



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
1600 EAST LAMAR BOULEVARD  
ARLINGTON, TEXAS 76011-4511

September 22, 2021

Mr. Robert Franssen, Site Vice President  
Entergy Operations, Inc.  
Grand Gulf Nuclear Station  
P.O. Box 756  
Port Gibson, MS 39150

SUBJECT: GRAND GULF NUCLEAR STATION - NOTIFICATION OF NRC TRIENNIAL  
HEAT EXCHANGER/SINK PERFORMANCE INSPECTION (05000416/2021004)  
AND REQUEST FOR INFORMATION

Dear Mr. Franssen:

The purpose of this letter is to notify you that the U.S. Nuclear Regulatory Commission (NRC) staff will conduct the triennial portion of the heat exchanger/sink performance inspection at your Grand Gulf Nuclear Station beginning on December 6, 2021. The onsite phase of the inspection will consist of two reactor inspectors from the NRC's Region IV office for one week. The inspection will be conducted in accordance with NRC Inspection Procedure (IP) 71111, Attachment 07, "Heat Exchanger/Sink Performance," dated October 21, 2020.

The objectives of the inspection are to verify that: 1) any potential heat exchanger deficiencies which could mask degraded performance are identified, 2) any potential common-cause heat sink performance problems that have the potential to increase risk are identified, and 3) the licensee has adequately identified and resolved heat sink performance problems that could result in initiating events or affect multiple heat exchangers in mitigating systems and thereby increase risk.

To minimize the impact the inspection has on the site and to ensure an efficient inspection, we have enclosed a request for information needed for the inspection. It is important that these requests are fulfilled as completely and accurately as possible to minimize any additional requests during the preparation week or during the onsite inspection. The requests have been divided into three groups.

- The first group lists information necessary for our initial inspection scoping activities. This information should be available to the lead inspector no later than October 25, 2021. By November 1, 2021, the lead inspector will communicate the selected 2-4 risk significant or safety-related heat exchanger and/or heat sink samples. The lead inspector will also communicate whether only a subset of the second group information requests is required.

- The second group of information requested includes those items needed to support our in office preparation activities. This set of documents should be available no later than November 22, 2021. This information should be separated for each selected component. Note that the inspector(s) may identify during the preparation week additional information needed to support the inspection and will communicate those requests as soon as practicable.
- The third group of information requested includes the additional documentation identified during in-office preparation activities as well as other resource requests necessary to support our onsite inspection activities. The additional information or resources should be available throughout the week of onsite inspection activities beginning on December 6, 2021.

All information requested is to be from the time of the last triennial heat exchanger/sink performance inspection until the present. If no documents addressing a request fall within that time, the request applies to the last applicable document. If a request does not apply (or there are no responsive documents) for any heat exchanger/heat sink sample, no response is necessary. Include all attachments or addendums to the requests.

We have discussed the schedule for this inspection with your staff and understand that our regulatory contact for this inspection will be Mr. Jeff Hardy of your Regulatory Assurance organization. If there are any questions about this inspection or the documents requested, please contact the lead inspector, Jonathan Braisted, by telephone at 817-200-1469 or by e-mail at [Jonathan.Braisted@nrc.gov](mailto:Jonathan.Braisted@nrc.gov).

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Sincerely,

 Signed by Gaddy, Vincent  
on 09/22/21

Vincent G. Gaddy, Chief  
Engineering Branch 1  
Division of Reactor Safety

Docket No. 05000416  
License No. NPF-29

Enclosure: Triennial Heat Exchanger/Sink  
Performance Inspection Request for  
Information

cc w/ encl: Distribution via LISTSERV®

GRAND GULF NUCLEAR STATION – NOTIFICATION OF NRC TRIENNIAL HEAT EXCHANGER/SINK PERFORMANCE INSPECTION (05000416/2021004) AND REQUEST FOR INFORMATION – DATED SEPTEMBER 22, 2021

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DATE	09/22/2021	09/22/2021			

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**Request for Information**  
**Triennial Heat Exchanger/Sink Performance Inspection**  
Grand Gulf Nuclear Station

Inspection Report: 05000416/2021004

Inspection Dates: December 6 – 10, 2021

Inspection Procedure: IP 71111.07, Triennial “Heat Exchanger/Sink Performance”

Inspectors: Jonathan Braisted, Reactor Inspector, Lead  
Dustin Reinert, Reactor Inspector

***I. Information Requested by October 25, 2021:***

1. Copy of any heat exchanger/heat sink program documents including Generic Letter (GL) 89-13 programs or aging management programs (AMPs)
2. Copy of any original and/or supplemental responses to GL 89-13
3. Copy of any current requirements and/or commitments related to GL 89-13 or AMPs
4. Copy of any heat exchanger/heat sink program self-assessments, audits, etc.
5. Copy of the updated final safety analysis report, technical specifications (and bases), and technical requirements manual (and bases)
6. List of safety-related, risk-significant, or GL 89-13 program heat exchangers in order of risk significance
7. List of corrective action program documents related to heat exchangers/heat sinks

***II. Information Requested by November 22, 2021:***

1. For the selected heat exchangers that are directly cooled by the service water (or open water) system:
  - a. Documentation of performance testing (i.e., heat transfer, temperature effectiveness, etc.) and/or monitoring methods (i.e., pressure loss, temperature difference, etc.) such as technical reports, complete work orders, implementing procedures, etc.
  - b. Documentation of as-found/as-left periodic flow testing and/or flow balancing such as technical reports, complete work orders, implementing procedures, etc.
  - c. Documentation of visual inspections, non-destructive examinations (i.e., eddy-current, ultrasonic testing, etc.), and cleanings such as technical reports, complete work orders, implementing procedures, etc.

Enclosure

- d. Documentation of biotic fouling and/or macrofouling treatment such as technical reports, complete work orders, implementing procedures, etc.
  - e. Copy of the tube plugging map, tube plugging criteria, and heat exchanger margin if based upon tube plugging
  - f. Copy of any relevant design basis calculations including any evaluations of the potential for water hammer
  - g. Copy of the applicable system health report, design basis document, and/or system description
  - h. Copy of any relevant system piping and instrumentation diagrams
  - i. Copy of the heat exchanger design specification, heat exchanger data sheet, and any relevant vendor manuals
  - j. Copy of the heat exchanger (and motor/fan if an air-to-water heat exchanger) preventive maintenance (PM) schedule including the frequency of those PM activities and their bases
2. For the selected heat exchangers that are directly cooled by a closed loop cooling water system:
- a. Documentation of performance testing (i.e., heat transfer, temperature effectiveness, etc.) and/or monitoring methods (i.e., pressure loss, temperature difference, etc.) such as technical reports, complete work orders, implementing procedures, etc.
  - b. Documentation of as-found/as-left periodic flow testing and/or flow balancing such as technical reports, complete work orders, implementing procedures, etc.
  - c. Documentation of visual inspections, non-destructive examinations (i.e., visual, eddy-current, ultrasonic testing, etc.), and cleanings such as technical reports, complete work orders, implementing procedures, etc.
  - d. Copy of the tube plugging map, tube plugging criteria, and heat exchanger margin if based upon tube plugging
  - e. Results from chemical treatments such as technical reports, complete work orders, implementing procedures, etc.
  - f. Copy of any relevant design basis calculations including any evaluations of the potential for water hammer
  - g. Copy of the applicable system health report, design basis document, and/or system description
  - h. Copy of any relevant system piping and instrumentation diagrams

- i. Copy of the heat exchanger design specification, heat exchanger data sheet, and any relevant vendor manuals
  - j. Copy of the heat exchanger (and motor/fan if an air-to-water heat exchanger) PM schedule including the frequency of those PM activities and their bases
3. For the selected ultimate heat sink (UHS):
- a. Forced draft cooling tower or spray pond UHS:
    - i. Copy of any calculations that demonstrate sufficient reservoir capacity
    - ii. Documentation of periodic monitoring and trending of sediment such as technical reports, complete work orders, implementing procedures, etc.
    - iii. Documentation of any performance monitoring of heat transfer capability such as technical reports, complete work orders, implementing procedures, etc.
    - iv. Documentation of UHS structural integrity monitoring such as technical reports, complete work orders, implementing procedures, etc.
  - b. Operation of the service water system (SWS) and UHS:
    - i. List of modifications to the SWS and UHS
    - ii. Copy of procedures for a loss of SWS or UHS
    - iii. Copy of the applicable system health report, design basis document, and/or system description
    - iv. Documentation of biotic fouling and macrofouling treatments such as technical reports, complete work orders, implementing procedures, etc.
    - v. Documentation of chemistry monitoring such as technical reports, complete work orders, implementing procedures, etc.
    - vi. Copy of any evaluation of strong-pump to weak-pump interactions
  - c. Performance testing of the SWS and UHS:
    - i. Documentation of inservice testing of SWS/UHS pumps, valves, and fans such as technical reports, complete work orders, implementing procedures, etc.
    - ii. Documentation of SWS flow balance testing such as complete work orders, implementing procedures, etc.
    - iii. Documentation of diagnostic testing for valves that interface with safety-related service water and nonsafety-related or nonseismic piping systems such as complete work orders, implementing procedures, etc.

- iv. Documentation of performance testing of risk-significant nonsafety-related functions (or alignments) of the SWS such as complete work orders, implementing procedures, etc.
- d. Service water and/or closed cooling water system:
- i. Documentation of inaccessible pipe testing, inspection (i.e., visual, ultrasonic, etc.), and/or monitoring such as technical reports, complete work orders, implementing procedures, etc.
  - ii. Copy of any evaluations of active thru wall pipe leaks
  - iii. Copy of any corrective action documents related to thru wall pipe leakage including trend evaluations
  - iv. For closed cooling water systems, copy of any trend data on make-up to the system
  - v. Documentation of protective coatings inspections such as technical reports, complete work orders, implementing procedures, etc.
  - vi. For deep draft vertical pumps, documentation of diagnostic testing (or equivalent method) such as, technical reports, complete work orders, implementing procedures, etc.
- e. Service water intake structure (SWIS):
- i. Copy of the PM schedule for traveling screens and strainers the frequency of those PM activities and their bases
  - ii. Copy of any corrective action documents related to traveling screens, strainers, trash racks, etc.
  - iii. Copy of any SWS/UHS normal and abnormal operating procedures
  - iv. Documentation of SWIS inspections regarding structural integrity and silting such as technical reports, complete work orders, implementing procedures, etc.
  - v. Copy of any service water pump bay water level instrument documentation related to setpoints and calibrations such as calculations, complete work orders, implementing procedures, etc.
  - vi. Copy of any SWS/UHS water temperature instrumentation documentation related to setpoints and calibrations such as calculations, complete work orders, implementing procedures, etc.
  - vii. Copy of any evaluations of the potential for frazil ice formation
  - viii. For underwater weir walls, copy of any evaluations of potential of silt introduction



#### 4. UHS Containment Device or Dam

- a. For an above-ground UHS encapsulated by embankments, weirs or excavated side slopes:
  - i. Copy of weir or embankment design documentation, specification, etc.
  - ii. Copy of any licensee or third-party dam inspection documentation used to monitor the integrity or performance of the heat sink
  - iii. Copy of any calculations for demonstrating sufficient reservoir capacity
  - iv. Documentation of significant debris or sediment build-up monitoring in the UHS such as any technical reports, complete work orders, implementing procedures, etc.
  - v. Copy of any corrective action program documents related to debris, structural integrity, seepage, settlement, rip rap, etc.
- b. For underwater UHS weirs, structures, or excavations:
  - i. Copy of any underwater weirs, structures, or excavations design documentation, specifications, etc.
  - ii. Documentation of settlement or movement related to structural integrity and/or capacity monitoring such as technical reports, complete work orders, implementing procedures, etc.
  - iii. Documentation of sediment intrusion monitoring such as technical reports, complete work orders, implementing procedures, etc.
  - iv. Copy of any calculations for demonstrating sufficient capacity
  - v. Copy of any corrective action program documents related to settlement, movement, structural integrity, sediment, etc.

### ***III. Additional Requests During Inspection Activities Beginning December 6, 2021***

1. Supplemental requests identified during in-office preparation activities
2. Additional requests identified during onsite inspection activities
3. Discussions with relevant subject matter experts
4. Walkdowns of selected heat exchanger/heat sink samples
5. Corrective action program documents generated as a result of this inspection

If any of the information requested above will not be available, please contact Jonathan Braisted as soon as possible.

Inspector Contact Information:

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Reactor Inspector  
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