				
84.80	3.3	1481	2.1				
84.85	4.0	1795	2.6				
84.90	4.5	2020	2.9				
84.95	5.2	2334	3.4				
85.00	6.0	2693	3.9				
85.05	6.6	2962	4.3				
85.10	7.5	3366	4.8				
85.15	8.3	3725	5.4				
85.20	9.0	4040	5.8				
85.25	9.9	4443	6.4				

*CFS values obtained from Reference 2.7

FLOW DETERMINATIONS AND CONVERSION
FLOW CONVERSION* FOR OUTFALL 014 USING BASIN "B" POOL GAUGE

POOL GAUGE ELEVATION (FT)	FLOW CFS	MGD
90.0	0	0
90.5	0.5	0.3
91.0	1	0.7
91.5	2	1.3
92.0	3	1.9
92.5	3.5	2.3
92.9	4	2.6
93.0	5	3.2
93.1	7	4.5
93.2	9	5.8
93.3	12	7.8
93.4	15	9.7
93.5	19	12.3
93.6	23	14.9
93.7	28	18.1
93.8	33	21.3
93.9	38	24.6
94.0	45	29.1
94.1	54	34.9
94.2	64	41.4
94.3	82	53.0
94.4	100	64.6
94.5	120	77.6
94.6	136	87.9
94.7	156	100.8
94.8	176	113.8
94.9	196	126.7
95.0	216	139.6
95.5	308	199.1
96.0	432	279.2
96.5	560	361.9

* CFS values obtained from Reference 2.7

FLOW DETERMINATIONS AND CONVERSION
VALUES OF T FOR CALIFORNIA PIPE FLOW FORMULA *

$\frac{a}{d}$	T	$\frac{a}{d}$	T	$\frac{a}{d}$	T
0.00	3900	0.35	1740	0.70	410
0.01	3830	0.36	1690	0.71	380
0.02	3760	0.37	1640	0.72	360
0.03	3690	0.38	1590	0.73	330
0.04	3610	0.39	1540	0.74	310
0.05	3540	0.40	1490	0.75	290
0.06	3470	0.41	1450	0.76	270
0.07	3400	0.42	1400	0.77	250
0.08	3330	0.43	1350	0.78	230
0.09	3260	0.44	1310	0.79	210
0.10	3200	0.45	1270	0.80	100
0.11	3130	0.46	1230	0.81	170
0.12	3070	0.47	1180	0.82	160
0.13	3000	0.48	1140	0.83	140
0.14	2930	0.49	1100	0.84	125
0.15	2870	0.50	1060	0.85	110
0.16	2810	0.51	1020	0.86	97
0.17	2750	0.52	930	0.87	85
0.18	2690	0.53	915	0.88	73
0.19	2630	0.54	905	0.89	61
0.20	2570	0.55	870	0.90	51
0.21	2510	0.56	830	0.91	42
0.22	2450	0.57	800	0.92	34
0.23	2390	0.58	760	0.93	26
0.24	2330	0.59	730	0.94	20
0.25	2270	0.60	700	0.95	14
0.26	2210	0.61	660	0.96	9
0.27	2160	0.62	630	0.97	5
0.28	2100	0.63	600	0.98	3
0.29	2050	0.64	570	0.99	1
0.30	1990	0.65	540	0.9917	0.4811**
0.31	1940	0.66	510	0.9958	0.1307**
0.32	1890	0.67	480		
0.33	1840	0.68	460		
0.34	1790	0.69	430		

* Obtained from References 2.8 and 2.9.

** Calculated for 1/8" and 1/4" water depth in a 30" pipe using formula for T.

Value T calculated from formula $T = 3900 \left(1 - \frac{a}{d}\right)^{1.88}$

FLOW DETERMINATIONS AND CONVERSION VALUES OF W FOR CALIFORNIA PIPE FLOW FORMULA *

Pipe Diameter Inches	d feet	W
3	0.25	0.032
4	0.33	0.064
6	0.50	0.179
8	0.67	0.370
10	0.83	0.630
12	1.00	1.00
14	1.17	1.48
15	1.25	1.74
16	1.33	2.03
18	1.50	2.73
20	1.67	3.57
21	1.75	4.01
22	1.83	4.48
24	2.00	5.58
27	2.25	7.47
30	2.50	9.70
33	2.75	12.29
36	3.00	15.25

* Obtained from References 2.8 and 2.9.

Value W calculated from formula $W = d^{2.47}$

FLOW DETERMINATIONS AND CONVERSION
FLOW CONVERSION FOR OUTFALL 007

FLOW RATE*

(STORM DRAINAGE SYSTEM)

VERSUS

DEPTH

DEPTH (INCHES)	FLOW (GPM)
0	0
½	35
1	155
1½	380
2	700
2½	1140
3	1675
3½	2330
4	3085
4½	3855
5	4945
5½	6035
6	7895
6½	9260
7	10740
7½	12330
8	14010
8½	16725
9	18680
9½	20725
10	22875
10½	25120
11	27470
11½	29895
12	32410
15	49375
18	70820
21	94715
24	118355
30	159005
36	215840

* Flow calculated using Manning formula. (Historical Reference see MWO M2C065).

FLOW DETERMINATIONS AND CONVERSION
OTHER CALCULATIONS

O&G/TSS/Cl-/BOD:

- Determine monthly average and maximum for each parameter and record on NPDES Form.

  Average (O/G or TSS) mg/l* = $\frac{\text{sum of analysis results (mg/l)}}{\text{number of samples collected}}$

  Maximum (O/G or TSS) mg/l = maximum result recorded

Flow:

- MGD (Million gallons per day) = GPD (Gallons per day) x 1.000 E-6
- Determine monthly average and maximum flow. Record on NPDES Form.

  Average Flow = $\frac{\text{sum of flow recordings (MGD**)}}{\text{number of flow observations}}$

  Maximum Flow = maximum flow recorded for month (MGD)

Fecal Coliform:

- Total coliform colonies/100 ml = $\frac{\text{coliform colony counts x 100}}{\text{ml sample filtered}}$
- Calculate and record on NPDES Form geometric mean between:

  (Method 1)***

  Two numbers a, b = $\sqrt{ab} = (ab)^{1/2}$

  n numbers = $(a, a_2 \ldots a_n)^{1/n}$

  (Method 2)***

  Take common log of each sample result, average, then antilog of the average.

*mg/l = milligrams per liter

**MGD = million gallons per day

*** = See Ref 2.5 or similar

DOT SHIPPING REQUIREMENTS*

I. When any sample is to be shipped by common carrier or sent through the United States Mails, it must comply with Department of Transportation (DOT) Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring compliance. For preservation requirements, the Office of Hazardous Materials, Materials Transportation Bureau, Department or Transportation has determined that the Hazardous Materials Regulations do NOT apply to the following materials:

- HCl in water solution at concentrations of 0.04% by weight or less (pH about 1.96 or greater)
- HNO_3 in water solution at concentrations of 0.15% by weight or less (pH about 1.62 or greater)
- H_2SO_4 in water solution at concentratons of 0.35% by weight or less (pH about 1.15 or greater)
- NaOH in water solution at concentrations of 0.080% by weight or less (pH about 12.30 or less)

II. Examples

A. Description: 5 ml HCl in 4 Liters of Cistern Water
Specific Gravity HCl = 1.192 g/ml
Specific Gravity H_2O = 1.0 g/ml
1.192 g/ml x 5 ml = 5.96 g
5.96 g ÷ 4000 g = 0.00149 x 100 = 0.149%

Since the concentration of HCl in this solution is greater than 0.04%, this solution is subject to DOT requirements.

B. Description: 1 ml H_2SO_4 in 1 Quart of water
Specific Gravity H_2SO_4 = 1.84 g/ml
1 Quart = 0.9472 Liters

1.84 g/ml x 1 ml = 1.84 g
1.84 g ÷ 947 g = 0.00194 x 100 = 0.194%

Since the concentration of H_2SO_4 is less than 0.35%, this solution would not be subject to DOT regulation.

III. Based on laboratory tests, Environmental personnel determined that 1 ml H_2SO_4/1000 ml water will produce a pH < 2 and greater than 1.15. The concentration for the above is 0.184%. Therefore this solution would not be subject to DOT regulation.

IV. Samples subject to DOT requirements may be shipped in accordance with 01-S-09-8, Packaging and Shipping. Contact Chemistry Superintendent if assistance is needed.

*40 CFR 136.3, Table II, Footnote 3

THERMAL MONITORING REQUIREMENTS

I. **MONITORING REQUIREMENTS:**

a). Monitoring is performed during discharge of the heated plant effluent in accordance with Part III, Section D.3., of the NPDES Permit.

b). River stages are monitored and documented by chemistry. If a river stage exceeds a Permit monitoring requirement, notify the Chemistry Superintendent, or designee, and perform monitoring.

c). Documentation of river stage is kept with NPDES data file for reporting to and inspection by MDEQ available for inspection at any time.

d). Measurements are taken at the water surface and 5 feet subsurface if possible. The detector may float on the water surface for the surface measurement. Suspend the detector below the surface for the subsurface measurements. [M&TE maintains a specially designed device with an extended stainless steel probe for subsurface river measurements. If this is not available an improvised device may be used.]

e). At each location, allow the thermometer to stabilize before recording measurement.

II. **SAFETY PRECAUTIONS:**

a). Complete the operational checklist for boat operation (attached) to ensure it is functioning safely prior to entering the Mississippi River.

b). Lifejackets must be worn by GGNS employees and provided to non-GGNS employees.

III. **MONITORING LOCATIONS:**

a). Upriver (Point 1):
Approximately 400 feet North of the mouth of the barge slip and not more than 60 feet from the Eastern shoreline, in a depth of water approximately 5 feet.

b). Discharge Outlet:
The plant discharge pipe opening. In periods of high water this may be taken in the vicinity of the discharge plume. This may be indicated by an area of turbulent water near the South shoreline of the barge slip. In periods of low water when a 5' depth measurement is impractical, a measurement may be taken directly from the pipe plume. The location should be noted on the data sheet and an N/A entered in the discharge outlet temperature 5 ft. blank.

c). Barge Slip Outlet:
The opening or "mouth" of the barge slip where waters enter into the Mississippi River. If subsurface sample must be collected at less than 5 feet, note the approximate depth on the data sheet.

d). Downriver (Point 7):
Approximately 100 feet South of the mouth of the barge slip in the mixing zone, approximately not more than 60 feet from the Eastern shoreline, in a depth of water approximately 5 feet.

THERMAL MONITORING REQUIREMENTS

e). Ambient Air Temperature:
This may be a stabilized measurement using a calibrated temperature device or determined from meteorological tower data.

f). Mississippi River Level:
Daily river stage obtained by contacting the U.S. Army Corps of Engineers or the U.S. Weather Service.

g). Outfall 001 Temperature:
Data is an instantaneous reading from the strip chart recorder located at the 001 Outfall.

h). Receiving Water:
Waters outside of the mouth of the barge slip . These include the mixing zone as well as the Mississippi River.

IV. **RECORDS:**

a). Record measurements on a copy of the attached data form, or similar.

b). On completion of measurements forward to Chemistry Superintendent, or designee, for review and signature.

c). Forward completed forms to the NPDES Specialist. This becomes part of the NPDES data file for reporting to and inspection by MDEQ.

V. **TABLES AND FORMS:**

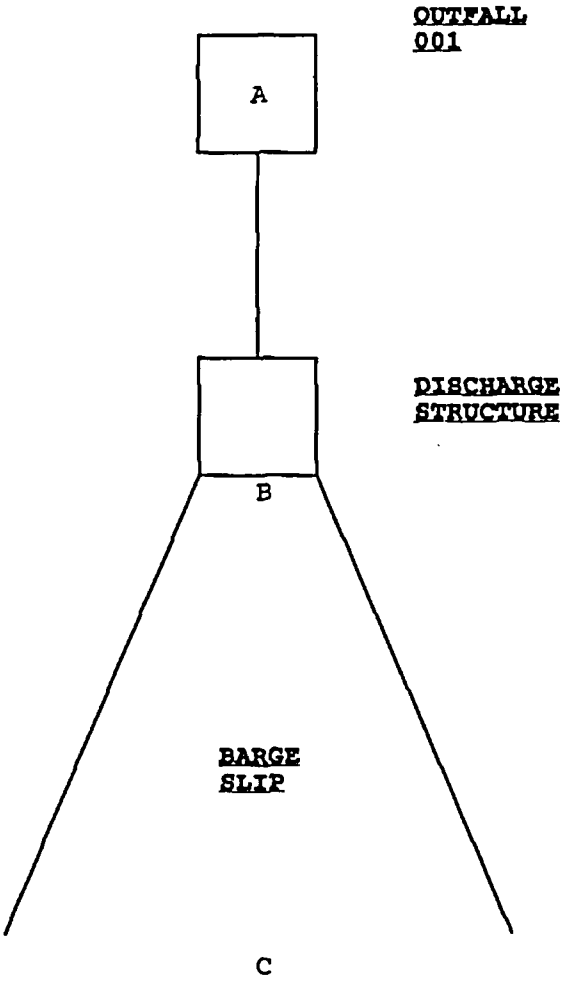
The following items are attached:

THERMAL MONITORING REQUIREMENTS
DISCHARGE PATH LOCATIONS

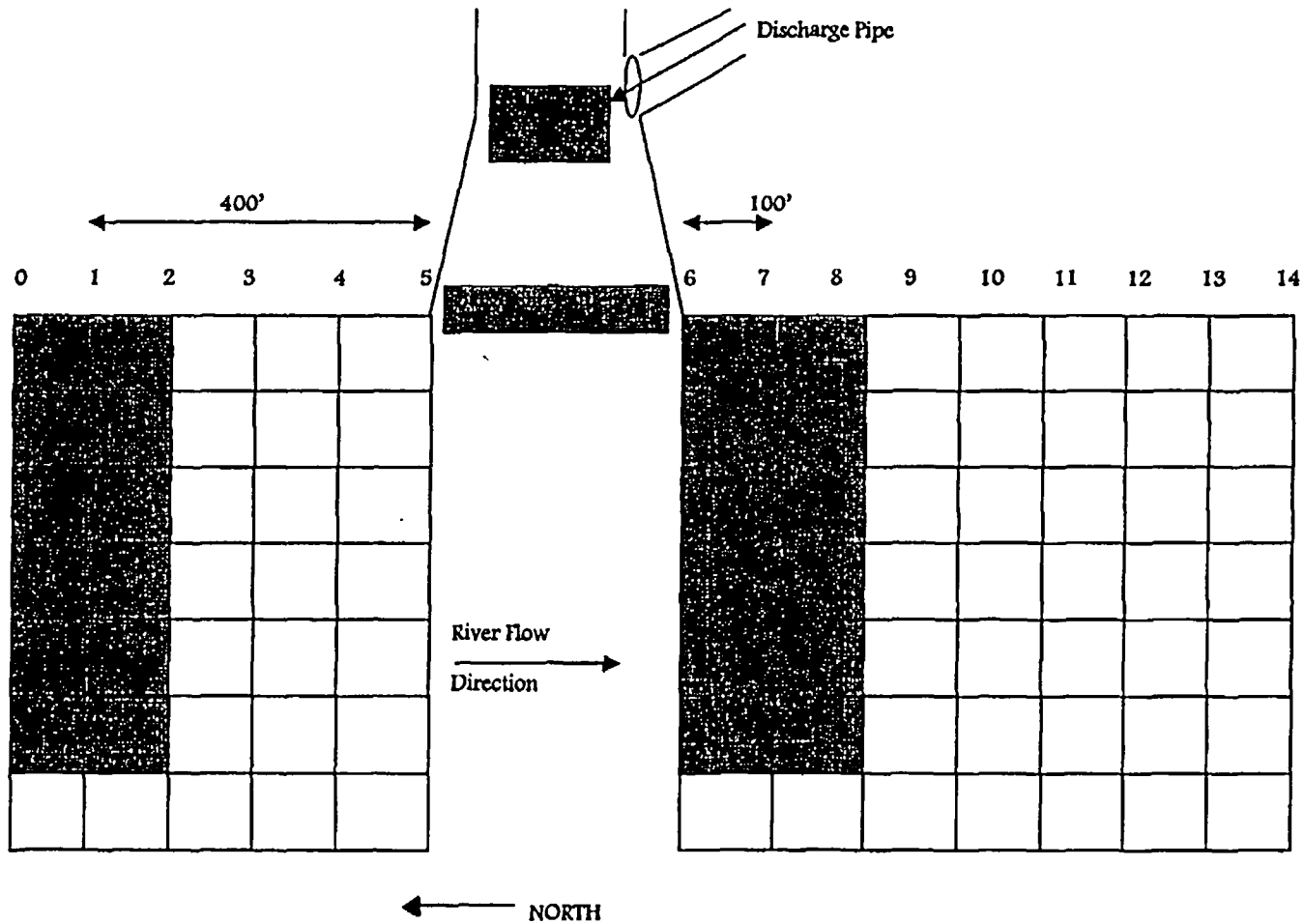
A Installed temperature recorder at Outfall 001

B Discharge Outlet

C Barge Slip Outlet



THERMAL MONITORING REQUIREMENTS
RIVER MEASUREMENT LOCATIONS



THERMAL MONITORING REQUIREMENTS
BOAT OPERATIONAL CHECKLIST

_____Visual Inspection of Hull for Damage

_____Gas Tank greater than 1/4 full (Unleaded gasoline >89 octane level recommended.)

_____Battery charged

_____Sufficient amount of life jackets provided

_____Fire Extinguisher on Board and Charged

_____Two-Way Radio Communication established

_____Paddle provided

_____Boat plug in place

_____Kill switch activated (Do not crank engine when out of water)**

_____Trailer tires aired up

_____Winch rope serviceable

_____Trailer hitch Operational

_____Engine stored in vertical position (If stored at an angle, rain water collects in housing and freezes in Winter.)

_____Outboard lubricant reservoir on outboard motor full of outboard lubricant/oil.

Checked by: _____ /Date
Initials

Reviewed by: _____ /Date
Initials

**When finished, disconnect fuel line with engine running to use residual fuel and avoid gumming engine.

THERMAL MONITORING REQUIREMENTS
THERMAL MONITORING DATA SHEET

I.	Date Performed		_____
II.	Upriver Temperature (Point 1)	Surface	_____ °C
		5 ft	_____ °C
III.	Discharge Outlet Temperature(Note 1)	Surface	_____ °C
		5 ft	_____ °C
IV.	Barge Slip Outlet Temperature(Note 2)	Surface	_____ °C
		5 ft	_____ °C
V.	Downriver Temperature (Point 7) (Receiving Water)	Surface	_____ °C
		5 ft	_____ °C
VI.	Ambient Air Temperature		_____ °C
VII.	River Level at Vicksburg		_____ ft
VIII.	Outfall 001 Recorder Temperature		_____ °C

NOTE:

A. Any temperature measurement in RECEIVING WATER which is equal to or greater than UPRIVER TEMPERATURE +2.8°C must be reported to the Chemistry Superintendent.

B. Any temperature measurement in RECEIVING WATER which exceeds 32.2°C must be reported to the Chemistry Superintendent.

Prepared by _____
Signature/Date

Reviewed by _____
Signature/Date

(Note 1) If the 5 ft. sample is impractical, note location of measurement and N/A the 5 ft blank. (See Page 1, III. b)

(Note 2) If subsurface measurement depth is less than 5 ft. note the approximate depth on the data sheet (See Page 1, III. c)

Entergy
P O Box 756
Port Gibson, MS 39150
Tel 601 437 6409
Fax 601 437 2795

William A Eaton
Vice President
Operations
Grand Gulf Nuclear Station

June 18, 2002

Mr. Milton Brumfield
Department of Environmental Quality
Office of Pollution Control
Post Office Box 10385
Jackson, Mississippi 39289-0385

SUBJECT: Grand Gulf Nuclear Station
NPDES Permit No. MS0029521
NPDES Permit Renewal Application

GEXO-2002/ 00065

Dear Mr Brumfield:

We have enclosed the NPDES Permit Renewal Application for Grand Gulf Nuclear Station (GGNS). Also, we are clarifying and updating descriptions of our existing source waters and requesting modifications to our permit [see enclosure].

If you have questions or require additional information, please contact Mr. Don Crawley at 601/437-2288.

Sincerely,

William A Eaton

cc w/BDB
DKC/JML/BDB/JBE/bcb
attachment: NPDES Permit Renewal Application
cc: Mr. Jay Barkley (MDEQ) w/a
Mr. C. A. Bottemiller w/o
Mr. R. N. Buckley (M-ECH-595) w/a
Mr. Micheal Canerdy (MDEQ) w/a
Mr. Ellis W. Merschoff (NRC) w/o
Mr. W. C. Page (M-ELEC-9A) w/a
Ms. Maya Rao (MDEQ) w/a
File (CENTRAL) [13] 6/19/02
File (CHEM) w/a

enc-ltr4/NPDESPERMITRENEWAL0066

Grand Gulf Nuclear Station

2002 NPDES Permit Application

Prepared by:
The GGNS Chemistry Effluents Group
Port Gibson, MS

NPDES PERMIT RENEWAL APPLICATION PACKAGE

CLARIFICATION OF EXISTING SOURCES

MODIFICATION REQUESTS

ADDITIONAL COMMENTS

EPA FORM 1 – General Information

ATTACHMENT A - Topographic Maps, Site Boundary Maps and Outfall Locations

EPA FORM 2C – OSNs 001,002,004,005,006,007,011,013,014,016

OSN 011 includes supplemental radiological information. To facilitate your review this information is incorporated immediately following the OSN 011 EPA Form 2C.

WATER FLOW SCHEMATICS

EPA FORM 2E – OSN 010

ATTACHMENT B – SSW Multi-grab Composite vs. Quadrant Grab Composites

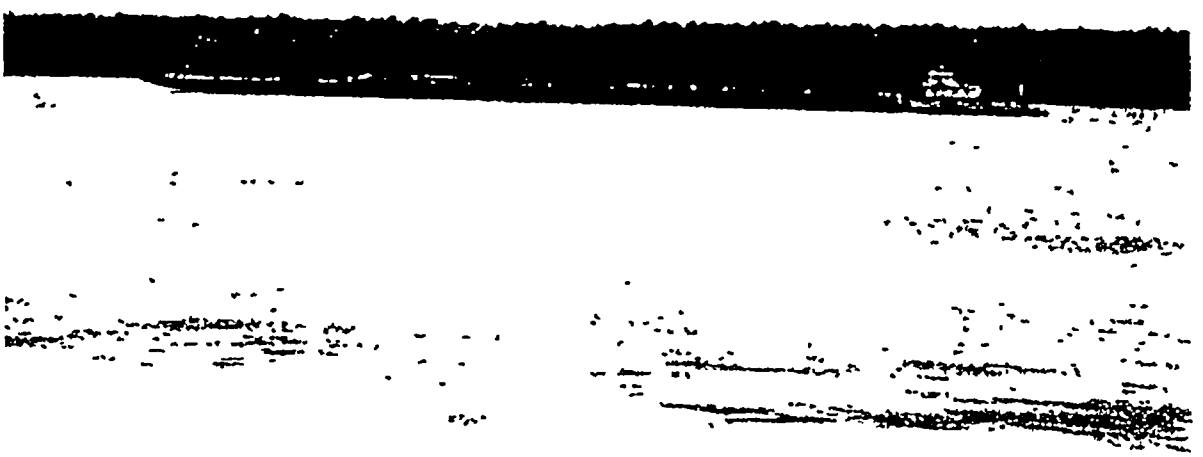
ATTACHMENT C - Thermal Monitoring Reports for Winter and Summer, 2001

Grand Gulf Nuclear Station

2002 NPDES Permit Renewal Application

ATTACHMENT C

2001 Winter and Summer Thermal Monitoring Reports



THERMAL MONITORING PROGRAM

Part III, D, Item 3, Page 31 of 33, of the GGNS NPDES Permit requires measurements of Mississippi River receiving water temperatures, during periods of power generation when specified conditions occur. In addition, the permit standard conditions require monitoring during the summer and winter months during the year preceding the permit renewal [2001]

Because implementing conditions did not otherwise occur, the measurements were performed once during the summer and once during the winter of 2001, as prescribed by the GGNS NPDES Permit. The Thermal Monitoring Data Sheets documenting these exercises are attached Please note in both instances there was no significant thermal influence on receiving waters. For your convenience here is a summary of the results

	UPSTREAM SURFACE [C°]	UPSTREAM SUBMERGED [C°] [5 feet]	DOWNSTREAM SURFACE [C°]	DOWNSTREAM SUBMERGED [C°] [5 feet]
Summer [May – October]	29 3	29 4	29.2	29 2
Winter [November-April]	11 7	11 6	11.7	11 7

THERMAL MONITORING REQUIREMENTS
FORM 1. THERMAL MONITORING DATA SHEET

I.	Date Performed		8/21/01	
II.	Ambient Air Temperature (Probe)		34.5	°C
III.	Outfall 001 Recorder Temperature		32.6	°C
IV.	River Level at Vicksburg		10.1'	°C RS 8/21/01
V.	Discharge Outlet Temperature(1)	Surface	34.6	°C
		5 ft	N/A①	°C
VI.	Barge Slip Outlet Temperature(2)	Surface	31.5	°C
		5 ft	29.8	°C
VII.	Upriver Temperature (Pt 1)	Surface	29.3	°C
		5 ft	29.4	°C
VIII.	Downriver Temperature (Pt 7)	Surface	29.2	°C
		5 ft	29.2	°C

NOTE:

A. Any temperature measurement in SURROUNDING WATER which is equal to or greater than UPRIVER TEMPERATURE +2.8°C must be reported to the Chemistry Superintendent.

B. Any temperature measurement in SURROUNDING WATER which exceeds 32.2°C must be reported to the Chemistry Superintendent.

Prepared by Rusty Shaw 8-21-01
Signature/Date

Reviewed by Craig 8-21-01
Signature/Date

(1) If the 5 ft. sample is impractical, note location of measurement and N/A the 5 ft blank. (See III. b)

(2) If subsurface measurement depth is less than 5 ft note the approximately depth on the data sheet (See III. c)

① Monitoring performed in Pipe Plume. 5' sample was not available due to low river stage.

THERMAL MONITORING REQUIREMENTS
FORM 1. THERMAL MONITORING DATA SHEET

I.	Date Performed		12/6/01	
II.	Ambient Air Temperature		25.3	°C
III.	Outfall 001 Recorder Temperature		30.0	°C
IV.	River Level at Vicksburg		27.5 ft.	°C as 12 hr avg
V.	Discharge Outlet Temperature(1)	Surface	20.0	°C
		5 ft	12.7	°C
VI.	Barge Slip Outlet Temperature(2)	Surface	11.8	°C
		5 ft	11.7	°C
VII.	Upriver Temperature (Pt 1)	Surface	11.7	°C
		5 ft	11.6	°C
VIII.	Downriver Temperature (Pt 7)	Surface	11.7	°C
		5 ft	11.7	°C

NOTE:

A. Any temperature measurement in SURROUNDING WATER which is equal to or greater than UPRIVER TEMPERATURE +2.8°C must be reported to the Chemistry Superintendent.

B. Any temperature measurement in SURROUNDING WATER which exceeds 32.2°C must be reported to the Chemistry Superintendent.

Prepared by Rusty Shaw / 12-6-01
Signature/Date

Reviewed by Crews 12-6-01
Signature/Date

(1) If the 5 ft. sample is impractical, note location of measurement and N/A the 5 ft blank. (See III. b)

(2) If subsurface measurement depth is less than 5 ft. note the approximately depth on the data sheet (See III. c)

STATE OF MISSISSIPPI
WATER POLLUTION CONTROL PERMIT

TO DISCHARGE WASTEWATER IN ACCORDANCE WITH THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

THIS CERTIFIES THAT

Entergy Mississippi Inc, Grand Gulf Nuclear Station
Grand Gulf Road
Port Gibson, Mississippi
Claiborne County

has been granted permission to discharge wastewater into

Outfall 001 – Mississippi River
Outfall 013- Unnamed Tributary to Hamilton Lake
Outfall 014 – Unnamed Tributary to Hamilton Lake

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, and III hereof. This permit is issued in accordance with the provisions of the Mississippi Water Pollution Control Law (Section 49-17-1 et seq.; Mississippi Code of 1972), and the regulations and standards adopted and promulgated thereunder, and under authority granted pursuant to Section 402(b) of the Federal Water Pollution Control Act.

MISSISSIPPI ENVIRONMENTAL QUALITY PERMIT BOARD

AUTHORIZED SIGNATURE

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY

Issued: JUL 24 2003 **Permit No. MS0029521**

Expires: June 30, 2008

2082 PER20020003

Part I.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning **July 24, 2003**, and lasting until **June 30, 2008**, the permittee is authorized to discharge from outfall(s) serial number(s) **001 (Discharge Basin – Inclusive of wastewater from the following Outfalls: 002, 004, 005, 006, and 011 Discharged to the Mississippi River).**

   Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lbs/day)	kg/day (lbs/day)	*Other Units (Specify)*		Measurement Frequency	Sample Type
	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.		
Flow-M^3/Day (MGD)	--	--	Report (MGD)	Report (MGD)	Continuous	Recorder
Temperature °C (°F)	--	--	Report (°F)	Report (°F)	Continuous	Recorder

2. **During outages when the Natural Draft and Auxiliary Cooling Tower has no load and the Plant Service Water (PSW) bypasses the tower and discharges directly to the Discharge Basin through outfall serial no. (OSN) 001, Free Available Chlorine limitations shall be imposed on the discharge at OSN 001. The daily average shall not exceed 0.2 mg/l and the daily maximum shall not exceed 0.5 mg/l which shall be monitored continuously with multiple grab samples taken every 30 minutes following commencement of the bypass until no chlorine is detectable. Time of chlorine discharge shall not exceed a maximum of 120 minutes each day.**

3. The pH shall not be less than 6.5 standard units nor greater than 9.0 standard units and shall be monitored once per week with a grab sample of the effluent.

4. There shall be no discharge of floating solids or visible foam in other than trace amounts.

5. The discharge shall not cause the occurrence of a visible sheen on the surface of the receiving waters.
6. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): **the nearest accessible point following confluence of all wastewaters permitted for discharge at this outfall, but prior to entering or mixing with the receiving waters. However when the Balance of Plant Computer System is utilized to monitor flow and temperature, the samples for each permitted wastewater stream shall be taken after final treatment but prior to entering or mixing with the receiving waters.**
7. **Continuous monitoring for temperature and flow may use either data from the continuous monitors/recorders or the Balance of Plant computer system.**

Permit No. MS0029521

Part I.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning **July 24, 2003**, and lasting until **June 30, 2008**, the permittee is authorized to discharge from outfall(s) serial number(s) **002 (Natural Draft and Auxiliary Cooling Tower Blowdown including waters from ESF Room Cooler flushes).**

   Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lbs/day)	kg/day (lbs/day)	Other Units (Specify)		Measurement Frequency	Sample Type
	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.		
Flow-M^3/Day (MGD)	--	--	Report (MGD)	Report (MGD)	Twice/Month	Instantaneous
Free Available Chlorine	--	--	0.2 mg/l	0.5 mg/l	Continuous	Multiple Grabs[1]
Time of Chlorine Discharge	--	--	Report	120 Min.	Twice/Month[3]	Log
Zinc, Total Recoverable	--	--	1.0 mg/l	1.0 mg/l	Twice/Month	24-Hr. Composite

2. There shall be no discharge of floating solids or visible foam in other than trace amounts.
3. The discharge shall not cause the occurrence of a visible sheen on the surface of the receiving waters.
4. **Addition of any chemical product to the cooling water other than those submitted with the application is prohibited unless prior written approval is obtained in accordance with Part III.C on page 31 of 33. Chemicals used for the maintenance of cooling water chemistry, or otherwise to operate or maintain the cooling water system, shall not cause a violation of the terms and conditions contained in Part III.D.12 on page 33 of 33.**
5. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): **the nearest**

accessible point following blowdown, but prior to mixing any other wastewaters, with the exception of the Treated Liquid Rad wastewater discharged at Outfall Serial No. 011, which may mix with the discharge from Outfall Serial NO. 002 prior to sample collection.

---

[1]Multiple grab samples shall consist of a series of grab samples taken every 30 minutes following startup of blowdown after chlorine addition until no chlorine is detectable.

[2] Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit may discharge free available or total residual chlorine at any one time. The exact time of discharge of free available or total residual chlorine shall be recorded for each unit and reported as required in Part I.D.2.

[3] Start-up of blowdown shall not occur until a series of instantaneous readings indicate that the discharge is in conformance with the permit limitations.

Permit No. MS0029521

Part I.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning **July 24, 2003**, and lasting until **June 30, 2008**, the permittee is authorized to discharge from outfall(s) serial number(s) **004 (Unit A Standby Service Water).**

   Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lbs/day)	kg/day (lbs/day)	Other Units (Specify)			
	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.	Measurement Frequency	Sample Type
Flow-M^3/Day (MGD)	--	--	Report (MGD)	Report (MGD)	1/Batch[1]	Instantaneous
Free Available Chlorine	--	--	0.2 mg/l	0.5 mg/l	1/Batch[2]	Multiple Grabs[3]
Time of Chlorine Discharge[4]	--	--	Report Min.	120 Min.	1/Batch[2]	Log
Zinc, Total Recoverable	--	--	1.0 mg/l	1.0 mg/l	1/Batch	Composite[5]

2. There shall be no discharge of floating solids or visible foam in other than trace amounts.
3. The discharge shall not cause the occurrence of a visible sheen on the surface of the receiving waters.
4. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): **the nearest accessible point following blowdown, but prior to mixing with any other wastewaters.**
5. **Addition of any chemical product to the cooling water other than those submitted with the application is prohibited unless prior**

written approval is obtained in accordance with Part III.C on page 31 of 33. Chemicals used for the maintenance of cooling water chemistry, or otherwise to operate or maintain the cooling water system, shall not cause a violation of the terms and conditions contained in Part III.D.12 on page 33 of 33.

---

[1]The Flow reported shall be the total volume discharged in a 24-hour period.

[2]Monitoring shall be performed daily whenever a batch is discharged. Initiation of discharge shall not occur until a series of *instantaneous readings indicate* the discharge shall be in compliance with permit limitations.

[3]Multiple grab samples shall consist of a series of grab samples taken every 30 minutes following startup of blowdown after chlorine addition until no chlorine is detectable.

[4] Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit may discharge free available or total residual chlorine at any one time. The exact time of discharge of free available or total residual chlorine shall be recorded for each unit and reported as required in Part I.D.2.

[5] If the basin has been recirculated for a timeframe of no less than four (4) hours to allow for adequate mixing within each quadrant, composite will be defined as the combined sample of the four (4) grab samples from each quadrant of the basin. If the basin is not recirculated for a sufficient period of time to allow for adequate mixing within the quadrants, composite will be defined as the combined sample of the three (3) individual grab samples collected at the beginning, middle, and end of the discharge for each batch discharge.

Part I.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning July 24, 2003, and lasting until June 30, 2008, the permittee is authorized to discharge from outfall(s) serial number(s) **005 (Unit B Standby Service Water).**

Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lbs/day)	kg/day (lbs/day)	Other Units (Specify)		Measurement Frequency	Sample Type
	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.		
Flow-M^3/Day (MGD)	–	–	Report (MGD)	Report (MGD)	1/Batch[1]	Instantaneous
Free Available Chlorine	–	–	0.2 mg/l	0.5 mg/l	1/Batch[2]	Multiple Grabs[3]
Time of Chlorine Discharge[4]	–	–	Report Min.	120 Min.	1/Batch[2]	Log
Zinc, Total Recoverable	–	–	1.0 mg/l	1.0 mg/l	1/Batch	Composite[5]

2. There shall be no discharge of floating solids or visible foam in other than trace amounts.
3. The discharge shall not cause the occurrence of a visible sheen on the surface of the receiving waters.
4. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): **the nearest accessible point following blowdown, but prior to mixing with any other wastewaters.**
5. **Addition of any chemical product to the cooling water other than those submitted with the application is prohibited unless prior written approval is obtained in accordance with Part III.C on page 31 of 33. Chemicals used for the maintenance of cooling water**

chemistry, or otherwise to operate or maintain the cooling water system, shall not cause a violation of the terms and conditions contained in Part III.D.12 on page 33 of 33.

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[1]The Flow reported shall be the total volume discharged in a 24-hour period.

[2]Monitoring shall be performed daily whenever a batch is discharged. Initiation of discharge shall not occur until a series of instantaneous readings indicate the discharge shall be in compliance with permit limitations.

[3]Multiple grab samples shall consist of a series of grab samples taken every 30 minutes following startup of blowdown after chlorine addition until no chlorine is detectable.

[4] Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit may discharge free available or total residual chlorine at any one time. The exact time of discharge of free available or total residual chlorine shall be recorded for each unit and reported as required in Part I.D.2.

[5]If the basin has been recirculated for a timeframe of no less than four (4) hours to allow for adequate mixing within each quadrant, composite will be defined as the combined sample of the four (4) grab samples from each quadrant of the basin. If the basin is not recirculated for a sufficient period of time to allow for adequate mixing within the quadrants, composite will be defined as the combined sample of the three (3) individual grab samples collected at the beginning, middle, and end of the discharge for each batch discharge.

Part I.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning **July 24, 2003,** and lasting until **June 30, 2008,** the permittee is authorized to discharge from outfall(s) serial number(s) **006 (Treated Low Volume Wastewater).**

   Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lbs/day)	kg/day (lbs/day)	Other Units (Specify)			
	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.	Measurement Frequency	Sample Type
Flow-M^3/Day (MGD)	--	--	Report (MGD)	Report (MGD)	1/Batch[1]	Instantaneous
Oil and Grease	--	--	15 mg/l	20 mg/l	1/Batch	Grab
Total Suspended Solids	--	--	30 mg/l	100 mg/l	1/Batch	Grab

2. There shall be no discharge of floating solids or visible foam in other than trace amounts.
3. The discharge shall not cause the occurrence of a visible sheen on the surface of the receiving waters.
4. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): **the nearest accessible point following final treatment, but prior to mixing with any other wastewaters.**

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[1]**The Flow reported shall be the total volume discharged in a 24-hour period.**

Part I.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning **July 24, 2003**, and lasting until **June 30, 2008**, the permittee is authorized to discharge from outfall(s) serial number(s) **007 (Miscellaneous Wastewaters Discharged into Sediment Basin B comprised of Building Drains from the Water Treatment Building, Diesel Generator Building, Administration Building, Firewater Pump house, Ionics Reject Water, Turbine Building Cooling Water Blowdown, Administrative Building HVAC cooling tower blowdown, Turbine Building Repeater Room air conditioner once through cooling water, Unit 2 Circulating Water Pit [Standby Service and Rainwater], Water Treatment Building Air Compressor once through outage cooling water, Intermittent Plant Service Water from Pipe Leaks and Maintenance Activities Intermittent releases of Standby Service Water resulting from heat exchanger maintenance activities and Stormwater Runoff).**

Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lbs/day)	kg/day (lbs/day)	Other Units (Specify)		Measurement Frequency	Sample Type
	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.		
Flow-M^3/Day (MGD)	--	--	Report (MGD)	Report (MGD)	Twice/Month	Instantaneous
Total Suspended Solids	--	--	30 mg/l	100 mg/l	Twice/Month	Grab
Oil and Grease	--	--	15 mg/l	20 mg/l	Twice/Month	Grab
Chlorine, Total Residual	--	--	Report (mg/l)	Report (mg/l)	Twice/Month	Grab

2. The pH shall not be less than 6.5 standard units nor greater than 9.0 standard units and shall be monitored twice per month with a grab sample of the effluent

3. There shall be no discharge of floating solids or visible foam in other than trace amounts.
4. The discharge shall not cause the occurrence of a visible sheen on the surface of the receiving waters.
5. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): **the most accessible point following confluence of all separate wastewater streams which discharge at the East Wing Wall but prior to entering or mixing with the waters in Sediment Basin B.**

Permit No. MS0029521

Part I.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning **July 24, 2003**, and lasting until **June 30, 2008**, the permittee is authorized to discharge from outfall(s) serial number(s) **010 (Total Facility Treated Sanitary Wastewater Discharged to Basin A).**

   Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lbs/day)	kg/day (lbs/day)	Other Units (Specify)		Measurement Frequency	Sample Type
	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.		
Flow-M^3/Day (MGD)	--	--	Report (MGD)	Report (MGD)	Continuous	Recorder
BOD_5	--	--	30 mg/l	45 mg/l	Twice/Month	24-Hr. Composite
Total Suspended Solids	--	--	30 mg/l	45 mg/l	Twice/Month	24-Hr. *Composite*
Fecal Coliform Bacteria	--	--	2000/100 ml	4000/100 ml	Twice/Month	Grab
Chlorine, Total Residual	--	--	Report (mg/L)	0.5 mg/L	Twice/Month	Grab

2. The pH shall not be less than **6.5** standard units nor greater than **9.0** standard units and shall be monitored ***twice per month with a grab sample of the effluent***
3. There shall be no discharge of floating solids or visible foam in other than trace amounts.
4. The discharge shall not cause the occurrence of a visible sheen on the surface of the receiving waters.

5. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): **the nearest accessible point inclusive of all wastewaters permitted for discharge at this outfall, but prior to entering or mixing with Basin A.**

Part I.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning **July 24, 2003**, and lasting until **June 30, 2008**, the permittee is authorized to discharge from outfall(s) serial number(s) **011 (Treated Liquid Rad Wastewater. Contributing sources include Dilute Borated Water).**

   Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lbs/day)	kg/day (lbs/day)	Other Units (Specify)			
	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.	Measurement Frequency	Sample Type
Flow-M^3/Day (MGD)	--	--	Report (MGD)	Report (MGD)	Continuous	Pump Logs
Total Suspended Solids	--	--	Report (mg/L)	30 mg/l	Once/Month	Grab

2. There shall be no discharge of floating solids or visible foam in other than trace amounts.
3. The discharge shall not cause the occurrence of a visible sheen on the surface of the receiving waters.
4. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): **the nearest accessible point following final treatment, but prior to entering with any other wastewaters.**

Part I.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning **July 24, 2003**, and lasting until **June 30, 2008**, the permittee is authorized to discharge from outfall(s) serial number(s) **013 (Treated Effluent from Basin A that enters an Unnamed Tributary thence into Hamilton Lake. Contributing Sources of Wastewaters include Effluents from Outfalls 010, 016, Standby Service Water Leakage, and Stormwater Runoff).**

   Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lbs/day)	kg/day (lbs/day)	Other Units (Specify)		Measurement Frequency	Sample Type
	Yearly Avg.	Yearly Max.	Yearly Avg.	Yearly Max.		
Flow-M^3/Day (MGD)	--	--	Report (MGD)	Report (MGD)	Once/Quarter	Instantaneous
Total Suspended Solids	--	--	Report (mg/L)	Report (mg/L)	Once/Quarter	Grab

2. The pH shall not be less than 6.5 standard units nor grater than 9.0 standard units and shall be monitored **once per quarter with a grab sample of the effluent.**
3. There shall be no discharge of floating solids or visible foam in other than trace amounts.
4. The discharge shall not cause the occurrence of a visible sheen on the surface of the receiving waters.
5. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): **the nearest accessible point following final treatment, but prior to entering or mixing with the receiving waters.**

Part I.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. *During the period beginning* **July 24, 2003,** *and lasting until* **June 30, 2008,** the permittee is authorized to discharge from outfall(s) serial number(s) **014 (Treated Effluent from Basin B which enters an Unnamed Tributary thence into Hamilton Lake. Contributing Sources of Wastewaters include Effluents from Outfalls 007, Standby Service Water Leakage, Intermittent Circulating Water Basin Overflows and Stormwater Runoff).**

Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lbs/day)	kg/day (lbs/day)	Other Units (Specify)			
	Yearly Avg.	Yearly Max.	Yearly Avg.	Yearly Max.	Measurement Frequency	Sample Type
Flow-M^3/Day (MGD)	--	--	Report (MGD)	Report (MGD)	Once/Quarter	Instantaneous
Total Suspended Solids	--	--	Report (mg/L)	Report (mg/L)	Once/Quarter	Grab

1. The pH shall not be less than 6.5 standard units nor grater than 9.0 standard units and shall be monitored **once per quarter with a grab sample of the effluent.**
2. There shall be no discharge of floating solids or visible foam in other than trace amounts.
3. The discharge shall not cause the occurrence of a visible sheen on the surface of the receiving waters.
4. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): **the nearest accessible point following final treatment, but prior to entering or mixing with the receiving waters.**

Part I.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning **July 24, 2003**, and lasting until **June 30, 2008**, the permittee is authorized to discharge from outfall(s) serial number(s) **016 (Miscellaneous Wastewaters from the Energy Services Center Inclusive of Water Softener Backwash, Air Conditioning Cooling Tower Blowdown and Stormwater Runoff).**

   Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lbs/day)	kg/day (lbs/day)	Other Units (Specify)		Measurement Frequency	Sample Type
	Daily Avg.	Daily Max.	Yearly Avg.	Yearly Max.		
Flow-M^3/Day (MGD)	--	--	Report (MGD)	Report (MGD)	Twice/Quarter	Instantaneous
Chlorine, Total Residual	--	--	Report (mg/L)	0.5 mg/L	Twice/Quarter	Grab

No chemical treatments containing chloride, zinc, or chromium shall be added to any of the waters subject to discharge at this outfall without prior notification and permitting authority approval in accordance with conditions described in Part III.C. on page 31 of 34.

2. The pH shall not be less than 6.5 standard units nor grater than 9.0 standard units and shall be monitored twice per quarter with a grab sample of the effluent.
3. There shall be no discharge of floating solids or visible foam in other than trace amounts.
4. The discharge shall not cause the occurrence of a visible sheen on the surface of the receiving waters.
5. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): **the nearest accessible point following confluence of all wastewaters permitted for discharge at this outfall, but prior to entering Basin A.**

B. SCHEDULE OF COMPLIANCE

1. The permittee shall achieve compliance with the effluent limitations specified for discharge in accordance with the following schedule:

   a) **Within 360 days after the reissuance of this permit, Part V of Form 2C shall be submitted for the discharges associated with outfalls 013 and 014. For Outfall 013 and Outfall 014, provided in Part V of Form 2C application should be the results of 12 samples taken once per month for Total Recoverable Zinc. If the outfalls are inaccessible for a month during this timeframe or if the sample will not be representative due to seasonal flooding, the facility may take additional samples in the following viable month. Total Recoverable Zinc should be collected with an 8-hour composite of the effluent. The permit may be reopened and modified based upon the analytical results.**

   b) **Within 60 days after the reissuance of this permit, Part V of Form 2C shall be submitted for the discharges associated with outfalls 013 and 014. For Outfalls 013 and Outfall 014, provided in Part V of Form 2C application should be the results of 1 sample take for Benzidine; Benzo(a)Anthracene; Benzo (a) Pyrene; Benzo (b) Fluoranthene; Benzo (k) Fluoranthene; Bis(2-Chloroethyl)Ether; Bis(2-Ethyhexyl) Phthalate; Chrysene; Dibenzo(a,h)Anthracene; 2,4-Dinitrotoluene; and Indeno(1,2,3-cd)Pyrene. Samples for these parameter should be analyzed using the following analytical test methods:**

Parameter	Method	MQL
Benzidine	625	5.0 µg/L
Benzo (a) Anthracene	610	0.05 µg/L
Benzo (a) Pyrene	610	0.1µg/L
Benzo (b) Fluoranthene	610	0.1 µg/L
Benzo (k) Fluoranthene	610	5.0 µg/L
Bis(2-Chloroethyl)Ether	625	5.0 µg/L
Bis(2-Ethyhexyl) Phthalate	625	5.0 µg/L
Chrysene	610	0.5 µg/L
Dibenzo(a,h)Anthracene	610	0.1 µg/L
2,4-Dinitrotoluene	625	5.0 µg/L
Indeno(1,2,3-cd)Pyrene	610	0.1 µg/L

At the permittee's option, alternate approved test methods as per Part I.D.3 in this permit may be substituted if the test method detection levels are equal to or more sensitive than the above methods.

2. Within 14 days after either an interim or final date of compliance specified in Part I. B.1., the permittee shall provide the Permit Board with written notice of his compliance or noncompliance with the requirements or conditions specified to be completed by that date.

   Not Applicable.

C. DEFINITIONS

1. "Monthly average" means the average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during the month. The monthly average for fecal coliform bacteria is the geometric mean of "daily discharges" measured during the calendar month. In computing the geometric mean for fecal coliform bacteria, the value one (1) shall be substituted for sample results of zero.

2. "Daily discharge" means the "discharge of a pollutant" measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurements, the "daily average" is calculated as the average measurement of the discharge of the pollutant over the day.

3. "Daily maximum" means the highest "daily discharge" over a calendar month.

4. "Toxic pollutants" include, but are not limited to: (a) any toxic substance listed in Section 307(a)(1) of the Clean Water Act (CWA), any chemical listed in Section 313(c) of the Superfund Amendments and Reauthorization Act of 1986; and (b) any substance (that is not also a conventional or nonconventional pollutant) for which EPA or the State has published an acute or chronic toxicity criterion.

5. "Hazardous substances" are defined in 40 CFR 116.4.

6. "Quarterly average" means the average of "daily discharges" over a three-month period, calculated as the sum of all "daily discharges" measured during the quarter divided by the number of "daily discharges" measured during the quarter. The quarterly average for fecal coliform bacteria is the geometric mean of "Daily discharges" measured during the quarter. In computing the geometric mean for fecal coliform bacteria, the value of one (1) shall be substituted for a sample results of zero.

7. "Quarterly maximum" means the highest "daily discharge" measured over a three-month period.

8. "Yearly average" means the average of daily discharges" over a calendar year, calculated as the sum of all "daily discharges" measured during the calendar year divided by the number of "daily discharges" measured during the calendar year. The yearly average for fecal coliform bacteria is the geometric mean of the "daily discharges" during the calendar year. In computing the geometric mean for fecal coliform bacteria, the value of one (1) shall be substituted for sample results of zero.

9. "Yearly maximum" means the highest "daily discharge" measured over a calendar year.

D. MONITORING AND REPORTING

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored wastewater.

2. Reporting

a) Monitoring results obtained during the previous month shall be summarized and reported on a Discharge Monitoring Report Form (EPA No. 3320-1) **POSTMARKED NO LATER THAN THE 28TH DAY OF THE MONTH FOLLOWING THE COMPLETED REPORTING PERIOD. THE FIRST REPORT IS DUE ON September 28, 2003.** Copies of these, and all other reports required herein, shall be signed in accordance with Chapter One Sections II.C. and II.E. of the Mississippi Wastewater Permit Regulations, and shall be submitted to the Mississippi Environmental Quality Permit Board at the following address.

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF POLLUTION CONTROL
P. O. Box 10385
Jackson, Mississippi 39289-0385

b) If the results for a given sample analysis are such that any parameter (other than fecal coliform) is not detected at or above the minimum level for the test method used, a value of zero will be used for that sample in calculating an arithmetic mean value for the parameter. If the resulting calculated arithmetic mean value for that reporting period is zero, the permittee shall report "NODI = B" on the DMR. For fecal coliform, a value of 1.0 shall be used in calculating the geometric mean. If the resulting fecal coliform mean value is 1.0, the permittee shall report "NODI = B" on the DMR. For each quantitative sample value that is not detectable, the test method used and the minimum level for that method for that parameter shall be attached to and submitted with the DMR. The permittee shall then be considered in compliance with the appropriate effluent limitation and/or reporting requirement.

c) If the permittee monitors any pollutant as prescribed in the permit more frequently than required by the permit using test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, or as specified in the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Permit Board.

d) Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Permit Board in the permit.

3. Test Procedures

Test procedures for the analysis of pollutants shall conform to regulations published

pursuant to Section 304(h) of the Federal Water Pollution Control Act, as amended or alternative procedures approved and/or promulgated by EPA. For those parameters listed in Exhibit D of the Mississippi Wastewater Permit Regulations, the permittee shall use approved methods with minimum quantification levels as sensitive as those found in Exhibit D of the regulations.

4. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall maintain records of all information obtained from such monitoring including:

a) The exact place, date, and time of sampling;

b) The dates the analyses were performed;

c) The person(s) who performed the analyses;

d) The analytical techniques, procedures or methods used; and

e) The results of all required analyses.

5. Records Retention

All records and results of monitoring activities required by this permit, including calibration and maintenance records, shall be retained by the permittee for a minimum of three (3) years, unless otherwise required or extended by the Permit Board, copies of which shall be furnished to the Department upon request.

6. Falsifying Reports

Any permittee who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required by the Permit Board to be maintained as a condition in a permit, or who alters or falsifies the results obtained by such devices or methods and/or any written report required by or in response to a permit condition, shall be deemed to have violated a permit condition and shall be subject to the penalties provided for a violation of a permit condition pursuant to Section 49-17-43 of the Code.

Part II.

A. MANAGEMENT REQUIREMENTS

1. Facility Expansion and/or Modification

Any facility expansion, production increases, process modifications, changes in discharge volume or location or other changes in operations or conditions of the permittee which may result in a new or increased discharge of waste, shall be reported to the Permit Board by submission of a new application for a permit pursuant to Section II.A. of the Mississippi Wastewater Regulations, or if the discharge does not violate effluent limitations specified in the permit, by submitting to the Permit Board a notice of a new or increased discharge.

2. Duty to Comply 40 CFR 122.41(a)

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

3. Noncompliance Notification

a) Twenty-Four Hour Reporting

(1) The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and/or prevent recurrence of the noncompliance.

(2) The following shall be included as information which must be reported within 24 hours under this paragraph.

i. Any unanticipated bypass which exceeds any effluent limitation in the permit.

ii. Any upset which exceeds any effluent limitation in the permit.

iii. Violation of a maximum daily discharge limitation for any of the pollutants listed by the Permit Board in the permit to be reported within 24 hours.

iv. The Executive Director may waive the written report on a case-by-case basis for reports under paragraph a. of this section if the oral report has been received within 24 hours.

b) Other Noncompliance

The permittee shall report all instances of noncompliance not reported under paragraph (a)., at the time monitoring reports are submitted or within 30 days from the end of the month in which the noncompliance occurs. The reports shall contain the information listed in paragraph (a).

c) Other Information

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Permit Board, it shall promptly submit such facts or information.

4. Proper Operation, Maintenance and Replacement

The permittee shall at all times properly operate, maintain, and when necessary, promptly replace all facilities and systems of collection, treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures. Proper replacement includes maintaining an adequate inventory of replacement equipment and parts for prompt replacement when necessary to maintain continuous collection and treatment of wastewater. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit

5. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of the permit that has a reasonable likelihood of adversely affecting human health or the environment.

6. Bypassing

The permittee shall comply with the terms and conditions regarding bypass found in 40 CFR 122.41(m).

7. Upsets

Permittee shall meet the conditions of 40 CFR 122.41(n) regarding "Upsets" and as follows:

a) Definition. "Upset" means an exceptional incident in which there is unintentional

and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b) Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of paragraph c) of this section are met. Any determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, shall not constitute final administrative action subject to judicial review.

c) Conditions necessary for demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the cause(s) of the upset;

(2) The permitted facility was at the time being properly operated; and

(3) The permittee submitted notice of the upset as required in 40 CFR 122.41(L)(6)(ii)(B)(24-hour notice of noncompliance).

(4) The permittee complied with any remedial measures required under 40 CFR 122.41(d) (Duty to Mitigate).

d) Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

8. Removed Substances

Solids, sludges, filter backwash, or other residuals removed in the course of treatment or control of wastewater shall be disposed of in a manner such as to prevent such materials from entering State waters and in a manner consistent with the Mississippi Solid Waste Disposal Act, the Federal Resource Conservation and Recovery Act, and the Mississippi Water Pollution Control Act.

9. Power Failures

If electric power is required, in order to maintain compliance with the conditions and prohibitions of the permit, the permittee shall either:

a) Provide an alternative power source to operate the wastewater control facilities; or, if such alternative power source is not in existence, and no date for its implementation appears in the permit,

b) Halt, reduce, or otherwise control production and/or all wastewater flows upon reduction, loss, or failure of the primary source of power to the wastewater control facilities.

B. RESPONSIBILITIES

1. Inspection and Entry

The permittee shall allow any authorized Commission representative to enter the permittee's premises at any reasonable time, to have access to and copy any applicable records, to inspect process facilities, treatment works, monitoring methods or equipment or to take samples, as authorized by Section 49-17-29 of the Code. In the event of investigation during an emergency response action, a reasonable time shall be any time of the day or night. Follow-up investigations subsequent to the conclusion of the emergency event shall be conducted at reasonable times.

2. Transfer of Ownership or Control

This permit is not transferable to any person except after proper notice and approval by the Permit Board. In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the permittee shall notify the Mississippi Environmental Quality Permit Board at least thirty (30) days in advance of the proposed transfer date. The notice should include a written agreement between the existing and new permittees containing a specific date for the transfer of permit responsibility, coverage, and liability.

3. Signatory Requirements 40 CFR 122.41(k)

All applications, reports, or information submitted to the Permit Board shall be signed and certified.

a) All permit applications shall be signed as follows:

(1) For a corporation: by a responsible corporate officer. For the purpose of this Section, a responsible corporate officer means: (1) a president, secretary, treasurer or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy - or decision-making function for the corporation, or (2) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding 25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

(2) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

(3) For a municipality, State, Federal, or other public agency: by either a

principal executive officer or ranking elected official.

b) All reports required by the permit and other information requested by the Permit Board shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described above;

(2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and

(3) The written authorization is submitted to the Permit Board.

c) Changes to authorization. If an authorization under paragraph b) of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph b) of this section must be submitted to the Permit Board prior to or together with any reports, information, or applications.

d) Certification. Any person signing a document under paragraphs a) or b) of this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under the direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

4. Availability of Records

Except for data determined to be confidential under the Mississippi Water Pollution Control Law, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the office of the Mississippi Department of Environmental Quality Office of Pollution Control.

5. Duty to Provide Information

The permittee shall furnish to the Permit Board within a reasonable time any relevant information which the Permit Board may request to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit, or to determine compliance

with the permit.

6. Toxic Pollutants

The permittee shall comply with any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) established under Section 307(a) of the Federal Water Pollution Control Act.

7. Toxic Pollutants Notification Requirements

The permittee shall comply with the applicable provisions of 40 CFR 122.42.

8. Civil and Criminal Liability

a) Any person who violates a term, condition or schedule of compliance contained within this permit or the Mississippi Water Pollution Control Law is subject to the actions defined by law.

b) Except as provided in permit conditions on "Bypassing" and "Upsets" (Part II. A.6 and 7), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

c) It shall not be the defense of the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

9. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject to under Section 311 of the Federal Water Pollution Control Act and applicable provisions under Mississippi Law pertaining to transportation, storage, treatment, or spillage of oil or hazardous substances.

10. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

11. Severability

The provisions of this permit are severable. If any provision of this permit, or the application of any provision of this permit to any circumstances, is challenged or held invalid, the validity of the remaining permit provisions and/or portions thereof or their application to other persons or sets of circumstances, shall not be affected thereby.

12. Expiration of Permit

At least 180 days prior to the expiration date of this permit pursuant to the State law and regulation, the permittee who wishes to continue to operate under this permit shall submit an application to the Permit Board for reissuance. The Permit Board may grant permission to submit an application later than this, but no later than the expiration date of the permit.

13. Protection of Confidential Information

a) Pursuant to Miss. Code Ann. ' 49-17-39 and 40 CFR 123.41, the Permit Board shall make available to the public all information contained on any form and all public comments on such information. Effluent data and information concerning air or water quality shall also be made available to the public. Information that is determined by the Commission to be trade secrets shall not be disclosed to the public without prior consent of the source of such information. When a claim of confidentiality is made by a person in accordance with the provisions of Miss. Code Ann. ' 49-17-39, a recommendation on the questions of confidentiality shall be made by the Commission and forwarded to the Regional Administrator (or his/her designee) of EPA for his concurrence in such determination of confidentiality.

b) A copy of a State, UIC, or NPDES permit application, public notice, fact sheet, draft permit and other forms relating thereto, including written public comment and other reports, files and information relating to the application not classified as confidential information by the Commission pursuant to Part II. B.13.a), shall be available for public inspection and copying during normal business hours at the office of the Department in Jackson, Mississippi.

c) Upon determination by the Commission that information submitted by a permit applicant is entitled to protection against disclosure as trade secrets, the information shall be so labeled and otherwise handled as confidential. Copies of the information and a notice of the Commission's action shall be forwarded to the Regional Administrator (or his/her designee). In making its determination of entitlement to protection as a trade secret, the Commission shall follow the procedure set forth in Miss. Code Ann. ' 49-17-39. In the event the Commission denies the claim of confidentiality, the applicant shall have, upon notification thereof, the right to appeal the Commission's determination in the same manner provided for other orders of the Commission. No disclosure, except to EPA, shall be allowed until any appeal from the determination of the Commission is completed.

14. Spill Prevention and Best Management Plans

Any permittee which has above ground bulk storage capacity, of more than 1320 gallons or any single container with a capacity greater than 660 gallons, of materials and/or liquids (including but not limited to, all raw, finished and/or waste material) with chronic or acute potential for pollution impact on waters of the State and not subject to Mississippi Hazardous Waste Management Regulations or 40 CFR 112 (Oil Pollution Prevention) regulations shall provide secondary containment as found in 40 CFR 112 or

equivalent protective measures such as trenches or waterways which would conduct any tank releases to a permitted treatment system or sufficient equalization or treatment capacity needed to prevent chronic/acute pollution impact.

Part III.

A. REOPENER CLAUSE

This permit shall be modified, or alternately, revoked and reissued, to comply with any applicable effluent standard, limitation or storm water regulation issued or approved under Section 301(b)(2)(C), and (D), 304(b)(2), 307(a)(2) and 402(p) of the Federal Water Pollution Control Act if the effluent standard, limitation or regulation so issued or approved:

1. Contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or

2. Controls any pollutant not limited in the permit.

B. CLOSURE REQUIREMENTS

Should the permittee decide to permanently close and abandon the premises upon which it operates, it shall provide a Closure Plan to the Permit Board no later than 90 days prior to doing so. This Closure Plan shall address how and when all manufactured products, by-products, raw materials, stored chemicals, and solid and liquid waste and residues will be removed from the premises or permanently disposed of on site such that no potential environmental hazard to the waters of the State will be presented. Closure plan(s) submitted to and approved by Mississippi Department of Environmental Quality for compliance with other environmental regulations will satisfy the closure requirements for those items specifically addressed in the closure plan(s) as long as the closure does not present a potential for environmental hazard to waters of the State.

C. REQUIREMENTS REGARDING COOLING AND BOILER WATER ADDITIVES

Notification shall be made to the permitting authority in writing not later than sixty (60) days prior to initiating the addition of any chemical product to the cooling water and/or boiler water which is subject to discharge, other than those previously approved and/or used. Such notification should include, but not be limited to:

1. Name and composition of the proposed additive,

2. Proposed discharge concentration,

3. Dosage addition rates,

4. Frequency of use,

5. EPA registration, if applicable, and

6. Aquatic species toxicological data.

Written approval must be received from the permitting authority prior to initiating use.

D. OTHER STANDARD CONDITIONS

1. There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid. In the event that PCB containing equipment is used on site, administrative procedures shall be instituted to (1) maintain a detailed inventory of PCB use, (2) assure engineering design and construction to preclude release of PCB's to the environment, and (3) effectively detect the loss of PCB's from equipment. PCB containing equipment is any large volume containing vessels kept on site with the potential to pollute State Waters (i.e. transformers).

2. Discharge of blowdown from the cooling system shall be limited to the discharge of recirculating water necessary for the purpose of discharging materials contained in the process, the further build-up of which would cause concentrations or amounts exceeding limits established in this permit. Discharge temperature shall not exceed the lowest temperature of the recirculating cooling water prior to the addition of make-up.

3. The receiving water shall not exceed a maximum water temperature change of 2.8°C (5.0°F) relative to the upriver temperature, outside a mixing zone not exceeding a maximum width of 60 feet from the river edge and a maximum length of 6,000 feet downstream from the point of discharge, as measured at depth of 5 feet. The river edge shall be defined as being no further east than the mouth of the barge slip. The maximum water temperature shall not exceed 32.2°C (90°F) outside the same mixing zone, except when ambient temperatures approach or exceed this value. Thermal monitoring shall be performed any time the river stage is less than 0.5 feet (Vicksburg gauge) during winter months (November-April) or, is less than minus 1.2 feet (Vicksburg gauge) during summer months (May-October). If these conditions occur and the plant is generating power, monitoring shall be performed upriver at PT.1 (surface/5 feet subsurface), Discharge Outlet, Barge Slip Outlet, and down river at PT.7. However, once monitoring has been performed at river stages less than those cited (0.5 feet during the winter months and minus 1.2 feet during the summer), the river stage which existed at the time of thermal monitoring, will then become the standard river stage during which a subsequent monitoring exercise must be performed if the river falls below that stage. Thorough documentation shall be maintained on file of the river stage during each period of the thermal monitoring. This policy is subject to modification if any data collected during a particular river stage indicates temperature variations not previously measured. Additionally, thermal monitoring shall be performed during the winter of 2006/2007 and the summer of 2007. Results shall be included with the application for permit reissuance. Agreement regarding specific conduct of the thermal monitoring shall be determined prior to implementation.

4. Copies of any and all routine liquid effluent and water quality monitoring reports submitted to the Nuclear Regulatory Commission (NRC) shall be simultaneously submitted to the Mississippi Office of Pollution Control Permit Board and EPA. Copies of any routine and nonroutine reports submitted to the Permit Board and EPA shall also be submitted to the NRC when regarded necessary for their review.

5. Discharge of uncontaminated waters including fire protection water, condensate from air conditioning equipment, cooling tower make-up bypasses, radial well direct discharges, uncontaminated secondary containment infiltration, Domestic/Construction Water and yard drains to the yard drainage system is permitted without limitation or monitoring requirements.

6. Discharges resulting from outages or other maintenance activities resulting from the draining of the Circulating Water System (CWS) and associated components shall meet monitoring requirements specified for Outfalls 002. The permittee shall notify the Permit Board of such discharges no less than 10 days prior to the discharge. Bioassay results may be required if conditions warrant.

7. System discharges during outages or other maintenance activities resulting from the draining of the Standby Service Water System (SSW) and associated components shall meet the effluent limitations and monitoring requirements specified for Outfalls 004 and 005. The permittee shall notify the Permit Board of such discharges no less than 10 days prior to the discharge. Bioassay results may be required if conditions warrant.

8. In addition to the specific conditions of this permit, the permittee shall comply with all applicable conditions of 40 CFR 122.42.

9. Solid waste treatment sludges shall be disposed of in an approved manner. The handling, dewatering, storage, compaction, and method of placement of this material shall be in accordance with Permit Board requirements.

10. Applicable administrative procedures regarding Radioactive Discharge Controls shall be followed in management of discharges from the Turbine Building Cooling Water System, which is disposed of through Outfall Serial No. 007.

11. There shall be no discharge of Metal Cleaning Wastewater.

12. Compliance Demonstration Requirements. The permittee shall, not less than once per year, (with the DMR due on January 28th of each year), certify that chemicals added for cooling water system maintenance, including such chemicals used for corrosion inhibition, do not result in the discharge via cooling tower blowdown of any of the 126 priority pollutants (excluding zinc but including chromium) in detectable concentrations. Additionally, once for each product used for cooling tower maintenance (unless subsequent changes in the product formulation occur or, the product is obtained from a different source), compliance shall be demonstrated by submission of certification from the manufacturer that such product contains no priority pollutants or, if any of the 126 priority pollutants are contained in such product, calculations which show that the addition of such product does not result in the discharge of that individual priority pollutant at concentrations greater than 10 micrograms per liter due to dilution within the cooling system.