Exelon Generation Company, LLC
Byron Station
4450 North German Church Road
Byron, IL 61010-9794

www.exeloncorp.com

Exelon Nuclear

October 14, 2005

LTR: BYRON 2005-0122
File: 1.10.0101

United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Byron Station, Units 1 and 2
Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. STN 50-454 and STN 50-455

Subject: Licensee Event Report (LER) 454-2005-005-00, "Both Trains of the Ultimate Heat Sink Water Makeup Trains Exceeded Technical Specifications Required Action Completion Time Due to Contaminated Fuel Oil Resulting From Inadequate Tank Cleaning Procedure"

Enclosed is an LER involving the discovery of contaminated fuel oil in the diesel driven Essential Service Water Makeup pump's storage tanks. This condition is reportable to the NRC in accordance with 10 CFR 50.73 (a) (2) (i) (B) and 50.73 (a) (2) (vii)

Should you have any questions concerning this matter, please contact Mr. William Grundmann, Regulatory Assurance Manager, at (815) 406-2800.

Respectfully,

Stephen E. Kuczynski

Stephen E. Kuczynski
Site Vice President
Byron Nuclear Generating Station

Attachment LER 454-2005-005-00

NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 06/30/2007

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Byron Station	0500454	1 of 4

4. TITLE Both Trains of the Ultimate Heat Sink Water Makeup Trains Exceeded Technical Specification Required Action Completion Time Due to Contaminated Fuel Oil Resulting From Inadequate Tank Cleaning Procedure

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
									Byron Station	0500455
06	01	2005	2005	005	00	10	14	2005	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE

1

10. POWER LEVEL

100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

- ☐ 20.2201(b)
- ☐ 20.2201(d)
- ☐ 20.2203(a)(1)
- ☐ 20.2203(a)(2)(i)
- ☐ 20.2203(a)(2)(ii)
- ☐ 20.2203(a)(2)(iii)
- ☐ 20.2203(a)(2)(iv)
- ☐ 20.2203(a)(2)(v)
- ☐ 20.2203(a)(2)(vi)
- ☐ 20.2203(a)(3)(i)
- ☐ 20.2203(a)(3)(ii)
- ☐ 20.2203(a)(4)
- ☐ 50.36(c)(1)(i)(A)
- ☐ 50.36(c)(1)(ii)(A)
- ☐ 50.36(c)(2)
- ☐ 50.46(a)(3)(ii)
- ☐ 50.73(a)(2)(i)(A)
- ☒ 50.73(a)(2)(i)(B)
- ☐ 50.73(a)(2)(i)(C)
- ☐ 50.73(a)(2)(ii)(A)
- ☒ 50.73(a)(2)(ii)(B)
- ☐ 50.73(a)(2)(iii)
- ☐ 50.73(a)(2)(iv)(A)
- ☐ 50.73(a)(2)(v)(A)
- ☐ 50.73(a)(2)(v)(B)
- ☐ 50.73(a)(2)(v)(C)
- ☐ 50.73(a)(2)(v)(D)
- ☒ 50.73(a)(2)(vii)
- ☐ 50.73(a)(2)(viii)(A)
- ☐ 50.73(a)(2)(viii)(B)
- ☐ 50.73(a)(2)(ix)(A)
- ☐ 50.73(a)(2)(x)
- ☐ 73.71(a)(4)
- ☐ 73.71(a)(5)
- ☐ OTHER

Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Byron Station, William Grundmann, Regulatory Assurance Manager	(815) 406-2800

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

Both trains of the safety related Ultimate Heat Sink (UHS) Water Makeup system were declared inoperable on August 16, 2005 due to fuel oil samples indicating water and sediment contamination. The fuel oil supplies the diesel engine of the UHS Makeup pumps. Appropriate Technical Specification (TS) action conditions were entered. An investigation concluded that the contamination was the result of residual water and cleaning agent after a fuel oil tank cleaning process for each tank in June 2005. Consequently, the two trains were considered inoperable for a time period greater than allowed by TS. The cause was determined to be inadequate work instructions and post maintenance testing (PMT) requirements provided to the tank cleaning vendor. The instructions provided did not contain sufficient detail to ensure the tanks were clean prior to refilling with fuel oil. Corrective actions include developing a permanent tank cleaning procedure with sufficient details and controls to ensure cleanliness and a review of other vendor activities to ensure proper work instructions are used. An engineering evaluation concluded this event had minimal safety significance due to other operable makeup sources. This is reportable to the NRC in accordance with 10 CFR 50.73 (a)(2)(i)(B) as a condition prohibited by TS. In addition, this is a condition where a single cause caused two independent trains in a single system to become inoperable and therefore reportable in accordance with 10 CFR 50.73 (a)(2)(vii).

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Byron Station	0500454	2005	005	00	Page 2 of 4

(If more space is required, use additional copies of NRC Form 366A)(17)

A. Plant Condition Prior to Event:

Event Date/Time: June 1, 2005 / 1505 hours CST

Unit 1 and Unit 2 - Mode 1 – Power Operations, Reactor Power 100%

Reactor Coolant System for both Units [AB]: Normal operating temperature and pressure.

No structures, systems or components were inoperable at the start of the event that contributed to the event.

Background

The Ultimate Heat Sink (UHS) at Byron Station is a common system to both units and consists of two mechanical draft cooling towers with a diverse Makeup system. Three non-safety related circulating water makeup pumps provide normal makeup to the towers. In addition, there are two safety related diesel driven makeup pumps (i.e., 0A and 0B Essential Service Water (SX)[BS] Makeup Pumps) and two deep well pumps [BS] with safety related power sources. The UHS is governed by Technical Specification (TS) 3.7.9, "Ultimate Heat Sink." Action Condition C of this TS provides the required actions to be taken when one SX Makeup Pump is inoperable and Action Condition D provide actions when two SX Makeup Pumps are inoperable. Both conditions allow seven days to restore the SX Makeup Pumps to operable status.

B. Description of Event:

On August 16, 2005, Operations personnel took a scheduled diesel fuel sample for the 0A SX Makeup Pump. Visual examination of the sample showed high water and sediment content. Based on the condition of the sample, at 1206 hours, the 0A SX Makeup Pump was declared inoperable and TS 3.8.9 Action Condition C was entered. This was the first oil sample drawn since the diesel fuel oil tank had been cleaned and refilled on June 21, 2005. Furthermore, since the 0B SX Diesel Fuel Oil Storage tank was cleaned and refilled on June 1, 2005, a similar condition was considered to potentially exist for the fuel oil of the 0B SX Makeup Pump. A sample was taken and the 0B SX Makeup Pump Diesel Oil Storage Tank sample showed similar results. The 0B SX Makeup Pump was also declared inoperable at 1452 hours and TS 3.8.9 Action Condition D was entered.

Evaluation of the oil samples indicated the contamination was iron oxide particulate and an aqueous solution typical for cleaning diesel fuel storage tanks. This analysis indicated the June 2005 tank cleaning activities as the source of contamination for both fuel tanks.

Consequently, the 0A SX Makeup Pump was considered inoperable since June 21, 2005 until August 16, 2005 (i.e., 56 days) and the 0B SX Makeup Pump was considered inoperable since June 1, 2005 until August 16, 2005 (i.e., 77 days). This is in excess of the allowed 7 days of TS 3.7.9 and thus reportable to the NRC in accordance with 10 CFR 50.73 (a)(2)(i)(B) as a condition prohibited by TS. In addition, this is a condition where a single cause caused two independent trains in a single system to become inoperable and also reportable in accordance with 10 CFR 50.73 (a)(2)(vii).

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Byron Station	0500454	2005	005	00	Page 3 of 4

(If more space is required, use additional copies of NRC Form 366A)(17)

C. Cause of the Event

The root cause of this event was determined to be inadequate work instructions and post maintenance testing (PMT) for the tank cleaning activity. The work instructions contained insufficient scope and technical details to ensure tank cleanliness following the cleaning process. Iron oxide particles and aqueous cleaning agent solution remained in the tank when fuel oil was added. In addition, the PMT did not require an oil sample to be taken and analyzed.

A vendor who has successfully performed many tank cleaning activities in the past performed the tank cleaning work. However, a tank cleaning procedure did not exist nor were detailed work instructions provided. The Maintenance Planner believed the vendor, who specializes in tank cleaning, would have the expertise to perform the activity correctly. Consequently, detailed work instructions were not provided.

D. Safety Analysis

The SX Makeup Pump's fuel oil tanks are sized such that they would need refilling after three and half days of continuous running. An engineering evaluation concluded there is a high degree of confidence that both pumps would be fully capable of starting and operating for approximately three and one half days each without issue. The inoperability concern from a design basis standpoint is due to the inability to prove that during refilling of the SX Makeup Diesel Fuel Oil Tank turbulence would not cause sediment and/or water to mix into the suction line to the SX Makeup Pump engine. Since both SX Makeup Pump engines had successfully run for two monthly surveillances after the tank cleanings, it is reasonable to conclude that an SX Makeup pump engine would have run until it was refilled. The suction line to the SX M/U pump engine is approximately three inches off the bottom of the tank. Based on the review of the amount of contaminated oil removed from both storage tanks and the inspections performed on the day tanks and engine fuel filters, there is no concern that sediment or water migrated to the diesel engines or would have been capable of migrating to the engines until the point at which the tanks would need refilling (i.e. ~ three and one half days into the design basis accident).

The UHS design basis for Byron Station has a 30-day requirement for operability and the SX Makeup Pumps are credited as the source of water for the UHS. Therefore, since it cannot be demonstrated that either SX Makeup Pump would have been capable of operating for 30 days, the conclusion regarding inoperability was made. However, from a margin and risk standpoint, there is a negligible impact due to this historical condition. The water inventory makeup requirements after three and one half days into the design basis accident are minimal. In addition, there are two trains of non-safety related deep well pumps that were always available during the time period in question. Even though the deep well pumps are considered non-safety related, they are seismically qualified and are capable of being powered from safety related power sources. They are also credited in the Byron licensing and design basis. This is not considered a loss of a safety function

E. Corrective Actions

As an immediate corrective action, the tanks were drained, cleaned, flushed, refilled with new fuel oil and sampled before returning to service.

The diesel engine fuel filters were replaced and the removed filters examined. The results showed no signs of sediment or water associated with the tank contamination.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Byron Station	0500454	2005	005	00	Page 4 of 4

(If more space is required, use additional copies of NRC Form 366A)(17)

Interim controls were established to ensure proper re-cleaning of the SX Makeup Pump fuel oil tanks and the cleaning of other fuel oil tanks. In addition, all tank cleaning PMTs will require an oil sample to be taken and analyzed. These controls will be developed into a permanent procedure.

A review of other vendor related activities will be conducted review of open contract releases and corresponding work instructions for vendor-supported activities planned to ensure adequate level of detail is provided for scope of work, work sequence, and work closeout criteria delineated in both the contract and associated work instructions.

F. Previous Occurrences

There have been no previous occurrences of this nature.