



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

June 9, 2022

Mr. Joseph Sullivan  
Site Vice President  
Entergy Operations, Inc.  
N-TSB-58  
1448 S.R. 333  
Russellville, AR 72802-0967

SUBJECT: ARKANSAS NUCLEAR ONE, UNITS 1 AND 2 – NOTIFICATION OF NRC TRIENNIAL HEAT EXCHANGER/SINK PERFORMANCE INSPECTION (05000313/2022003 AND 05000368/2022003) AND REQUEST FOR INFORMATION

Dear Mr. Sullivan:

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 Arkansas Nuclear One, Units 1 and 2 from August 22-26, 2022. 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 July 11, 2022. After reviewing the information, the lead inspector will communicate the selected 2-4 risk significant or safety-related heat exchanger and/or heat sink samples as soon as practical. 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 August 5, 2022. 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 August 22, 2022.

If a request does not apply (or there are no responsive documents) for any heat exchanger/heat sink sample, no response is necessary though a brief explanation is beneficial. Include all attachments, addendums, enclosures, etc. to the requests as applicable. Please organize responses in the manner presented in the enclosure.

We have discussed the schedule for this inspection with your staff and understand that our regulatory contact for this inspection will be Mr. Michael Hall of your Licensing organization. If there are any questions about this inspection or the documents requested, please contact the lead inspector, Mr. Ronald Kopriva, by telephone at 817-200-1104 or by email at [Ron.Kopriva@nrc.gov](mailto:Ron.Kopriva@nrc.gov) as soon as practicable.

#### PAPERWORK REDUCTION ACT STATEMENT

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J. Sullivan

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Sincerely,

 Signed by Gaddy, Vincent  
on 06/09/22

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

Docket No(s). 05000313 and 05000368  
License No(s). DPR-51 and NPF-6

Enclosure:  
Request for Information

Distribution via Listserv

ARKANSAS NUCLEAR ONE, UNITS 1 AND 2 – NOTIFICATION OF NRC TRIENNIAL HEAT EXCHANGER/SINK PERFORMANCE INSPECTION 05000313/2022003 AND 05000368/2022003 (AND REQUEST FOR INFORMATION) – DATED JUNE 9, 2022

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**Request for Information  
Triennial Heat Exchanger/Sink Performance Inspection  
Arkansas Nuclear One, Units 1 and 2**

Inspection Report: 05000313/2022003 AND 05000368/2022003  
Inspection Dates: August 22-26, 2022  
Inspection Procedure: IP 71111.07, Triennial "Heat Exchanger/Sink Performance"  
Lead Inspector: Ronald A. Kopriva, Senior Reactor Inspector

***I. Information Requested by July 11, 2022:***

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. since last NRC triennial heat exchanger/heat sink inspection.
5. Copy of the updated final safety analysis report, technical specifications, technical requirements manual, preventive maintenance program, and inservice inspection program. Include bases documents as applicable.
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 with title and/or brief description related to heat exchangers/heat sinks since last NRC triennial heat exchanger/heat sink inspection.

***II. Information Requested by August 5, 2022.***

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. Limit response to last six of each.
  - b. Documentation of as-found/as-left periodic flow testing and/or flow balancing such as technical reports, complete work orders, implementing procedures, etc. Limit response to last six of each.

- 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. Limit response to last six of each.
  - d. Documentation of biotic fouling and/or macrofouling treatment such as technical reports, complete work orders, implementing procedures, etc. Limit response to last six of each.
  - 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.
  - k. Copy of documentation of completed PM activities if not already provided. Limit response to last six of each.
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. Limit response to last six of each.
  - b. Documentation of as-found/as-left periodic flow testing and/or flow balancing such as technical reports, complete work orders, implementing procedures, etc. Limit response to last six of each.
  - 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. Limit response to last six of each.
  - 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. Limit response to last six of each.

- 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.
  - k. Copy of documentation of completed PM activities if not already provided. Limit response to last six of each.
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. Limit response to last six of each.
    - iii. Documentation of any performance monitoring of heat transfer capability such as technical reports, complete work orders, implementing procedures, etc. Limit response to last six of each.
    - iv. Documentation of UHS structural integrity monitoring such as technical reports, complete work orders, implementing procedures, etc. Limit response to last six of each.
  - 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. Limit response to last six of each.
    - v. Documentation of chemistry monitoring such as technical reports,

complete work orders, implementing procedures, etc. Limit response to last six of each.

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. Limit response to last six of each.

ii. Documentation of SWS flow balance testing such as complete work orders, implementing procedures, etc. Limit response to last six of each.

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. Limit response to last six of each.

iv. Documentation of performance testing of risk-significant nonsafety-related functions (or alignments) of the SWS such as complete work orders, implementing procedures, etc. Limit response to last six of each.

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. Limit response to last six of each.

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 since last NRC triennial heat exchanger/heat sink inspection.

iv. For closed cooling water systems, copy of any trend data on make-up to the system since last NRC triennial heat exchanger/heat sink inspection.

v. Documentation of protective coatings inspections such as technical reports, complete work orders, implementing procedures, etc. Limit response to last six of each.

vi. For deep draft vertical pumps, documentation of diagnostic testing (or equivalent method) such as, technical reports, complete work orders, implementing procedures, etc. Limit response to last six of each.

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. since last NRC triennial heat exchanger/heat sink inspection.
- 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. Limit response to last six of each.
- 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. Limit response to last six of each.
- vi. Copy of any SWS/UHS water temperature instrumentation documentation related to setpoints and calibrations such as calculations, complete work orders, implementing procedures, etc. Limit response to last six of each.
- 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.

**III. Additional Requests During Inspection Activities Beginning August 22, 2022:**

- 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 the information requested above will not be available, please contact Mr. Ronald A. Kopriva as soon as possible.

Inspector Contact Information:

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Ron.Kopriva@nrc.gov

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