



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

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

July 5, 2012

Mr. Michael J. Pacilio  
Senior Vice President, Exelon Generation Company, LLC  
President and Chief Nuclear Officer (CNO), Exelon Nuclear  
4300 Winfield Road  
Warrenville, IL 60555

**SUBJECT: QUAD CITIES NUCLEAR POWER STATION – NOTIFICATION OF AN NRC  
TRIENNIAL HEAT SINK PERFORMANCE INSPECTION AND REQUEST  
FOR INFORMATION INSPECTION REPORT 05000254/2012004(DRS);  
05000265/2012004(DRS)**

Dear Mr. Pacilio:

On September 17, 2012, the U.S. Nuclear Regulatory Commission (NRC) will begin the on-site portion of the Triennial Heat Sink Performance Inspection at your Quad Cities Nuclear Power Station, Units 1 and 2. This inspection will be performed in accordance with NRC baseline inspection procedure (IP) 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 3, 2012. By August 17, 2012, the inspector will communicate the initial selected set of approximately 2-3 risk significant heat exchangers.
- The second group of documents requested is those items 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 August 30, 2012. 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 on-site to the inspector on September 17, 2012. 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.

M. Pacilio

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The lead inspector for this inspection is Mr. Larry J. Jones Jr. We understand that our regulatory contact for this inspection is Tom Petersen of your organization. If there are questions about the material requested, or the inspection, please call Larry J. Jones Jr. at (630) 829-9864. Please send the information electronically or to the following e-mail address [larry.jones@nrc.gov](mailto:larry.jones@nrc.gov). A hard-copy with the required information is also an acceptable option.

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 on-site inspection.

All requested documents are to be for the time period from the on-site 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.

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 10 CFR 2.390 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 document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA by A. Dunlop for/

Ann Marie Stone, Chief  
Engineering Branch 2  
Division of Reactor Safety

Docket Nos. 50-254, 50-265 and 72-053  
License Nos. DPR-29 and DPR-30

Enclosure: TRIENNIAL HEAT SINK PERFORMANCE INSPECTION DOCUMENT  
REQUEST

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## TRIENNIAL HEAT SINK PERFORMANCE INSPECTION DOCUMENT REQUEST

**Inspection Report:** 05000254/2012004(DRS); 05000265/2012004(DRS)

**Inspection Dates:** September 17 – 21, 2012

**Inspection Procedure:** Inspection Procedure (IP) 71111.07, "Heat Sink Performance"

**Lead Inspector:** Larry J. Jones Jr.  
(630) 829-9864  
[larry.jones@nrc.gov](mailto:larry.jones@nrc.gov)

**Team Member:** Gerard F. O'Dwyer  
(630) 829-9624  
[gerard.odwyer@nrc.gov](mailto:gerard.odwyer@nrc.gov)

### ***I. Information Requested By August 3, 2012***

1. List of all 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.
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. The requested documents are to be for the time period from the on-site inspection period back to the documents that were provided in response to the previous heat sink performance inspection.
7. List of permanent and temporary modifications (with a short description) associated with GL 89-13 heat exchangers. The requested documents are to be for the time period from the on-site inspection period back to the documents that were provided in response to the previous heat sink performance inspection.

## TRIENNIAL HEAT SINK PERFORMANCE INSPECTION DOCUMENT REQUEST

### ***II. Information Requested By August 30, 2012***

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;
  - b. Copy of system description and design basis document for the heat exchangers (as applicable);
  - c. Copies of normal, abnormal, and emergency operating procedures associated with the selected heat exchangers;
  - d. Copy of the construction code, Design Specification, heat exchanger data sheets, and vendor documents including component drawings applicable for the heat exchangers;
  - e. Copies of calculations (excluding data files), which currently apply to each heat exchanger 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
    - v. evaluate excessive tube vibration in each heat exchanger.
  - f. Provide a list of calculations (with a short description), which currently apply to each heat exchanger excluding the calculations requested in the previous item;
  - g. Copy of any operability determination or other documentation of degradation associated with the heat exchangers or the systems that support the operation for the selected heat exchangers;

## TRIENNIAL HEAT SINK PERFORMANCE INSPECTION DOCUMENT REQUEST

- h. Copies of the two most recent completed tests and evaluation data confirming thermal performance for those heat exchangers, which are performance tested;
  - i. Provide a list of instruments (with a short description) associated with automatic or alarm functions for these heat exchangers;
- 6. For the ultimate heat sink (UHS) and the safety-related service water system (or equivalent):
  - a. Copies of the applicable UFSAR sections;
  - b. Copy of system description and design basis document (as applicable);
  - c. Copy of the construction code and Design Specification;
  - d. 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;
  - e. Copy of any operability determinations or other documentation of degradation associated with the UHS and the safety-related service water system;
  - f. 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;
  - g. Copies of corrective action documents associated with waterhammer or hydraulic transients in the service water system since the last Heat Sink Inspection;
  - h. If available, provide an electronic copy of piping and instrumentation diagrams (P&IDs) for the service water system, including the intake structure;
  - i. Provide a list of calculations (with a short description), which currently apply to UHS and 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;
  - 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. Copy of the last flow balance testing performed on the safety-related service water system;
- 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.
- 8. If available, electronic copies of the current Technical Specifications, Technical Specifications Basis, and Technical Report Manual.

## TRIENNIAL HEAT SINK PERFORMANCE INSPECTION DOCUMENT REQUEST

### **III. *Information Requested to be Available on First Day of Inspection, September 17, 2012***

1. For the specific heat exchangers selected:
  - a. 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;
  - b. Copies of calculations that determine the setpoint values of any alarms which monitor on-line performance;
  - c. Copies of the documents describing the open-and-inspect results of each heat exchanger. The requested documents are to be for the time period from the on-site inspection period back to the documents that were provided in response to the previous heat sink performance inspection;
  - d. The cleaning and inspection maintenance schedule for each heat exchanger for the next 5 years;
  - e. Copy of the operating procedure that ensures that the maximum cooling water system inlet temperature limit is not exceeded. Also, provide a copy of the calculation that demonstrates the acceptability of the maximum cooling water inlet temperature;
  - f. Copy of documents that describe the controls that prevent heat exchanger degradation due to excessive flow induced vibration during operation;
  - g. Copy of the periodic flow testing at or near maximum design flow. The requested documents are to be for the time period from the on-site inspection period back to the documents that were provided in response to the previous heat sink performance inspection;
  - h. 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;
  - i. Copy of the document establishing the repair criteria (plugging limit) for degraded tubes which are identified in each heat exchange;
  - j. Copies of the documents describing the structural integrity inspection results the heat exchangers (e.g., eddy current summary sheets, ultrasonic testing results, and visual inspection results). The requested documents are to be for the time period from the on-site inspection period back to the documents that were provided in response to the previous heat sink performance inspection;

## **TRIENNIAL HEAT SINK PERFORMANCE INSPECTION DOCUMENT REQUEST**

- k. Copies of those documents that describe the methods taken to control water chemistry in the heat exchangers; and
  - l. Hardcopies of piping and instrumentation diagrams (P&IDs) of the systems applicable to the selected heat exchangers (11"X17" or similar size is preferred if legible).
2. For the UHS:
- a. Copies of the toe of the weir or embankment inspection procedures and the associated results. The requested documents are to be for the time period from the on-site inspection period back to the documents that were provided in response to the previous heat sink performance inspection;
  - b. Copies of the inspection procedures of the rip rap protection placed on excavated side slopes and the associated results. The requested documents are to be for the time period from the on-site inspection period back to the documents that were provided in response to the previous heat sink performance inspection;
  - c. Copies of the dam inspection procedures that monitor the integrity of the heat sink and the associated results, if applicable. The requested documents are to be for the time period from the on-site inspection period back to the documents that were provided in response to the previous heat sink performance inspection;
  - d. Copies of the inspection procedures for the verification of the structural integrity of underwater/underground UHS and the associated results. The requested documents are to be for the time period from the on-site inspection period back to the documents that were provided in response to the previous heat sink performance inspection;
  - e. Copies of the maintenance and/or inspection procedures for underwater UHS sediment intrusion and the associated results including underwater/underground diving inspections and/or sediment removal activities. The requested documents are to be for the time period from the on-site inspection period back to the documents that were provided in response to the previous heat sink performance inspection;
  - f. Copies of calculations and surveillances that determine the UHS reservoir capacity and heat transfer capability; and
  - g. 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 on-site 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:

## TRIENNIAL HEAT SINK PERFORMANCE INSPECTION DOCUMENT REQUEST

- a. Copies of the documents associated with the monitoring, trending, and remediation macrofouling (e.g., silt, dead mussel shells, or debris) and biotic fouling (e.g., fish, algae, grass, or kelp) at the service water pump bay. The requested documents are to be for the time period from the on-site inspection period back to the documents that were provided in response to the previous heat sink performance inspection;
- b. Copies of procedures associated with operating during adverse conditions (e.g., icing, high temperatures, low water level, grass intrusion);
- c. Copies of surveillance procedures and testing results performed on the service water pump house water level instruments. The requested documents are to be for the time period from the on-site inspection period back to the documents that were provided in response to the previous heat sink performance inspection;
- d. Copies of documents associated with the monitoring of safety-related service water pump performance for potential strong-pump vs. weak-pump interaction;
- e. 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;
- f. Copies of procedures used to monitor interface valves between the safety-related section of the service water system and the non-safety-related section and the associated results. The requested documents are to be for the time period from the on-site inspection period back to the documents that were provided in response to the previous heat sink performance inspection;
- g. Hardcopies of piping and instrumentation diagrams (P&IDs) of the safety-related service water system (11"X17" or similar size is preferred if legible);

If the information requested above will not be available, please contact Larry J. Jones Jr., as soon as possible at (630) 829-9864 or email [larry.jones@nrc.gov](mailto:larry.jones@nrc.gov).



M. Pacilio

-2-

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Sincerely,

/RA by A. Dunlop for/  
Ann Marie Stone, Chief  
Engineering Branch 2  
Division of Reactor Safety

Docket Nos.: 50-254 and 50-265  
License Nos.: DPR-29 and DPR-30

Enclosure: TRIENNIAL HEAT SINK PERFORMANCE INSPECTION DOCUMENT REQUEST

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Letter to Mr. Michael J. Pacilio from Ms. Ann Marie Stone dated July 5, 2021.

SUBJECT: QUAD CITIES NUCLEAR POWER STATION – NOTIFICATION OF AN NRC  
TRIENNIAL HEAT SINK PERFORMANCE INSPECTION AND REQUEST  
FOR INFORMATION INSPECTION REPORT 05000254/2012004(DRS);  
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