



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, ILLINOIS 60532-4352

August 25, 2020

Mr. Bryan C. Hanson
Senior VP, Exelon Generation Company, LLC
President and CNO, Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2 – NOTIFICATION OF AN NRC
TRIENNIAL HEAT SINK PERFORMANCE INSPECTION AND REQUEST FOR
INFORMATION; INSPECTION REPORT 05000456/2020004;
05000457/2020004

Dear Mr. Hanson:

On November 16, 2020, the U.S. Nuclear Regulatory Commission (NRC) will begin the onsite portion of the Triennial Heat Sink Performance Inspection at your Braidwood Station Units 1 and 2 Nuclear Power Plant. This inspection will be performed in accordance with NRC baseline Inspection Procedure 71111.07.

In order to minimize the impact that the inspection has on the site and to ensure a productive inspection, we have enclosed a request for documents needed for the inspection. The documents 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 September 21, 2020. By October 2, 2020, the inspector will communicate the initial selected set of approximately 2-3 risk significant heat exchangers.
- The second group is needed to support our in-office preparation activities. This set of documents, including the calculations associated with the selected heat exchangers, should be available at the Regional Office no later than November 2, 2020. This information should be separated for each selected component, especially if provided electronically (e.g., folder with component name that includes calculations, condition reports, maintenance history, etc.). During the in-office preparation activities, the inspector may identify additional information needed to support the inspection.
- The last group includes the additional information above as well as plant specific reference material. This information should be available at the Regional Office no later than November 9, 2020. It is also requested that corrective action documents and/or questions developed during the inspection be provided to the inspector as the documents are generated.

All requested documents are to be for the time period from the onsite inspection period back to the documents that were provided in response to the previous Heat Sink Performance Inspection. If no activities were accomplished in that time period, then the request applies to the last applicable document in the previous time period. It is important that these documents be as

complete as possible, in order to minimize the number of documents requested during the preparation week or during the onsite inspection.

The lead inspector for this inspection is Vance Petrella. We understand that our licensing contact for this inspection is James Mark of your organization. If there are any questions about the inspection or the material requested in the enclosure, please contact the lead inspector at 630-829-9847 or via e-mail at Vance.Petrella@nrc.gov.

This letter does not contain new or amended information collection requirements subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). Existing information collection requirements were approved by the Office of Management and Budget, Control Number 3150-0011. The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid Office of Management and Budget Control Number.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Vance Petrella, Reactor Engineer
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 50-456; 50-457
License Nos. NPF-72; NPF-77

Enclosure:
Triennial Heat Sink Performance Inspection
Document Request

cc: Distribution via LISTSERV®

Letter to Bryan C. Hanson from Vance Petrella dated August 25, 2020.

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2 – NOTIFICATION OF AN NRC
TRIENNIAL HEAT SINK PERFORMANCE INSPECTION AND REQUEST FOR
INFORMATION; INSPECTION REPORT 05000456/2020004;
05000457/2020004

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TRIENNIAL HEAT SINK PERFORMANCE INSPECTION DOCUMENT REQUEST

Inspection Report: 05000456/2020004; 05000457/2020004

Inspection Dates: November 16 - 20, 2020

Inspection Procedure: IP 71111.07, "Heat Sink Performance"

Lead Inspector: Vance Petrella
630-829-9847
Vance.Petrella@nrc.gov

Please provide the information electronically in "pdf" files, Excel, or other searchable formats, preferably on some portable electronic media (e.g., CD-ROM, DVD). The portable electronic media should contain descriptive names and be indexed and hyperlinked to facilitate ease of use. Information in "lists" should contain enough information to be easily understood by someone who has knowledge of light water reactor technology.

I. Information Requested by September 21, 2020

1. List of the Generic Letter (GL) 89-13, "Service Water System Problems Affecting Safety-Related Equipment," heat exchangers in order of risk significance.
2. Copy of heat exchanger performance trending data tracked for each GL 89-13 heat exchanger.
3. List of corrective action program documents (with a short description) associated with GL 89-13 heat exchangers, heat sinks, silting, corrosion, fouling, or heat exchanger testing, for the previous three years or since the last corrective action program document list was sent to the NRC for the previous heat sink performance inspection. The list should include all corrective action program documents not on the last corrective action program document list.
4. Copy of any self-assessment done on any of GL 89-13 heat exchangers, Ultimate Heat Sink (UHS), and safety-related service water systems since the last heat sink performance inspection.
5. Last two System Health Report(s) and maintenance rule system notebooks for all the GL 89-13 heat exchangers, UHS, and safety-related service water systems.
6. List of engineering-related operator workarounds (with a short description) associated with GL 89-13 heat exchangers. The requested documents are to be for the time period from the onsite inspection period back to the documents that were provided in response to the previous heat sink performance inspection.

Enclosure

TRIENNIAL HEAT SINK PERFORMANCE INSPECTION DOCUMENT REQUEST

7. List of permanent and temporary modifications (with a short description) associated with GL 89-13 heat exchangers, UHS, and safety-related service water systems. The requested documents are to be for the time period from the onsite inspection period back to the documents that were provided in response to the previous heat sink performance inspection.
8. Electronic copies of the current Final Safety Analysis Report, Technical Specifications, Technical Specifications Basis, Technical Report Manual, and Technical Report Manual Basis.
9. List of enhancements and/or commitments made during license renewal for GL 89-13 heat exchangers, UHS, and safety-related service and closed cooling water systems (as applicable).
10. Electronic copies of the current Probability Risk Assessment (PRA) Summary Note Books.
11. Provide an electronic copy of piping and instrumentation diagrams (P&IDs) for the safety-related service water system, including the intake structure.

II. Information Requested by November 2, 2020

1. Copies of the GL 89-13 responses.
2. Copies of procedures developed to implement the recommendations of GL 89-13 (e.g. the GL 89-13 Heat Exchanger Program description).
3. Copies of the selected corrective action program documents.
4. For the specific heat exchangers selected:
 - a. Copies of the UFSAR sections applicable for each heat exchanger.
 - b. Copy of system description and design basis document for the heat exchangers (as applicable).
 - c. Provide the calculations or evaluations that:
 - i. Establish the limiting design basis heat load required to be removed by each of these heat exchangers;
 - ii. Demonstrate the heat exchangers capacity to remove the limiting heat load;
 - iii. Correlate surveillance testing and/or inspection results from these heat exchangers with design basis heat removal capability (e.g., basis for surveillance test and/or inspection acceptance criteria);
 - iv. Evaluate the potential for water hammer in each heat exchanger or associated piping; and

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- v. Evaluate excessive tube vibration in each heat exchanger.
 - d. Copy of any operability determinations or other documentation of degradation associated with the heat exchangers or the systems that support the operation for the selected heat exchangers.
 - e. Copy of the construction code, design specification, heat exchanger data sheets, and vendor documents including component drawings applicable for the heat exchangers.
 - f. Copies of normal, abnormal, and emergency operating procedures associated with the selected heat exchangers.
 - g. Copies of the Aging Management Programs (AMP) and the implementing procedures that manage aging of the selected heat exchangers (as applicable).
5. For the ultimate heat sink (UHS) and the safety-related service water system (or equivalent):
- a. Copies of the applicable Updated Final Safety Analysis Report (UFSAR) sections.
 - b. Copy of system description and design basis document (as applicable).
 - c. Copy of any operability determinations or other documentation of degradation associated with the UHS and the safety-related service water system.
 - d. Copy of the document (e.g. UFSAR or Technical Requirements Manual) that states the maximum cooling water system inlet temperature limit that still allows full licensed power operation of the nuclear reactor.
 - e. Copy of the construction code and design specification.
 - f. Copies of normal, abnormal, and emergency operating procedures associated with the UHS and safety-related service water systems including procedures for loss of these systems.
 - g. Copies of corrective action documents associated with water hammer or hydraulic transients in the service water system since the last Heat Sink Inspection.
 - h. If available, provide electronic copies of the structural drawings of the intake structure and Ultimate Heat Sink.
 - i. Provide a list of calculations (with a short description), which currently apply to UHS and safety-related service water system.
 - j. Provide a list of instruments (with a short description) associated with automatic or alarm functions for the safety-related service water system and/or UHS.

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- k. Provide a list of any design change (with a short description) performed on the UHS or safety-related service water system since the last heat sink performance inspection.
 - l. Copies of the AMPs and the implementing procedures that manage aging of the UHS (including the intake structure) and the safety-related service and closed cooling water systems (as applicable).
6. A schedule of all inspections, cleanings, maintenance, or testing of any safety-related plant heat exchanger to be performed during the on-site portion of the inspection.

III. Information Requested by November 9, 2020

- 1. For the specific heat exchangers selected:
 - a. Copies of the two most recent completed tests and evaluation data confirming thermal performance for those heat exchangers which are performance tested.
 - b. Documentation and procedures that identify the types, accuracy, and location of any special instrumentation used for the two most recently completed thermal performance tests for the heat exchangers (e.g., high accuracy ultrasonic flow instruments or temperature instruments). Include calibration records for the instruments used during these tests.
 - c. Information regarding any alarms which monitor on-line performance.
 - d. Copy of the document describing the inspection results of each heat exchanger. The requested documents are to be for the time period from the onsite inspection period back to the documents that were provided in response to the previous heat sink performance inspection.
 - e. The cleaning and inspection maintenance schedule for each heat exchanger for the next 5 years.
 - f. Copy of the operating procedure that ensures that the maximum cooling water system inlet temperature limit is not exceeded.
 - g. Copy of the calculations or documents which evaluate the potential for water hammer in each heat exchanger or associated piping.
 - h. The documents that describe the controls that prevent heat exchanger degradation due to excessive flow induced vibration during operation.
 - i. Copy of the periodic flow testing at or near maximum design flow. The requested documents are to be for the time period from the onsite inspection period back to the documents that were provided in response to the previous heat sink performance inspection.

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- j. Copy of the document which identifies the current number of tubes in service for each heat exchanger and the supporting calculation which establishes the maximum number of tubes which can be plugged in each heat exchanger.
 - k. Copy of the document establishing the repair criteria (plugging limit) for degraded tubes which are identified in each heat exchanger.
 - l. Copies of the documents that verify the structural integrity of the heat exchanger (e.g. eddy current summary sheets, ultrasonic testing results, and visual inspection results).
 - m. Copies of those documents that describe the methods taken to control water chemistry in the heat exchangers.
 - n. Copies of those documents that describe the methods taken to control water chemistry in the heat exchangers, including those credited by any AMPs (as applicable).
 - o. Copies of any credited AMP monitoring/inspection results for the selected heat exchangers (as applicable). The requested documents are to be for any completed monitoring/inspection in the time period from the onsite inspection period back to the documents that were provided in response to the previous heat sink performance inspection.
2. For the UHS:
- a. Copies of the inspection procedures for the verification of the structural integrity of underwater UHS and the associated results. The requested documents are to be for the time period from the onsite inspection period back to the documents that were provided in response to the previous heat sink performance inspection.
 - b. Copies of the maintenance and/or inspection procedures for underwater UHS sediment intrusion and the associated results including underwater diving inspections and/or sediment removal activities. The requested documents are to be for the time period from the onsite inspection period back to the documents that were provided in response to the previous heat sink performance inspection.
 - c. Copies of calculations and surveillances that determine the UHS reservoir capacity and heat transfer capability.
 - d. Copies of surveillance procedures and testing results performed on the instrumentation relied upon to determine UHS reservoir capability. The requested documents are to be for the time period from the onsite inspection period back to the documents that were provided in response to the previous heat sink performance inspection.
3. For the review associated with the system walkdown of the service water intake structure:
- a. Copies of corrective maintenance for the last 6 years associated with service water strainers, traveling screens and trash racks.

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- b. Copies of the last two inspections and/or surveillances associated with service water strainers, traveling screens and trash racks.
- c. List of preventive maintenance, including frequency, associated with service water strainers, traveling screens and trash racks.
- d. Copies of abnormal procedures for the traveling screens and service water strainers.
- e. Copies of the last two inspections and/or surveillances documenting that component mounts have not excessively degraded (i.e., due to corrosion). For example, inspections for the mounts for the, Service water pumps, service water strainers, traveling screens and trash racks.
- f. Copies of the documents associated with the monitoring, trending, and remediation of silt accumulation at the service water pump bay.
- g. Copies of surveillance procedures and testing results performed on the service water pump bay water level instruments. The requested documents are to be for the time period from the onsite inspection period back to the documents that were provided in response to the previous heat sink performance inspection.
- h. Copies of procedures associated with operating during adverse weather conditions (e.g. icing, high temperatures, or low level).
- i. Copy of the evaluation for the potential effects of low flow/level on underwater weir walls intended to limit silt or sand intake, if applicable.
- j. Copies of any credited AMP monitoring/inspection results for the safety-related service and closed cooling water systems, and the UHS (as applicable). The requested documents are to be for any completed monitoring/inspection in the time period from the onsite inspection period back to the documents that were provided in response to the previous heat sink performance inspection.

If the information requested above will not be available, please contact Vance Petrella as soon as possible at 630-829-9847 or e-mail Vance.Petrella@nrc.gov.