



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
2443 WARRENVILLE RD. SUITE 210
LISLE, IL 60532-4352

July 14, 2016

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

**SUBJECT: BYRON STATION, UNITS 1 AND 2 – NOTIFICATION OF AN NRC TRIENNIAL
HEAT SINK PERFORMANCE INSPECTION AND REQUEST FOR INFORMATION;
INSPECTION REPORT 05000454/2016004; 05000455/2016004**

Dear Mr. Hanson:

On October 24, 2016, the U.S. Nuclear Regulatory Commission (NRC) will begin the onsite portion of the Triennial Heat Sink Performance Inspection at your Byron Station, Units 1 and 2. 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 August 30, 2016. By September 9, 2016, the inspector will communicate the initial selected set of approximately 1 – 2 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 October 13, 2016. 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 onsite to the inspector on October 24, 2016. 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.

B. Hanson

-2-

The lead inspector for this inspection is Mr. Andrew Dunlop. We understand that our licensing contact for this inspection is Ms. L. Zurawski of your organization. If there are any questions about the inspection or the material requested in the enclosure, please contact the lead inspector at 630-829-9726, or via e-mail at Andrew.Dunlop@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's Public Document Room or from the Publicly Available Records (PARS) component of the 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/

Andrew Dunlop, Senior Reactor Engineer
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 50-454; 50-455
License Nos. NPF-37; NPF-66

Enclosure:
Triennial Heat Sink Performance Inspection
Document Request

cc: Distribution via LISTSERV®

TRIENNIAL HEAT SINK PERFORMANCE INSPECTION DOCUMENT REQUEST

Inspection Report: 05000454/2016004; 05000455/2016004

Inspection Dates: October 24 – 28, 2016;

Inspection Procedure: IP 71111.07, "Heat Sink Performance"

Lead Inspector: Andrew Dunlop, DRS
630-829-9726
Andrew.Dunlop@nrc.gov

I. Information Requested By August 30, 2016:

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 3 years.
4. Copy of any self-assessment done on any of GL 89-13 heat exchangers.
5. Last two System Health Report(s) and maintenance rule system notebooks for all the GL 89-13 heat exchangers.
6. List of engineering-related operator workarounds (with a short description) associated with GL 89-13 heat exchangers that were in place within the last 3 years.
7. List of permanent and temporary modifications (with a short description) associated with GL 89-13 heat exchangers for the last 3 years.

II. Information Requested By October 13, 2016:

1. Copies of the GL 89-13 responses.
2. Copy of the Updated Final Safety Analysis Report (UFSAR) section applicable to the GL 89-13 Heat Exchanger Program.
3. Copies of procedures developed to implement the recommendations of GL 89-13 (e.g. the GL 89-13 Heat Exchanger Program description).
4. Copies of the selected Corrective Action Program documents.
5. For the specific heat exchangers selected:
 - a. Copies of the UFSAR sections applicable for each heat exchanger.

Enclosure

TRIENNIAL HEAT SINK PERFORMANCE INSPECTION DOCUMENT REQUEST

- b. Copy of system description and design basis document for the heat exchangers (as applicable).
 - c. Provide a list of calculations (with a short description) which currently apply to each heat exchanger.
 - 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
 - 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.
6. 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 system description and design basis document (as applicable).
 - f. Copy of the construction code and Design Specification.

TRIENNIAL HEAT SINK PERFORMANCE INSPECTION DOCUMENT REQUEST

- g. 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.
 - h. Copies of corrective action documents associated with waterhammer or hydraulic transients in the service water system since the last Heat Sink Inspection.
 - i. If available, provide an electronic copy of piping and instrumentation diagrams for the service water system, including the intake structure.
 - j. Provide a list of calculations (with a short description), which currently apply to UHS and safety-related service water system.
 - k. 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.
 - l. 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.
7. 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 to be Available on First Day of Inspection, October 24, 2016:

- 1. For the specific heat exchangers selected.
 - a. Copy of the calculation which correlates surveillance testing results from these heat exchangers with design basis heat removal capability (e.g., basis for surveillance test acceptance criteria
 - b. Copies of the two most recent completed tests and evaluation data confirming thermal performance for those heat exchangers which are performance tested.
 - c. 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.
 - d. Information regarding any alarms which monitor on-line performance.
 - e. Copy of the document describing the inspection results of each heat exchanger.
 - f. The cleaning and inspection maintenance schedule for each heat exchanger for the next 5 years.
 - g. Copy of the design specification and heat exchanger data sheets for each heat exchanger.
 - h. Copy of the vendor manuals including component drawings for each heat exchanger.

TRIENNIAL HEAT SINK PERFORMANCE INSPECTION DOCUMENT REQUEST

- i. Copy of the calculation which establishes the limiting (maximum) design basis heat load which is required to be removed by each of these heat exchangers.
 - j. Copy of the operating procedure that ensures that the maximum cooling water system inlet temperature limit is not exceeded.
 - k. Copy of the calculations or documents which evaluate the potential for water hammer in each heat exchanger or associated piping.
 - l. Copy of the calculations that evaluate excessive tube vibration in each heat exchanger and the documents that describe the controls that prevent heat exchanger degradation due to excessive flow induced vibration during operation.
 - m. Copy of the periodic flow testing at or near maximum design flow.
 - n. 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.
 - o. Copy of the document establishing the repair criteria (plugging limit) for degraded tubes which are identified in each heat exchanger.
 - p. 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).
 - q. Copies of those documents that describe the methods taken to control water chemistry in the heat exchangers.
2. For the review of the operation of the safety-related service water system (or equivalent) and the UHS:
- a. Copies of any design change performed on the UHS in last 3 years.
 - b. Copies of any design change performed on the safety-related service water system in last 3 years.
 - c. Copies of procedures for a loss of UHS.
 - d. Copies of procedures for a loss of service water system.
 - e. Inspections and/or maintenance related to preventing macrofouling (e.g., silt, dead mussel shells, or debris) and biotic fouling (e.g., fish, algae, grass, or kelp) in last 3 years.
 - f. Copies of chemistry procedures that monitor for pH, calcium hardness, etc. Also, provide copies of the associated results for the last 3 years.
 - g. Copies of documents associated with the monitoring of pump performance for potential strong-pump vs. weak-pump interaction.

TRIENNIAL HEAT SINK PERFORMANCE INSPECTION DOCUMENT REQUEST

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.
 - 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 for the last performed on the service water pump bay water level instruments.
 - 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.

If the information requested above will not be available, please contact Mr. Andrew Dunlop as soon as possible at 630-829-9726, or via e-mail Andrew.Dunlop@nrc.gov.

B. Hanson

-2-

The lead inspector for this inspection is Mr. Andrew Dunlop. We understand that our licensing contact for this inspection is Ms. L. Zurawski of your organization. If there are any questions about the inspection or the material requested in the enclosure, please contact the lead inspector at 630-829-9726, or via e-mail at Andrew.Dunlop@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's Public Document Room or from the Publicly Available Records (PARS) component of the 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/

Andrew Dunlop, Senior Reactor Engineer
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 50-454; 50-455
License Nos. NPF-37; NPF-66

Enclosure:
Triennial Heat Sink Performance Inspection
Document Request

cc: Distribution via LISTSERV®

DISTRIBUTION:	Cynthia Pederson	Linda Linn
Jeremy Bowen	Darrell Roberts	DRPIII
RidsNrrDorLpl3-2 Resource	Richard Skokowski	DRSIII
RidsNrrPMByron Resource	Allan Barker	
RidsNrrDirslrib Resource	Carole Ariano	

ADAMS Accession Number ML16196A110

Publicly Available Non-Publicly Available Sensitive Non-Sensitive

To receive a copy of this document, indicate in the concurrence box "C" = Copy without attach/encl "E" = Copy with attach/encl "N" = No copy

OFFICE	RIII		RIII		RIII		RIII
NAME	ADunlop:cl						
DATE	07/14/16						

OFFICIAL RECORD