

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-334/86-13

Docket No. 50-334

License No. DPR-66 Priority - Category C

Licensee: Duquesne Light Company
Post Office Box 4
Shippingport, Pennsylvania 15077

Facility Name: Beaver Valley Unit 1

Inspection At: Shippingport, Pennsylvania

Inspection Conducted: June 9-13, 1986

Inspectors: c/o for J. Chung 7/23/86
Jin W. Chung, Lead Reactor Engineer date

c/o for S. McNeil 7/23/86
Scott McNeil, Reactor Engineer, I&E date

Approved by: C. J. Anderson 7/23/86
C. J. Anderson, Chief, PSS date

Inspection Summary:

Inspection on June 9-13, 1986 (Inspection Report No. 50-334/86-13)

Areas Inspected: Special unannounced inspection of containment integrity and tours of the facility.

Results: No violations or deviations were identified.

DETAILS

1.0 Persons Contacted

- *H. R. Caldwell, Director, I&C
- J. Daugherty, Nuclear Shift Supervisor
- *J. R. Dodson, Record Management Administration
- *A. J. Dometrovich, Engineer I
- *K. D. Grada, Manager, Nuclear Safety
- A. Hartner, Nuclear Shift Supervisor
- *W. S. Lacey, Plant Manager
- R. Manko, Test Engineer
- C. McFeters, Engineer II
- *W. Mercer, Test Supervisor
- *B. F. Sepelak, NSU Engineer
- *G. S. Sovick, Senior Licensing Engineer
- *T. G. Zyra, Director, Testing & Plant Performance

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- *W. Troskoski, Senior Resident Inspector
- *A. A. Asars, Resident Inspector

The inspector also held discussions with other licensee employees during the inspection, including operations, technical supports and administrative personnel.

*Denotes those present at the exit meeting on June 13, 1986.

2.0 Scope of Inspection

2.1 Objective

The objective was to verify that containment integrity was maintained and that appropriate systems were available and adequate procedures were implemented to mitigate release in the event of a loss of containment integrity following a LOCA.

2.2 Scope

The containment systems and components designed to mitigate offsite release of contamination were inspected for compliance with regulatory requirements. Hardware availability was evaluated to ensure that the containment integrity would be maintained in the event of severe accidents. The post-LOCA mitigation systems reviewed included the following:

- Spray Additive System
- Ventilation System
- Recirculation Spray System
- Quench Spray System
- Steam Ejector and Vacuum Pumps
- Post-DBA Hydrogen Control Systems
- Control Room Chlorine Detection System
- Fire Protection Deluge System

The containment penetrations and isolation valves were also inspected to verify that local leakages determined by Local Leak Rate Test (LLRT) per Type B and C tests of Appendix J, 10 CFR 50, were within the specifications. A walkdown visual inspection was conducted on spare mechanical and electrical penetrations, both inside and outside the containment, to verify that the LLRT was performed properly and that the exemptions from the LLRT Appendix J requirements for the mechanical spare penetrations were appropriate.

An "As Found" and "As Built" verification walkdown inspection was conducted for the isolation valves, containment penetrations and the containment systems. The objective was to verify current system lineup and valve positions, and to look for obvious indications of leakage or abnormalities.

Hardware availability was evaluated based on the licensee's programs and implementation of their programs as supported by the records, procedures, in-progress activities, initiatives, and "As Found" conditions. The following criteria were employed to assess hardware availability:

- Preventive measures to reduce equipment failure (preventive maintenance).
- Prompt detection of deficiencies (surveillances and operations).
- Effective corrective measures and measures to prevent the recurrence of deficiencies or failures (corrective maintenance, Environmental Qualifications, trendings, and NPRDS).
- Licensee's programs to verify equipment operability after maintenance, surveillance, and testing (post-maintenance testing and implementation per Generic Letter 83-28).
- "As Built" and "As Found" walkdown inspections.

The operational readiness of the post-LOCA mitigating systems was evaluated based on the adequacy of the procedures, surveillances, and "As Found" condition. The capability of direct or indirect surveillance of the containment integrity in combination with a high degree of equipment availability improves assurance of containment integrity.

2.3 Finding Summary

The inspection findings indicated that the plant programs and the containment systems to mitigate the contamination release in the event of a failure of containment integrity and/or a LOCA are in a high state of availability, and that the plant is capable of monitoring continuously the sub-atmospheric containment atmosphere and containment integrity.

The good indication of equipment availability and the demonstration of containment integrity is indicative of the licensee's effective programs. Surveillance and maintenance programs were adequate. Their implementation and records were consistent with the station procedures. The LLRT records under type B and C test requirements and surveillance records indicated that the containment integrity is maintained. Several areas where the licensee's containment program could be improved include:

- ° Technical Specification 4.6.1.1 specifies monthly surveillance requirements for all containment isolation valves and penetrations. No exemptions or provisions were provided in the Technical Specifications for those valves and penetrations which are not readily accessible.

Operating Surveillance Test (OST) procedure 1.47.2 specifies a paper review for isolation valves inside containment or other inaccessible isolation valves during power operation. For example, the procedural step 16 in OST 1.47.2 requires that the containment isolation valves PC-38 and PC-9, both inside the containment, be verified closed by reviewing the lead seal log in the control room.

The inspector discussed the inconsistency between procedures and the technical specifications with the licensee representatives and was informed that the technical specifications would be revised to include an exemption provision for those inaccessible isolation valves and penetrations (paragraph 4.1).

- ° Post-maintenance testing requirements were not clearly specified in the station procedures, particularly, operability testing after maintenance activities. These requirements were not specified clearly to meet the intent of Generic Letter 83-28. This led to several deficiencies in documentation and recording of the post-maintenance testing of the completed Maintenance Work Requests (MWRs) (see paragraph 4.3).
- ° Channel calibration and functional test procedures (MSP 44.01 thru MSP 44.06) were inadequate in that the chlorine detection system in the control room could become inoperable due to the electrode clogging. The chlorine sensitivity test of the

detector sensors will be incorporated into the procedures (see paragraph 3.2).

3.0 Primary Containment Integrity

The inspector evaluated the procedures and results of containment integrity verification surveillances that were conducted from October 1985 through April 1986. The following procedures were reviewed:

Procedure No.	Title
BVT 1.47.07	"Containment Isolation Valve Leak Test Connection Verification"
OST 1.47.002	"Containment Integrity Verification"

The containment penetrations in the upper head injection system, the chemical volume and control system, the hydrogen purge system, component cooling water system, and the fire protection deluge system were examined by the inspector to determine if these procedures satisfied the surveillance requirements of Technical Specification (T.S.) 4.6.1.1a. The inspector concluded that these procedures adequately verified the closure of all primary containment penetrations not capable of being closed by operable, automatic containment isolation valves. Included in these surveillances was the closure of equipment hatches, vent and drain valves, and spare mechanical and electrical penetration isolation boundaries.

No unacceptable conditions were identified.

3.1 Surveillances on Post-LOCA Mitigation Systems

The performance of the T.S. required surveillances over the period October 1985 through May 1986 demonstrated the operability of the following post-LOCA mitigation systems.

System	T.S.	Surveillance(s)
o containment quench spray and recirculation spray systems	4.6.2.1a & 2a	o OST 1.13.1, "1A Quench Pump - Flow Test" o OST 1.13.2, "1B Quench Pump - Flow Test" o OST 1.13.3, "1A Recirculation Pump Dry Test" o OST 1.13.4, "1B Recirculation Pump Dry Test"

System	T.S.	Surveillance(s)
		<ul style="list-style-type: none"> ◦ OST 1.13.5, "2A Recirculation Pump Dry Test" ◦ OST 1.13.6, "2B Recirculation Pump Dry Test" ◦ OST 1.13.8, "Containment Depressurization System MOV's Exercise - Train A" ◦ OST 1.13.9, "Containment Depressurization System MOV's Exercise - Train B"
◦ hydrogen analyzers	4.6.4.1a	<ul style="list-style-type: none"> ◦ MSP 46.03A, "Hydrogen Analyzer H2-HY100A Calibration" ◦ MSP 46.03B, "Hydrogen Analyzer H2-HY100B Calibration"
◦ electric hydrogen recombiners	4.6.4.2b	<ul style="list-style-type: none"> ◦ MSP 46.01A, "Hydrogen Recombiner 1A Visual Inspection" ◦ MSP 46.01B, "Hydrogen Recombiner 1B Visual Inspection" ◦ MSP 46.02A, "Hydrogen Recombiner 1A Calibration" ◦ MSP 46.02B, "Hydrogen Recombiner 1B Calibration" ◦ OST 1.46.1, "Post-DBA Hydrogen Control System A Functional Test" ◦ OST 1.46.2, "Post-DBA Hydrogen Control System B Functional Test"
◦ hydrogen purge system	4.6.4.3a	<ul style="list-style-type: none"> ◦ OST 1.46.5, "Post-Accident Hydrogen Purge System Functional Test"

These surveillances satisfied the requirements to adequately demonstrate the operability of these systems. Additionally, the inspector verified that surveillance tests were performed at the proper frequencies.

The licensee was unable to locate the following four surveillance records which the inspector requested for review.

- OST 1.13.1, performed December 12, 1985
- OST 1.13.4, performed December 16, 1985
- OST 1.13.4, performed November 18, 1985
- OST 1.13.4, performed October 21, 1985

The licensee was required to perform these surveillances as the unit was in mode 1 during this entire period. A review of the licensee's "Shift Operating Report" logs found that the surveillances listed above were logged as being satisfactorily performed during the months in question.

Three of the above four records were found a week later. The records of the OST 1.13.4 surveillance completed on October 21, 1985 were not located. The inspector determined that this was an isolated case of filing problems since more than 200 records were requested and reviewed.

3.2 Chlorine Detection Systems

The inspector reviewed the licensee's channel functional tests and channel calibrations required by T.S. 4.3.3.7 to demonstrate the operability of the unit's three independent chlorine detection systems. The surveillances reviewed were as follows:

- MSP 44.01, "CL-VS101A Control Room Chlorine Detection Loop Channel I Calibration"
- MSP 44.02, "CL-VS101B Control Room Chlorine Detection Loop Channel III Calibration"
- MSP 44.03, "CL-VS101C Control Room Chlorine Detection Loop Channel IV Calibration"
- MSP 44.04, "CL-VS101A Control Room Chlorine Detection Loop Channel I Test"
- MSP 44.05, "CL-VS101B Control Room Chlorine Detection Loop Channel III Test"
- MSP 44.06, "CL-VS101C Control Room Chlorine Detection Loop Channel IV Test"

The inspector found that these surveillances adequately met Technical Specification and vendor technical manual requirements for testing and maintenance (channel functional tests and channel calibrations) of the chlorine detection systems. However, a review of the eighteen CFTs performed November 1985 through April 1986 indicated that the electrolyte flowrates to the sensors wicks was deficient in ten CFTs, and that the potential existed to develop complete flow blockages of the electrolyte, resulting in the chlorine detection system failures.

The licensee committed to revise the monthly surveillance CFTs (MSP 44.04, MSP 44.05, and MSP 44.06) by September 1, 1986. The procedural revision would incorporate a chlorine sensitivity test of the detector sensor into the CFT to ensure its operability. This sensitivity test includes verification of the adequate electrolyte flow and complete wetting of the wicks prior to the CFT. This is an unresolved item pending revision of the procedures and subsequent NRC:RI inspection (50-334/86-13-01).

4.0 Containment Penetrations and Isolation Valves

Administrative controls were reviewed to determine the licensee's program for implementing requirements associated with corrective and preventive maintenance activities. The objectives were to assure that the licensee programs were consistent with the Technical Specifications, Regulatory Guide 1.33, ANSI N18.7, and Appendix B of 10 CFR 50. The following procedures and documents were reviewed:

- Operating Manual 1.36.J, "Breaker Racking Methodology"
- Site Administrative Procedure (SAP) Chapter 3D, "The Maintenance Request"
- SAP Chapter 8, "Maintenance"
- SAP Chapter 5B, "Test Group"
- OST 1.1.9, "Containment and ASME Section XI Manual Isolation Valve Exercise"
- BVT 1.1 - 1.47.2, "Containment Integrated Leakage Rate Test"
- BVT 1.3 - 1.47.5, "Type C Leak Test"
- Special Operating Order, 86-2, May 16, 1986

4.1 Local Leak Rate Test (LLRT)

Appendix J of 10 CFR 50 specifies that all isolation valves identified in Table 3.6-1 of the technical specifications be subjected to Type "C" LLRT requirements. The inspector reviewed the completed "As Found" and "As Left" Type "C" LLRT results, corrective maintenance work performed on the leaky valves, and calibration records of the test instruments.

Type "C" tests on 87 penetrations out of 110 were completed as of June 11, 1986. The "As Left" running total of the 87 penetrations was 528.709 SCFD, as opposed to an acceptance criterion of total LLRT of 3893.88 SCFD. This result demonstrated that the containment isolation valves were relatively leak-free and maintained the integrity of the containment. The inspector noted that three valves were required to be repaired during the LLRT due to excess leakage.

The following table summarizes the "As Found" and "As Left" LLRT results and the corresponding Maintenance Work for the leaky valves.

Penetration No.	Valve No.	Valve Leakage, SCFD		Maintenance Work
		As Found	As Left	
26	TV-CC-107E1	55.447	50.826	Valve Actuator
45	RC-72	69.244	33.299	MWR #866278
89	AS-278	129.985	7.833	MWR #866277

The valve operator for TV-CC-107E1 was replaced using corrective maintenance procedure CMP #1-75-234, "Pneumatic Actuator Maintenance," and the inside containment isolation check valve RC-72 was repaired on May 31, 1986 per maintenance procedure CMP #1-75-266, "Repair Anchor Darling 3" Check Valve C-42." The Main Condenser Vent System isolation check valve, AS-278, was also repaired per MWR #866277 using the maintenance procedure CMP #1-75-126. The inspector determined that the "As Found" leakage from these three valves was not large enough to have a major impact on the "As Found" Containment Integrated Leak Rate Test (CILRT) results.

The instrument calibration records reviewed included:

- OST 1.47.4, "Calibration of Leak Rate Monitor Panel," performed June 1, 1987
- Volumetric Flow meter, D003198, completed May 1, 1986
- Heise Gase, Model C, CC, CM, and CMM, performed January 31, 1986

No unacceptable conditions were identified.

4.2 LLRT Witnessing

A portion of a Type "C" LLRT performance was witnessed at 4:10 P.M., June 12, 1986. The inspector observed that an isolation valve TV-CC-103C was leak tested and that test procedure BVT 1.3 - 1.47.5 was used. The "As Found" LLRT was 0.32 SCFH.

No unacceptable conditions were identified.

4.3 Maintenance

Maintenance records associated with surveillance activities per technical specifications were reviewed for the last 6 month period of operation. The review objective was to verify that the containment isolation valves are reliable and that failures or deficiencies were promptly corrected. The maintenance program and its implementation were reviewed including the programmatic controls of post-maintenance testing per Generic Letter 83-28. The maintenance records reviewed were:

Category I Valves

- MWR #51948, TV-MS-101A, 8-9-85
- MWR #51959, TV-MS-101B, 8-30-85
- MWR #51949, TV-MS-101B, 8-29-85
- *◦ MWR #56239, TV-MS-10B1, 9-3-85 (no post-maintenance testing identified)
- MWR #51974, TV-MS-10B, Bypass valves, 9-2-85
- MWR #51950, TV-MS-10C1, 8-29-85
- MWR #51973, TV-MS-101C, 9-2-85

- o MWR #860533, PCV-MS-101A, 4-15-86
- o MWR #56939, CH-FL-4B, Drain Line, 509085
- *o MWR #51962, TV-BD-100B, 8-30-85
- o MWR #51520, TV-iSI-101-2, 6-18-85
- *o MWR #56234, TV-SS-105A1, 8-30-85
- *o MWR #51936, TV-SS-105A1, 8-29-85
- *o MWR #52476, MOV-QS-101B, 11-27-85

Category II Valves

- o MWR #51414, TV-BD-100A, 6-6-85
- o MWR #860204, FCV-FW-478, 2-20-86
- o MWR #860205, FCV-FW-498, 2-11-86
- o MWR #860512, FCV-FW-488, 4-9-86
- o MWR #865728, FCV-FW-488, 2-28-86
- *o MWR #57807, FCV-FW-488, 2-12-86
- *o MWR #57554, FCV-FW-488, 11-4-85
- o MWR #56235, FCV-FW-488, 9-1-85
- o MWR #52342, FCV-FW-488, 11-5-85
- o MWR #52381, FCV-FW-488, 11-9-85
- o MWR #52326, FCV-FW-478, 11-2-85
- *o MWR #52286, FCV-FW-478, 10-25-85
- o MWR #52151, FCV-FW-488, 10-3-85
- *o MWR #56238, PCV-MS-101C, 9-2-85
- *o MWR #56237, PCV-MS-101A, 9-2-85
- *o MWR #52407, PCV-MS-101A, 11-20-85
- *o MWR #52353, PCV-53-101C, 2-4-86

The above MWRs represented all of the maintenance work performed on the containment isolation valves for the last 12 month period. The MWRs with an "*" represent those without any specifications or documentation of the post-maintenance testings. Subsequent discussions with the licensee representative clarified that post-maintenance operability or surveillance testing was often completed later or filed under a separate filing system. As an example, post-maintenance surveillance testing was completed under OST 1.1.10 after a corrective maintenance work, MWR #57807, and the test record were filed separately in the OST surveillance file. Also, the inspector noted and the licensee concurred that some post-maintenance testing was not performed. The basis and rationale for not conducting these tests was not clearly documented.

It was determined that the above documentation deficiencies were a result of procedural inadequacies. Furthermore, the intent, of Generic Letter 83-28 was not properly implemented into the station maintenance procedure. The licensee agreed to revise the station Maintenance and Maintenance Work Request procedures to reflect the intent of Generic Letter 83-28 by January 1, 1987. This is an unresolved item pending the final implementation of the revised maintenance procedures which would incorporate the intent of Generic Letter 83-28, and subsequent NRC:RI inspection (50-334/86-13-02).

4.4 Walkdown Inspection of Containment Penetrations

A Walkdown visual inspection of the containment penetrations and isolation valves was conducted for both the inside and outside of the containment, and penetrations/valves. This included the following:

- Penetration x-27, TV-1CCR-105E2
- Spare mechanical penetrations: x-52, x-50, x-6, X-100, x-101, x-51, x-107, x-99, x-54, x-102, and x-30
- AFWS Sump Pump DA-P-13B
- Containment Vacuum Pump CV-P-1A/1B
- Electrical penetrations and spare electrical penetrations: RCP-16C, -16D, -16E, -16F, and -16G
- Containment Purge Intake Damper VS-D-5-5A/B and Purge Exhaust VS-D-5-3A/B
- x-19, MOV-CH-378, MOV-CH-369, MOV-CH-381
- MOV-1RW-103A/B/C/D, -106 A/B

The inspection objectives were to observe any obvious leakage or incorrect valve lineups. No unacceptable conditions were identified.

5.0 Containment Barrier Operability

The inspector reviewed surveillance procedures OST 1.47.003A, "Three Month Containment Isolation and ASME XI Valve Test"; OST 1.01.10, "Cold Shutdown Valve Exercise"; the results of the OST 1.47.003A tests performed from October 1985 through February 1986 and the OST 1.01.10 surveillance conducted in December 1984. The inspector found that the surveillances met the requirements of T.S. 4.6.3.1.1.a.1 and T.S. 4.6.3.1.2.d in that the required containment isolation valves were demonstrated operable by being cycled every 92 days and by verifying at least every 18 months that the required isolation times for these valves were within the Technical Specifications.

No violations or deviations were noted.

6.0 Facility Tours

The inspector observed Control Room operations for shift turnover, log sheets, and facility operations in accordance with the administrative control procedures and the Technical Specifications. Several inspection tours and visual system "walkthrough" observations were conducted based on the pre-scoped inspection plan, which included equipment tagging, lock-out, housekeeping, fire protection, radiological controls, and plant operations. The plant areas toured included:

- Inside Containment
- Penetrations as discussed in paragraph 4.3
- Feedwater Pumps, AFWS pumps
- Quench Spray Pumps

- Containment Purge System and Dampers
- Hydrogen Recombiners and Post-DBA Hydrogen Control Panels
- Recirculation Spray Pumps
- Various pressure indicators and instrumentation near the containment penetrations
- 4160 V RS Pump, Low-head SI Pump
- Hydrogen Analyzer

The inspector observed that housekeeping in general was good and station equipment tagging was good. Vital equipment, components and systems were identified by identification labels. No unacceptable conditions were identified.

7.0 Unresolved Items

Unresolved items are matters about which more information is required to determine if it is a violation, a deviation or acceptable. Unresolved items are discussed in paragraphs 3.2 and 4.3.

8.0 Exit Meetings

The inspector met with the licensee representatives denoted in paragraph 1 on June 13, 1986, and summarized the purpose, scope and findings of the inspection. The attendees are listed in paragraph 1 of the report details.

No written material was provided to the licensee by the inspector.