

U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos.: 50-334/88-17 License Nos.: DPR-66
50-412/88-13 NPF-73

Licensee: Duquesne Light Company
One Oxford Center
301 Grant Street
Pittsburgh, PA 15279

Facility Name: Beaver Valley Power Station, Units 1 and 2

Location: Shippingport, Pennsylvania

Dates: May 1-31, 1988

Inspectors: J. E. Beall, Senior Resident Inspector
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Approved by:

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6/20/88
Date

Inspection Summary: Combined Inspection Report Nos. 50-334/88-17 and
50-412/88-13 - May 1-31, 1988

Areas Inspected: Routine resident inspections by the resident inspectors of licensee actions on previous inspection findings, plant operations, physical security, radiological controls, plant housekeeping and fire protection, maintenance, surveillance testing, potential auxiliary feedwater pump material problem, first-out annunciator logic discrepancy, in-office review of licensee event reports and review of periodic reports.

Results: No violations were identified. Two unresolved items were opened regarding the logic of the Unit 2 first-out annunciation panel (section 8) and a Unit 1 cable separation inadequacy (section 9). More specific quantitative guidance appears to be needed as to which maintenance activities might affect MOV performance such that post maintenance testing would be appropriate (Section 3.2). Although it appeared to be an isolated example, an isolated instrument valve was not appropriately tagged, apparently as the result of a failure to follow in-place controls (Section 4.2.2). Improvements were noted in the area of staging of small tools and other materials used for specific jobs in locked high radiation areas (Section 4.5).

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DETAILS

1. Persons Contacted

During the report period, interviews and discussions were conducted with members of licensee management and staff as necessary to support inspection activities.

2. Summary of Facility Activities

Both Unit 1 and Unit 2 operated at or near full power for the entire inspection period, with the exception of a load reduction to 45 percent power on Unit 1 from May 13-15 to repair the heater drain tank normal level control valve. At the end of the inspection period, continuous operation reached 91 and 57 days for Unit 1 and Unit 2, respectively.

3. Followup on Outstanding Items

The NRC Outstanding Items (OI) List was reviewed with cognizant licensee personnel. Items selected by the inspector were subsequently reviewed through discussions with licensee personnel, documentation reviews and field inspection to determine whether licensee actions specified in the OIs had been satisfactorily completed. The overall status of previously identified inspection findings was reviewed, and planned/completed licensee actions were discussed for the items reported below:

- 3.1 (Closed) Unresolved Item (50-334/85-18-02): Implement proposed recommendations to check the low head safety injection (LHSI) pump control rod securing nuts for tightness during the performance of periodic surveillance tests. Each LHSI pump has an arrangement of nine control rods, intermittently spaced around the pump casing to dampen any vibration during a seismic event. The inspector verified that a procedure change was initiated, which incorporated the above recommendations. Additionally, the licensee consulted the pump vendor to develop specific torque values for the securing nuts. A value of 50 ft-lbs was identified, and will be specified in the associated annual preventive maintenance activity (Procedure No. 1-11SI-P-1A-B-1M), prior to its next performance. This item is closed.
- 3.2 (Open) Unresolved Item (50-334/86-08-06): NRC to review the appropriateness of the licensee's practice with respect to post maintenance testing of specific motor operated valves (MOVs). Certain valves, which were exempt from the ASME, Section XI (quarterly testing requirements), were not tested following maintenance (packing adjustments). Further review into this matter identified that certain maintenance activities, including stem packing adjustments, may or may not be subject to post maintenance testing requirements of

Section XI, Article 3200 (Valve Replacement, Repair and Maintenance). Valves are to be tested when they have undergone maintenance that could affect their performance. Licensee practice has been to implement the Code requirements, however no specific guidance has been provided to licensee personnel regarding what constitutes an effect on performance (e.g., quantitative guidance for amount of adjustment allowed). The licensee informally uses two nut flats (360 degree turns) to constitute a packing adjustment for which post maintenance testing need not be performed on certain valves. If the valve is not exempt from the quarterly requirements, it is likely to be stroke tested following any amount of packing adjustment. The inspector discussed with the licensee, the lack of specific quantitative guidance on maintenance activities which have the potential to affect valve performance. The licensee committed to develop the necessary guidance and to include it in the governing Site Administrative Procedure (SAP 3D, The Maintenance Work Request). This item remains open pending implementation of the above. For the interim, the informal determination process will be monitored by the inspector.

- 3.3 (Closed) Violation (50-334/87-05-02): Failure to return the gaseous waste system to normal system alignment prior to declaring the system back in service following maintenance. The licensee responded to the Notice of Violation as required by 10 CFR Part 2, Appendix C (Enforcement Policy). Following the event, discussions were held with all Operations shift personnel regarding proper configuration control per station procedure requirements, good operating practices and proper attention to detail during complex evolutions of a sensitive nature. The affected procedure change was completed to eliminate the associated procedural deficiencies which partially contributed to the event. Additionally, the individuals involved were counseled concerning their failure to adequately control the evolution. The inspector verified adequate completion of the licensee's corrective actions. This item is closed.
- 3.4 (Closed) Unresolved Item (50-412/87-50-02): Approve test results for Preoperational Procedure No. PO-2.43.01, Sections N and O (Radiation Monitoring System). The licensee responded to the inspection as requested by the NRC on October 14, 1987. The inspector verified that the associated Test Results Report was reviewed and approved on July 31, 1987. Test deficiencies were properly identified and tracked for resolution. This item is closed.
- 3.5 (Closed) Unresolved Item (50-412/87-47-02): Provide justification for deviating from the FSAR and address the replacement of 2CHS-FCV-160 with a stainless steel valve. The licensee provided technical justification for temporarily using a carbon steel valve in an application for which a stainless valve is necessary in a Nonconformance and Disposition Report and in a 10 CFR 50.59 Safety Evaluation Report. The inspector reviewed the documentation, and no deficiencies were identified.

The valve is closed during normal operation and is used as the outside containment isolation valve for containment penetration No. X-46. The licensee determined that the carbon steel valve could be subjected to its applied environment for up to approximately three years without violating the ASME Code requirements. Additionally, periodic ultrasonic testing (UT) thickness measurements are performed to confirm that adequate margin exists above minimum wall for both the valve and the attached spool segments. UT results to date show no evidence of degradation. The licensee has initiated and approved Design Change Package (DCP) No. 888, Stainless Steel Valve Replacement for 2CHS-FCV-160. DCP 888 is planned to be implemented during the first refueling outage, unless the periodic surveillance measurements indicate substantial degradation. This item is closed.

4. Plant Operations

4.1 General

Inspection tours of the following accessible plant areas were conducted during both day and night shifts with respect to Technical Specification (TS) compliance, housekeeping and cleanliness, fire protection, radiation control, physical security/plant protection and operational/maintenance administrative controls.

- | | |
|------------------------------|----------------------------------|
| -- Control Room | -- Safeguard Areas |
| -- Auxiliary Building | -- Service Building |
| -- Switchgear Area | -- Diesel Generator Buildings |
| -- Access Control Points | -- Containment Penetration Areas |
| -- Protected Area Fence Line | -- Yard Area |
| -- Turbine Building | -- Intake Structure |

4.2 Operations

During the course of the inspection, discussions were conducted with operators concerning knowledge of recent changes to procedures, facility configuration and plant conditions. During plant tours, logs and records were reviewed to determine if entries were properly made, and that equipment status/deficiencies were identified and communicated. These records included operating logs, turnover sheets, tag-out and jumper logs, process computer printouts, unit off-normal and draft incident reports. The inspector verified adherence to approved procedures for ongoing activities observed. Shift turnovers were witnessed and staffing requirements confirmed. In general, inspector comments or questions resulting from these reviews were resolved by licensee personnel. In addition, inspections were conducted during backshifts and weekends on May 28, 2:00 pm - 9:30 pm. The inspectors verified that plant operators were alert and displayed no signs of fatigue or inattention to duty.

4.2.1 Engineered Safety Feature Actuation

On May 19, a partial Train "B" ESF actuation of the Containment Spray system occurred at Unit 1 while operating at full power. The actuation was apparently due to a ground introduced into the Solid State Protection System (SSPS) while performing maintenance. An actual containment spray did not occur and there was no equipment damage. The event was reported to the NRC via the Emergency Notification System as per 10 CFR 50.72, Reporting Requirements.

Just prior to the event, licensee technicians were replacing valve actuator internal wires to address environmental qualification (EQ) concerns on the Quench Spray Train "B" discharge isolation valve (QS-MOV-101B). The associated wires were relanded, and the ground was introduced into the SSPS logic which caused an actuation of an associated containment spray actuation slave relay. The relay actuation initiated a River Water system flowpath realignment (through the Recirculation Spray system heat exchanger). An automatic start of the Standby River Water pump also occurred due to the pressure surge created following the realignment. All systems were subsequently returned to normal and EQ inspection/repair activities were temporarily suspended pending completion of a licensee investigation into this event.

Later that day, the licensee attempted to repeat the event by intentionally grounding the wires that were being replaced at the time of the actuation. However, several attempts failed to cause the slave relay to pick up. A Maintenance Surveillance Procedure (MSP 1.05, Reactor Protection Logic System Train B Monthly Test) was then performed to verify continuity of the slave relay. The inspector observed conduct of this test, which confirmed relay continuity. A review of plant drawings identified that the associated actuation circuitry for the slave relay only needs to be grounded to energize the relay (120 volts AC potential is normally provided). Although the event could not be duplicated, the licensee elected to continue with the EQ Inspection/Repair Activities, however, ESF equipment associated with the affected MOVs were placed in their respective ESF positions, eliminating a possibility of unnecessary automatic actuations. Additionally, plant operators and technicians were instructed to provide the necessary attention to detail while performing the activities. The planned activities were completed on May 20, 1988, without further incident.

Followup reviews conducted by the licensee identified that grounding the wires that were lifted and relanded on May 19, would not have caused an ESF actuation, however, grounding of adjacent contacts/wires would cause an ESF actuation. The licensee subsequently determined that an inadvertent ground introduced through the adjacent contacts was the actual cause of the event. The licensee initiated an engineering investigation to evaluate a potential design improvement in the system circuitry. Resolution of this issue will be reviewed during a subsequent inspection.

4.2.2 Instrument Valve Misalignment

On May 5, 1988, during a detailed system walkdown, the inspector identified a Unit 2 instrument isolation valve for pressure transmitter No. SIS-PT101B out of normal position on the "B" Train of the low head safety injection (LHSI) system. The plant was at full power. SIS-PT101B provides a computer input for the LHSI discharge pressure, and was found valved out of service by its associated isolation valve. The valve was not tagged out of service for any apparent reason. The Train "A" pressure instrument (SIS-PT101A) was unisolated and operable. The inspector notified the control room shift personnel of the finding. Plant operators verified that SIS-PT101B was isolated and attempted to determine the reason for the configuration. Operations personnel subsequently opened the isolation valve and found that a downstream fitting was leaking excessively. The valve was then reisolated and tagged, noting the leak and specifying the reason for the valve being isolated. The fitting was subsequently repaired and the pressure instrument was returned to service later that day. The inspector observed the associated maintenance activity. No deficiencies were identified.

Licensee review into this event could not identify when the pressure transmitter was isolated. Additionally, supporting documentation (e.g., equipment tag, MWR) was not found.

A similar event occurred on August 16, 1987, when a safety related Auxiliary Feedwater System pressure switch was found to be valved out of service. Additional instrumentation valve lineup checks following the August 16 event identified three additional instruments isolated. SIS-PT101A and SIS-PT101B were two of the three. Following the previous event, the licensee performed extensive checks of instrument and control switch alignments for safety systems such as Auxiliary Feedwater, Emergency Diesel Generator and Low Head Safety Injection Systems. No other significant discrepancies were found.

Although this event is similar to the previous event on August 16, 1987, the root causes appear to be different. The earlier event occurred due to an inadequate transition to permanent station work process controls, whereas this event was apparently caused by the failure to follow the in-place controls. The inspector performed complete walk-downs of both the Auxiliary Feedwater and Low Head Safety Injection Systems and no other valves were found out of normal position; this is considered an isolated case. Additionally, SIS-PT101A does not perform a safety function. However, to address the potential for the more serious concern of overall control of in-plant equipment and adherence to station policies, the licensee held discussions with Operations on-shift personnel, stressing the importance of the program. Additionally, other affected station groups were similarly cautioned. The inspector will continue to monitor the status of plant equipment and the effectiveness of the associated licensee programs.

4.2.3 Emergency Notification System Inoperative

On May 19, the licensee reported that the Beaver County Emergency Sirens were out of service due to an intermittent computer failure. Both units were operating at full power. The NRC Operations Center was notified of this event in accordance with the reporting requirements of 10 CFR 50.72. Later on May 19, the necessary repairs were completed and the system was returned to service. No concerns were identified.

4.3 Plant Security/Physical Protection

Implementation of the Physical Security Plan was observed in various plant areas with regard to the following:

- Protected Area and Vital Area barriers were well maintained and not compromised;
- Isolation zones were clear;
- Personnel and vehicles entering and packages being delivered to the Protected Area were properly searched and access control was in accordance with approved licensee procedures;
- Persons granted access to the site were badged to indicate whether they have unescorted access or escorted authorization;

- Security access controls to Vital Areas were being maintained and that persons in Vital Areas were properly authorized.
- Security posts were adequately staffed and equipped, security personnel were alert and knowledgeable regarding position requirements, and that written procedures were available; and
- Adequate illumination was maintained.

No deficiencies were identified.

4.4 Radiological Controls

Posting and control of radiation and high radiation areas were inspected. Radiation Work Permit compliance and use of personnel monitoring devices were checked. Conditions of step-off pads, disposal of protective clothing, radiation control job coverage, area monitor operability and calibration (portable and permanent) and personnel frisking were observed on a sampling basis. No concerns were identified.

4.5 Plant Housekeeping and Fire Protection

Plant housekeeping conditions including general cleanliness conditions and control and storage of flammable material and other potential safety hazards were observed in various areas during plant tours. Maintenance of fire barriers, fire barrier penetrations, and verification of posted fire watches in these areas were also observed. The inspector conducted detailed walkdowns of the accessible areas of both Unit 1 and Unit 2. Continued improvements were noted for both units. In particular, improvements were noted in the area of staging of small tools and other materials used for specific jobs in locked radiation areas. Individual deficiencies were identified to the licee see for resolution.

5. Maintenance

The inspector reviewed selected maintenance activities to assure that:

- the activity did not violate Technical Specification Limiting Conditions for Operation and that redundant components were operable;
- required approvals and releases had been obtained prior to commencing work;
- procedures used for the task were adequate and work was within the skills of the trade;
- activities were accomplished by qualified personnel;

- where necessary, radiological and fire preventive controls were adequate and implemented;
- QC hold points were established, where required, and observed;
- equipment was properly tested and returned to service.

Maintenance activities reviewed included:

MWR 885880 LHSI Pump Discharge Ultra-Seal Leak

MSP 1.05 Reactor Protection Logic Continuity Check (Train B)

No discrepancies were identified.

6. Surveillance Testing

The inspectors witnessed/reviewed selected surveillance tests to determine whether properly approved procedures were in use, details were adequate, test instrumentation was properly calibrated and used, Technical Specifications were satisfied, testing was performed by qualified personnel and test results satisfied acceptance criteria or were properly dispositioned. The following surveillance testing activities were reviewed:

- OST 1.6.2 Reactor Coolant System Inventory Balance
- OST 1.11.13 Boron Injection Flow Path Valve Position Verification
- OST 1.13.1 1A Quench Spray Pump Flow Test
- OST 1.46.5 Hydrogen Post Accident Purge System Test
- OST 2.13.6 Recirculation Spray Pump Dry Test
- OST 2.24.3 Motor Driven Auxiliary Feedwater Pump Test

No significant concerns were identified.

7. Potential AFW Pump Anomaly

By letter dated May 17, 1988, the licensee was notified of a potentially generic problem with pumps supplied to them by Bingham International (BI). BI recently submitted a 10 CFR Part 21 Report to the NRC, documenting the potentially generic issue.

On February 28, 1988, a turbine driven auxiliary feedwater (AFW) pump at South Texas Project, Unit 1, failed. The pump was run for about three hours, when the pump speed dropped and continued to drop after the governor was adjusted. Excessive vibration was not evident. After the pump was shutdown, an inspection of the pump internals was performed, which identified damage to the shaft center bearing and shaft throttle bearing. BI stated that the center and throttle sleeves are subject to cracking brought on by stress corrosion cracking. BI recommended a change in the pump internal materials such that future operation would be less susceptible to the stress corrosion cracking phenomenon.

The BI notification to the licensee indicated that the AFW pumps used at both BV-1 and BV-2 may be similarly affected. The licensee subsequently initiated a request for an engineering investigation to evaluate the applicability for BV-1 and BV-2 and develop corrective actions, if necessary. The inspector will review the results of the licensee's investigation and the proposed corrective actions during a future inspection.

8. First-Out Annunciator Logic Discrepancy

During a followup inspection of the April 4, 1988 reactor trip (Unit 2: See NRC Inspection Report No. 50-412/88-11), the inspector identified an apparent deficiency in the first-out annunciator system. Specifically, the first-out annunciators which illuminated following the trip was A5-3F (Reactor Coolant Pump Auto-Stop), when in fact, a reactor coolant pump (RCP) low flow condition generated the reactor trip signal. The licensee's annunciator response procedure notes that first-out annunciator A5-3F becomes illuminated when an automatic stop of any RCP occurs. This does not, however, generate a direct reactor trip. A two out of three logic must be satisfied for that particular trip. That is, 2 RCPs must auto-stop before a reactor trip signal is generated.

There is a first-out annunciator window associated with a low RCS flow generated reactor trip (A5-2G: 1/3 RCP Loop Flow Low Reactor Trip), however, it did not appear as the first-out following the reactor trip on April 4. The inspector brought this concern to the licensee's attention, who subsequently stated that an effort would be initiated to investigate the issue. Pending resolution of this concern, including a review of the licensee's conformance with the Detailed Control Room Design Review commitments, this is Unresolved Item No. 50-412/88-13-01.

9. Inadequate Cable Separation

During a walkdown of Unit 1 cable, the inspector identified examples of apparently inadequate cable separation. Cable was found to be tied to the undersides of orange and purple (the color designators of the two safety trains) raceways. The cable was to the narrow range hydrogen analyzers and the hydrogen recombiners. The inspector brought the separation concerns to the licensee's attention and the cable, which was portable in nature, was promptly relocated.

Preliminary licensee review indicates that the cables had been in place for over two years, but, in the case of the recombiner cable, had been energized only during surveillance testing. The cables walked down by the inspector were from a racked out breaker and thus incapable of producing a ground or short circuit. These factors minimize the safety significance of the identified example deficiencies.

The licensee committed to perform a further walkdown of safety related cable to assure that no similar separation problems existed in the field and also to conduct a programmatic review of portable cable usage. This item is Unresolved (50-334/88-17-01) pending completion of these licensee actions.

10. Inoffice Review of Licensee Event Reports (LERs)

The inspector reviewed LERs submitted to the NRC Region I Office to verify that the details of the event were clearly reported, including accuracy of the description of cause and adequacy of corrective action. The inspector determined whether further information was required from the licensee, whether generic implications were indicated, and whether the event warranted onsite followup. The following LERs were reviewed:

Unit 1:

- LER: 88-03-01: Inadvertent Start of Auxiliary Feedwater Pump Due to Procedural Deficiency
- LER: 88-04-00: Two of Four ESF Actuation Channels Defeated Due to a Procedural Deficiency
- LER: 88-05-00: Containment Isolation Valves Omission from Surveillance Testing
- LER: 88-05-01: Revision to LER 88-05

Unit 2:

- LER: 88-06-01: 2/4 Refueling Water Storage Water Storage Tank Level Channels Inoperable
- LER: 88-07-00: Reactor Trip Due to Reactor Coolant Pump Trip Caused by a Loss of 4 KV Bus 2A Motor Loads
- LER: 88-07-01: Revision to LER 88-07

The above LERs were reviewed with respect to the requirements of 10 CFR 50.73 and the guidance provided in NUREG 1022. Previous inspection reports have noted that while most LERs provided good documentation of event analyses, root cause determinations and corrective actions, some LERs were weak in that they contained event inaccuracies and safety evaluation omissions. Two of the above revised LERs (88-03-01 on Unit 1 and 88-06-01 on Unit 2) adequately addressed the documented concerns. Two of the LERs (88-05 on Unit 1 and 88-07 on Unit 2) submitted during this period were also revised during this period.

11. Review of Periodic Reports

Upon receipt, periodic reports submitted pursuant to Technical Specification 6.9 (Reporting Requirements) were reviewed. The review assessed whether the reported information was valid, included the NRC required data and whether results and supporting information were consistent with design predictions and performance specifications. The inspector also ascertained whether any reported information should be classified as an abnormal occurrence. The following reports were reviewed:

- BV-1/BV-2 Monthly Operating Report for April 1-30, 1988
- BV-1 Revised Monthly Operating Report for March 1-31, 1988

No deficiencies were identified.

12. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations or deviations. Unresolved items are discussed in sections 8 and 9.

13. Exit Interview

Meetings were held with senior facility management periodically during the course of this inspection to discuss the inspection scope and findings. A summary of inspection findings was further discussed with the licensee at the conclusion of the report period on June 10, 1988.

In addition, an announced meeting was held on May 12, 1988, at the Region I office attended by NRC and licensee senior management. The subjects of the meeting included recent licensee reorganization, initiatives and future plans.