

October 12, 2001

Mr. Oliver D. Kingsley
President and CNO
Exelon Nuclear
Exelon Generation Company, LLC
200 Exelon Way, KSA 3-E
Kennett Square, PA 19348

SUBJECT: LIMERICK GENERATING STATION - NRC INSPECTION REPORT
50-352/01-10, 50-353/01-10

Dear Mr. Kingsley:

On September 30, 2001, the NRC completed an inspection at your Limerick Generating Station Units 1 and 2. The enclosed report documents the inspection findings which were discussed on October 5, 2001, with Mr. W. O'Malley and other members of your staff.

This inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed procedures and records, observed activities, and interviewed personnel.

No findings of significance were identified.

In accordance with 10 CFR 2.790 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 the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (The Public Electronic Reading Room).

Sincerely,

/RA/

Mohamed Shanbaky, Chief
Project Branch 4
Division of Reactor Projects

Docket Nos.: 50-352; 50-353
License Nos: NPF-39; NPF-85

Enclosure: Inspection Report 50-352/01-10, 50-353/01-10

Attachment 1: Supplemental Information

cc w/encl: J. J. Hagan, Senior Vice President, Mid-Atlantic Regional Operating Group
W. Bohlke, Senior Vice President - Nuclear Services
J. Cotton, Senior Vice President - Operations Support
J. Skolds, Chief Operating Officer
G. Hunger, Chairman, Nuclear Review Board
M. Gallagher, Director - Licensing Mid-Atlantic Regional Operating Group
J. Benjamin, Vice President - Licensing and Regulatory Affairs
W. Levis, Vice President - Limerick Generating Station
R. C. Braun, Plant Manager, Limerick Generating Station
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| OFFICE | RI/DRP | | RI/DRP | |
| NAME | Aburritt/MS for | | MShanbaky/MS | |
| DATE | 10/12/01 | | 10/12/01 | |

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U.S. NUCLEAR REGULATORY COMMISSION

REGION 1

Docket Nos: 50-352; 50-353

License Nos: NPF-39, NPF-85

Report No: 50-352/01-10, 50-353/01-10

Licensee: Exelon Generation Company, LLC

Facility: Limerick Generating Station, Units 1 & 2

Location: Evergreen and Sanatoga Roads
Sanatoga, PA 19464

Dates: August 12, 2001 thru September 30, 2001

Inspectors: A. Burritt, Senior Resident Inspector
B. Welling, Resident Inspector
T. Burns, Reactor Inspector
S. Barr, Project Engineer
A. McMurtray, Senior Resident Inspector, Peach Bottom
J. Noggle, Senior Health Physicist

Approved by: Mohamed Shanbaky, Chief
Projects Branch 4
Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000352-01-10, IR 05000353-01-10, on 08/12-09/30/2001, Exelon Generation Company; Limerick Generating Station; Units 1 and 2; Resident Inspector Report.

This inspection was conducted by resident inspectors and regional specialists. The inspection identified no findings of significance.

The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply are indicated by "no color" or by the severity level of the applicable violation. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website at <http://www.nrc.gov/NRR/OVERSIGHT/index.html>.

A. Inspector Identified Findings

No findings of significance were identified.

B. Licensee Identified Violations

A violation of very low significance which was identified by the licensee has been reviewed by the inspector. Corrective actions taken or planned by the licensee appear reasonable. The violation is listed in section 40A7 of this report.

Report Details

Summary of Plant Status

Units 1 and 2 began this inspection period operating at 100% power and remained at or near that power level except for brief periods of planned testing and control rod pattern adjustments.

1. REACTOR SAFETY [R] Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R04 Equipment Alignment (71111.04)

a. Inspection Scope

The inspectors performed a partial walkdown on the Unit 2 “B” core spray (CS) loop, while the Unit 2 “A” CS loop was out of service for planned maintenance. The inspectors used piping and instrumentation diagram 8031-M-52.

The inspectors also performed a partial walkdown of the Unit 2 reactor core isolation cooling (RCIC) system while the Unit 2 high pressure coolant injection system was out of service for planned testing. The inspectors used system procedure S49.9.A, Routine Inspection of the RCIC System, and piping and instrumentation diagram 8031-M-49.

The walkdowns included reviews of valve positions, major system components, electrical power availability, and equipment deficiencies.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope

The inspectors toured high risk areas at both Limerick units to assess Exelon’s control of transient combustible material and ignition sources, fire detection and suppression capabilities, fire barriers, and any related compensatory measures. The inspectors reviewed the respective Pre-Fire Action Plan procedures and Section 9A of the Updated Final Safety Analysis Report, as applicable. The fire areas included:

- Spray pond pump house structure West (fire area 122)
- Spray pond pump and structure East (fire area 123)
- Emergency diesel generator fuel oil storage structure

b. Findings

No findings of significance were identified.

.1 Observe Plant Fire Drilla. Inspection Scope

The inspector observed an unannounced fire drill in the Unit 1 HPCI Room on August 15, 2001. The inspector evaluated various aspects of the fire brigade response, including use of protective gear and fire fighting equipment, communications with the main Control Room, and uses of the pre-fire plan procedure. The inspector attended the post-drill critique and discussed the results with the fire protection specialist and station management.

b. Findings

No findings of significance were identified.

1R08 Heat Sink Performance (71111.07)a. Inspection Scope

The inspector selected a sample of heat exchangers and coolers for inspection to verify that the licensee was identifying potential deficiencies which could mask degraded performance and potential common cause heat sink performance problems that have the potential to increase risk. The inspector also verified that the licensee entered identified problems into the corrective action program for evaluation and resolution. The sample was selected from systems that are ranked high in the "plant-specific" risk assessment. The components selected for inspection were:

- Residual heat removal (RHR) heat exchangers 1A-E205, 1B-E205, 2A-E205 and 2B-E205
- Unit 1 "C" and Unit 2 "C" RHR motor oil coolers
- Unit 1 "A" and Unit 1 "C" RHR Room coolers
- Emergency diesel generator (EDG) D22 lube oil cooler

The inspector reviewed the licensee's inspection, cleaning, maintenance, frequency of testing, test methodology, test results and acceptance criteria for the above heat exchangers and coolers. The inspector verified that these activities were conducted in accordance with accepted industry practices and the acceptance criteria were consistent with design basis values. The inspector verified that the tests properly reflected design basis specification values (flow rates and temperatures) provided by the vendor. Test instruments were verified to be within the calibration period and within specified tolerance values. The inspector reviewed the validation and verification calculation used to support the use of software developed to assess the performance of heat exchangers. The inspector performed a review of selected calculations to verify that heat exchanger performance was consistent with design. The inspector verified test results were recorded, evaluated and reconciled to address differences in test and design conditions and deficiencies were appropriately documented and dispositioned.

The inspector reviewed the frequency of maintenance and cleaning of the heat exchangers and coolers listed above with the system engineers to ensure that these

activities were scheduled and performed using trend data developed from the periodic heat transfer tests and previously performed visual inspections (open and clean). The inspector examined the trending of the measured data for the components inspected and assessed the licensee determination of the cause for any step change in the trend and, what steps were taken to disposition significant step changes. The inspector verified, through discussion with system engineers and chemistry personnel and reviews of test data, that chemical treatments were effective for control of corrosion and biotic fouling of service water and emergency service water systems.

The inspector performed a walk down of the RHR heat exchangers, motor coolers and room coolers to assess the material condition. Also, the selected EDG lube oil and water jacket cooler were examined for material condition and evaluation of the placement of test instruments used for heat transfer performance testing. The inspector also reviewed the licensee's operability evaluation of the EDG lube oil cooler, including actions taken, to address the issues identified in NRC Information Notice 97-41, "Potentially Undersized Emergency Diesel Generator Oil Coolers."

Finally, the inspector reviewed a sample of deficiencies to verify the licensee entered the problems into the corrective action program and provided appropriate corrective action.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11)

a. Inspection Scope

On September 18, 2001, the inspector observed a licensed operator requalification simulator evaluation (an as-found scenario) to assess licensed operator performance and the evaluator's critique. The inspector discussed the results with operators, operations management, and instructors. The inspector also referred to the simulator scenario document, LSTS 4502, and the following off-normal plant procedures and emergency operating procedures:

- E-1AY160, Loss of Unit 1 "A" Reactor Protection System Uninterruptible Power Supply
- ON-113, Loss of Reactor Enclosure Cooling Water
- T-101, Reactor Pressure Vessel Control

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation (71111.12)a. Inspection Scope

The inspectors reviewed Exelon's actions with respect to the Maintenance Rule for the following equipment performance issues:

- RCIC relays - high contact resistance (AR A0934270)
- High pressure coolant injection steam supply valve (HV-055-1F001) failed to open (AR A1324094)
- Fire protection water curtain deluge valve XV-22-138 failed to open (AR A1330758)
- "A" auxiliary equipment room fan trip (PEP I0012914 and AR A1328570)
- 1C core spray suction valve (HV-052-1F001C) failed to stroke (PEP I0012905)

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluation (71111.13)a. Inspection Scope

The inspectors reviewed Exelon's risk management and risk assessments as required by 10 CFR 50.65 (a)(4) of the following emergent and planned maintenance activities. The inspectors reviewed the Sentinel on-line risk assessment results, risk management activities, work control center planning and scheduling, and emergent work-related activities.

- Unit 2 "A" core spray system outage
- Unit 1 "C" low pressure coolant injection system testing
- Unit 2 Div II nuclear steam supply shutoff system bypass switch troubleshooting
- Unit 2 high pressure coolant injection system testing

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)a. Inspection Scope

The inspectors reviewed the technical adequacy of operability evaluations associated with the following plant equipment conditions. As needed, the inspectors discussed the operability evaluations with operators and engineering personnel.

- Div II nuclear steam supply shutoff system inability to bypass an isolation signal (AR A1333614)
- Emergency Service Water (ESW) flow balance (Condition Report CR 76196) (PEP I0012865)

The inspectors reviewed the applicable action request, condition report, and PEP documents and referred to Exelon Nuclear Operations Manual Chapter 11.1, Operability.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors observed post maintenance testing and reviewed the test data for the following. The inspectors verified that the test activities were adequate to ensure system operability and functional capability.

- 2A core spray loop injection valve (HV-52-2F005) breaker preventative maintenance
- Unit 1 "A" standby liquid control (SLC) relief valve replacement
- Standby gas treatment maintenance
- Unit 2 "A" main steam line flow transmitter repair
- Unit 1 high pressure coolant injection drain valve, 1F029, failed to stroke repair
- D14 EDG jacket water leak repair

The inspectors referred to testing procedures and work order documents, including:

- ST-2-041-424-2, Main Steam Line Flow - High; Channel A Calibration/Functional Test
- M1336640, Repair HPCI 1F029 valve
- M1337350, Repair D14 Flexmaster Coupling
- ST-4-076-322-0, Standby Gas Treatment Charcoal Adsorber/HEPA Filter Test

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors observed and reviewed the results of several scheduled equipment surveillance tests, including:

- ST-6-048-230-1, SLC pump, valve, and flow test
- ST-6-049-230-2, RCIC pump, valve, and flow test
- ST-6-07-101-2, Div 1 isolation logic system functional test

b. Findings

No findings of significance were identified.

1. EMERGENCY PREPAREDNESS [EP]

1EP6 Drill Evaluation (71114.06)

a. Inspection Scope

The inspectors observed an emergency preparedness drill on September 27, 2001, from the Technical Support Center. The inspectors reviewed the classification, notification, and protective action recommendation development activities. In addition, the inspectors compared their observations with licensee-identified weaknesses and deficiencies.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS2 ALARA Planning and Controls

a. Inspection Scope

The licensee's performance in maintaining occupational radiation exposure as low as is reasonably achievable (ALARA) during the Spring 2001 Limerick Unit 2 refueling outage was reviewed. As part of this review, the following five highest exposure outage tasks for the drywell were reviewed:

- general entry
- scaffolding
- under vessel work
- 50A valve replacement
- 001 valve replacement

The performance in this area was evaluated relative to information and criteria contained in the following documents and interviews:

- Limerick Generating Station Unit 2 Sixth Refuel Outage ALARA Report
- Supporting ALARA post-job reviews
- Station ALARA Program, HP-C-110, Rev. 2
- Cobalt Reduction Plan, HP-C-120, Rev. 0
- ALARA Review of Modifications, HP-C-301, Rev. 1
- Radiation Work Permit Program, HP-C-310, Rev. 3

- Shielding Program, HP-C-313, Rev. 2
- Station Source Reduction Program, HP-C-322, Rev. 2
- ALARA Job Reviews, HP-C-324, Rev. 3
- Information from interviews with three ALARA radiological engineers and the acting Radiological Engineering Manager
- Actual Job dose and dose estimate relative to previous outage dose estimates
- 10 CFR 20.1101(b).

In addition, 36 radiation protection Performance Enhancement Process (PEP) reports and 118 trend of performance reports, initiated between January 1 and September 13, 2001, were screened for safety significant issues and potential performance indicator (PI) events. Further, PEPs I0012159 and I0012484 were reviewed with respect to problem identification, evaluation, and resolution program requirements.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES [OA]

4OA1 Performance Indicator Verification (71151)

The inspectors reviewed the accuracy and completeness of the supporting data for the following Limerick performance indicator. The inspectors reviewed operator logs and maintenance records, and discussed the data with station personnel.

- Unplanned power changes (July 1, 2000 - June 30, 2001)

b. Findings

No findings of significance were identified.

4OA3 Event Follow-Up (71153)

.1 LER 2-01-001

Unit 2 manual scram following 2N SRV failing open due to erosion and oxidation of the first stage pilot valve disc seating area. This event was inspected in NRC Inspection Report 50-352; 353/2001-003. Unresolved Item (URI) 50-353/2001-003-01 remains open to review Exelon's root cause analysis and the associated impact on plant risk. No new findings of significance were identified during the LER review.

.2 LER 2-01-003

Unit 2B containment hydrogen recombiner temperature controller failure. This LER reported a condition that was prohibited by Technical Specifications (TS). This licensee identified violation is discussed in Section 4OA7 of this report.

4OA6 Meetings, Including Exit.1 Exit Meetings

The inspectors presented the inspection results to Mr. O'Malley and other members of station management on October 5, 2001.

The results of the heat sink performance inspection were presented to licensee management on August 17, 2001. The results of the radiological controls inspection were presented to licensee management on September 13, 2001.

The inspectors asked Exelon whether any materials examined during the inspections should be considered proprietary. No proprietary information was identified.

4OA7 Licensee Identified Violation

The following finding of very low significance was identified by the licensee and is a violation of NRC requirements which meets the criteria of Section VI of the NRC Enforcement Policy for being dispositioned as a Non-Cited Violation (NCV).

NCV Tracking NumberRequirement Licensee Failed to Meet

NCV 50-353/01-10-01

Technical Specification (TS) 3.6.6.1 requires restoration of an inoperable containment hydrogen recombiner within 30 days or be in a hot shutdown within the next 12 hours. This requirement was exceeded in September 2000, when the 2B hydrogen recombiner was in an undetected inoperable condition. A noncompliance with Technical Specifications 3.0.3 and 3.0.4 also occurred as a result of this condition. This violation was reported in LER 2-01-003, and was addressed in the licensee's corrective action program as PEP I0012750.

Attachment 1

SUPPLEMENTAL INFORMATIONa. Key Points of ContactExelon Generation Company

| | |
|--------------|-------------------------------------|
| J. Armstrong | Director - Site Engineering |
| R. Braun | Plant Manager |
| E. Callan | Director - Maintenance |
| W. Harris | Radiation Protection Manager |
| J. Kraus | Senior Manager - Design Engineering |
| W. Levis | Site Vice President |
| W. O'Malley | Senior Manager - Operations |
| J. Tucker | Senior Manager - Plant Engineering |

b. Items Opened, Closed, and DiscussedClosed

| | |
|--------------|---|
| LER 2-01-001 | Unit 2 manual scram following 2N SRV failing open due to erosion and oxidation of the first stage pilot valve disc seating area |
| LER 2-01-003 | Unit 2B containment hydrogen recombiner temperature controller failure |

Opened and Closed

| | |
|---------------------|---|
| NCV 50-353/01-10-01 | Licensee identified violation of Technical Specifications |
|---------------------|---|

c. List of Acronyms

| | |
|-------|------------------------------------|
| ALARA | As Low As is Reasonably Achievable |
| AR | action requests |
| CR | condition report |
| CS | core spray |
| EDG | emergency diesel generator |
| ESW | emergency service water |
| NCV | non-cited violation |
| PEP | performance enhancement process |
| PI | performance indicator |
| RCIC | reactor core isolation cooling |
| RHR | residual heat removal |
| SLC | standby liquid control |
| SRV | safety relief valve |