U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos.	94-27 94-28
Docket Nos.	50-334 50-412
License Nos.	DPR-66 NPF-73
Licensee:	Duquesne Light Company One Oxford Center 301 Grant Street Pittsburgh, PA 15279
Facility:	Beaver Valley Power Station, Units 1 and 2
Location:	Shippingport, Pennsylvania
Inspection Period:	December 20, 1994 - January 23, 1995
Inspectors:	Lawrence W. Rossbach, Senior Resident Inspector Peter P. Sena, Resident Inspector Scot A. Greenlee, Resident Inspector

Approved by: _____ 2/9/95
W. J. Lazarus, Chief — Date
Reactor Projects Section 3B

Inspection Summary

This inspection report documents the safety inspections conducted during day and backshift hours of station activities in the areas of: plant operations; maintenance and surveillance; engineering; and, plant support.

EXECUTIVE SUMMARY
Beaver Valley Power Station
Report Nos. 50-334/94-27 & 50-412/94-28

Plant Operations

Unit 1 started a scheduled 53 day refueling outage on January 2, 1995. Plant shutdown and cooldown were performed safely and professionally without any significant problems. Refueling preparations were very good, but did not prevent missing a quality control hold point during removal of the reactor vessel head. The missed hold point was a procedure **violation (50-334/94-27-01)**. Procedural adherence, communications and supervisory oversight were all very good during the remaining fuel unloading operations.

The NRC exercised discretion not to enforce two reactor protection system quarterly surveillance requirements at Unit 2. The exercise of discretion extended the surveillance interval by 14 days for the channel 3 overtemperature and overpressure delta-T circuits. The extension was needed to support a confidence run on the channel 2 overtemperature delta-T circuit which was repaired due to spiking. Spiking on the channel 2 overtemperature delta-T circuit could have caused a reactor trip during testing of the channel 3 overtemperature or overpressure delta-T circuits.

Maintenance

Outage maintenance activities at Unit 1 were very good. The work was performed professionally by knowledgeable personnel. Of particular note was the excellent vendor representative support during emergency diesel and reactor coolant pump seal maintenance activities.

A Unit 2 recirculation spray pump was not promptly returned to service after minor electrical preventative maintenance. The technicians started a second routine task and lost focus on returning the safety-related pump to service. Licensee upper management has emphasized the need to return equipment to service without delay following completion of the maintenance.

No concerns were identified during a review of on-line maintenance practices at Beaver Valley. The utility has historically been very conservative in this area. No risk significant combinations of inoperable equipment were identified during reviews of maintenance schedules and equipment outage histories.

Engineering

A temporary modification to repair a pinhole leak in the river water system was properly evaluated by the system engineer and onsite safety committee.

(EXECUTIVE SUMMARY CONTINUED)

Plant Support

Radiological control measures during the Unit 1 reactor vessel disassembly, core offload, and reactor coolant pump seal inspection were good. The identification of and response to a minor reactor coolant spill by a radiation technician was very good, as all appropriate actions were taken.

Various security program activities were observed to be properly implemented. The security power supply system performed well during the refueling outage surveillance test.

TABLE OF CONTENTS

DETAILS

1.0 MAJOR FACILITY ACTIVITIES

Unit 1 was in the end-of-cycle coast-down at approximately 90 percent power when the period began. Between December 24 and 25, power was reduced to 60 percent to support removal of the 'B' main feed pump from service. The unit continued to operate at 60 percent power until January 2 when plant shutdown for the tenth refueling outage began. Unit 1 entered Mode 5 on January 4, and remained there until January 11. Between January 11 and 18, the unit was in Mode 6 while the entire core was off-loaded to the spent fuel pool. The core remained off-loaded through the end of the period.

Significant maintenance activities scheduled for the Unit 1 tenth refueling outage included: motor-operated valve repair and testing; inspection of the 'B' reactor coolant pump seal assembly; inspection and rewind of the 'A' reactor coolant pump motor; 100 percent eddy current examinations and sludge lancing of all steam generators; overhaul of the '3A' motor driven auxiliary feedwater pump; replacement of emergency diesel generator river water piping; installation of a river water header bypass (flush) line around the recirculation spray heat exchangers; rod control timing modifications; and emergency diesel generator load sequencer timing modifications.

Unit 2 operated at full power throughout this inspection period except for a power reduction to 80 percent power from January 20 to 23 for leak investigations in condenser water box B. Also, Unit 2 operated at a site record capacity of 97.8 percent in 1994.

2.0 PLANT OPERATIONS (71707, 60705, 60710)

2.1 Operational Safety Verification

Using applicable drawings and check-off lists, the inspectors independently verified safety system operability by performing control panel and field walkdowns of the following systems: high and low safety injection inside containment, and recirculation spray system. These systems were properly aligned. The inspectors observed plant operation and verified that the plant was operated safely and in accordance with licensee procedures and regulatory requirements. Regular tours were conducted of the following plant areas:

- Control Room
- Auxiliary Buildings
- Switchgear Areas
- Access Control Points
- Protected Areas
- Spent Fuel Buildings
- Diesel Generator Buildings
- Safeguards Areas
- Service Buildings
- Turbine Buildings
- Intake Structure
- Yard Areas
- Containment Penetration Areas
- Containment Building

During the course of the inspection, discussions were conducted with operators concerning knowledge of recent changes to procedures, facility configuration, and plant conditions. The inspectors verified adherence to approved procedures for ongoing activities observed. Shift turnovers were witnessed and staffing requirements confirmed. The inspectors found that control room

access was properly controlled and a professional atmosphere was maintained. Inspectors' comments or questions resulting from these reviews were resolved by licensee personnel.

Control room instruments and plant computer indications were observed for correlation between channels and for conformance with technical specification (TS) requirements. Operability of engineered safety features, other safety related systems, and onsite and offsite power sources were verified. The inspectors observed various alarm conditions and confirmed that operator response was in accordance with plant operating procedures. Compliance with TS and implementation of appropriate action statements for equipment out of service was inspected. Logs and records were reviewed to determine if entries were accurate and identified equipment status or deficiencies. These records included operating logs, turnover sheets, system safety tags, and the jumper and lifted lead book. The inspectors also examined the condition of various fire protection, meteorological, and seismic monitoring systems.

2.2 Unit 2 Enforcement Discretion

By letter dated December 30, 1994, the NRC exercised discretion not to enforce compliance with two requirements in the Unit 2 Technical Specifications. The enforcement discretion pertained to quarterly surveillance testing of the channel 3 overtemperature delta-T (OTDT) and overpressure delta-T (OPDT) circuits in the reactor protection system, and was granted from December 30, 1994, at 6:20 p.m. for a period not to exceed 14 days.

Duquesne Light Company requested the enforcement discretion in a letter to the NRC dated December 30, 1994. The NRC was notified verbally of the need for discretion on December 29. The necessity for this action resulted from spiking on OTDT channel 2, coupled with expiration of the channel 3 OTDT and OPDT surveillance intervals (including the 25 percent allowed extension) on December 30 at 6:20 p.m. The licensee had traced the spiking problem to a lead/lag circuit card in the OTDT channel and was in the process of replacing the card when the need for discretion was recognized. The licensee appropriately decided that a confidence run of about 14 days would be required after the card was replaced to ensure the spiking was eliminated. In order to test channel 3 of OPDT or OTDT, both circuits must be placed in a tripped condition. With the channel 3 OTDT circuit tripped, a spike on channel 2 could have caused a reactor trip.

The licensee's safety basis for requesting enforcement discretion primarily involved a review of 25 channel 3 OTDT and OPDT functional tests performed since 1992. The review showed that comparator results were within tolerance in all but one case. Instrument drift in the single out of tolerance case was in the conservative direction. The licensee also installed a voltage recorder to monitor performance of channel 2 OTDT following replacement of the lead/lag circuit card.

The NRC concluded that exercising discretion not to enforce the Unit 2 OPDT and OTDT quarterly surveillance requirements was in the interest of public safety. The risk associated with not testing the two circuits for an additional 14 days was negligible; whereas, the risk of a significant plant

transient was greatly reduced by delaying the testing. The need for enforcement discretion ended on January 10, at 8:07 p.m. when the licensee completed testing the channel 3 OTDT and OPDT circuits. The circuits were all found within tolerance.

2.3 Unit 1 Plant Shutdown for Refueling

Observations of the Unit 1 plant shutdown for refueling included power reduction from approximately 60 percent to opening the main generator output breakers, and selected portions of the reactor coolant system cooldown in Modes 4 and 5. The inspectors noted excellent use of procedures, good coordination between the operators, and appropriate staffing levels. During the power reduction and following opening of the main output breakers the operators worked through several minor plant problems. Examples of the problems included: (1) a reactor coolant system temperature transient that resulted when the main output breakers were opened and the steam dumps did not compensate for the loss of load on the steam generators; (2) low main turbine gland seal pressure and a resultant drop in condenser vacuum; and (3) a constantly repeating "sequence of events recorder trouble" alarm. The inspectors concluded that the operators handled the problems capably and professionally. These problems were discussed with the Shift Supervisor and the Unit Operations Manager. Both individuals stated that they would look at ways to prevent these problems in the future.

2.4 Unit 1 Refueling Operations

The licensee's preparations for and conduct of refueling activities were assessed to determine if these activities were performed safely and in accordance with regulatory requirements. Areas reviewed and observed included: preparations for refueling; removal of the reactor vessel head; and fuel movement in the reactor cavity.

Refueling Preparations

The licensee's refueling preparations were very good. The refueling and operations procedures were easy to follow, contained sufficient detail, and covered all technical specification requirements. Management expectations for the conduct of refueling operations were clearly outlined in required reading assignments and required management discussions with refueling personnel. Duquesne Light Company and contractor supervisors were familiar with recent industry events, and had taken appropriate actions for the issues applicable to Beaver Valley.

Reactor Vessel Head Removal

The reactor vessel head was removed without incident; however, refueling personnel failed to complete a quality control (QC) inspection during the head lift. Beaver Valley Refueling Procedure 1RP-10R-2.7, Step 14 has a QC hold point that states: "The reactor vessel head has been raised approximately 2 inches, checked level and held for 10 minutes. Visually inspect the head lift rig critical welds and parts as listed in Tables 1 and 2. If no problems are apparent, continue to lift, monitoring the load cell readout at all times.

No cracks or deformation shall be apparent." This hold point is a Duquesne Light Company commitment in response to NUREG 0612 "Control of Heavy Loads at Nuclear Power Plants." The commitment is in an October 9, 1984, letter to the NRC outlining supplemental responses to the NRC Safety Evaluation Report on the control of heavy loads at Unit 1. The commitment states that in order to demonstrate continuing compliance with ANSI N14.6 Section 5.3 (Testing to Verify Continuing Compliance): "...a visual examination by qualified personnel of critical welds and parts will be conducted prior to lifting and at the initial lift prior to moving to full lift and movement for all three devices. This will be accomplished by raising the load slightly above its support and holding it for 10 minutes. During this time, critical welds and parts will be visually inspected." The head lift rig is one of the three devices referenced. The NRC inspector observing the head lift noticed that the hold point inspection was not as rigorous as he had seen in the past. The NRC inspector questioned the QC inspector about the hold point inspection. Review of the procedure then revealed that all of the critical welds specified had not been observed. By this time, the head had been lifted above the control rod drive mechanism shafts, and the hold point had been passed. Prior to missing the QC hold point, two other steps in the head lift procedure were almost missed, but the Refueling Senior Reactor Operator (SRO) recognized the error and intervened to correct the situation.

The licensee was still conducting a formal root cause evaluation of the head lift procedure problems when the report period ended. With one exception, the inspector's conclusions concerning the event are pending completion of the licensee's investigation. The inspector's did conclude that the failure to follow Refueling Procedure 1RP-10R-2.7 is a **violation (50-334/94-27-01)** of Technical Specification 6.8.1 which requires that written procedures shall be established, implemented, and maintained covering refueling operations.

Fuel Movement in Containment

Fuel movement operations in the containment building were very good. The requirements of the Beaver Valley refueling procedures were adhered to at all times, communications were clear, and the refueling SROs maintained close supervisory control of all movements. Several minor equipment problems were handled in a conservative manner with a strong focus on safety. Westinghouse personnel operated the refueling equipment, and demonstrated a high level of equipment and procedural knowledge. Radiological controls during the head lift and fuel movements were inspected as described in Section 5.1.

3.0 MAINTENANCE (62703, 61726, 71707, TI 2515/126)

3.1 Maintenance Observations

The inspectors 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; radiological and fire prevention

controls were adequate and implemented; QC hold points were established where required and observed; and equipment was properly tested and returned to service.

The maintenance work requests (MWRs), and preventive maintenance procedure (PMP), listed below were observed and reviewed. Unless otherwise indicated, the activities observed and reviewed were properly conducted.

MWR 03744 Minor Design Change to Upgrade the 1DF Emergency Bus Degraded Voltage Relays

MWR 027156 Reactor Coolant Pump (RCP) 1B Seal Removal, Rebuild and Reassembly

Job site performance during the 'B' RCP seal work was excellent. A Westinghouse technical representative was present during all the seal maintenance. The technical representative was extremely familiar with RCP seal maintenance, and was a key element in the successful accomplishment of this task. Radiological controls and quality controls support during the job were very good. The health physics technician and the QC inspector worked closely with the maintenance personnel to ensure proper performance in their respective areas.

MWR 22909 Master MWR for No. 1-2 EDG Preventative Maintenance

The inspectors observed the replacement of the air start motors for the No. 1-2 emergency diesel generator. The maintenance was performed using PMP-36EE-EG-1/2-1-2-3-4-1M "Replacement of Emergency Diesel Generator Air Start Motors." The maintenance personnel were very knowledgeable about the task, and the diesel vendor was at the work site for assistance, as needed. The maintenance was completed without any significant problems.

1/2 PMP-75-4KV Motor-1E Unit 2 Recirculation Spray Pump 2RSS-P21D

This preventive maintenance activity (PM) involved an inspection of the recirculation spray motor and resistance checks of the motor breaker. This activity was initiated on the daylight shift. During the inspectors' tour of the control room later that afternoon (2:30 p.m.), the inspector noticed that the "clearance" was still hung on the pump control switch (in the pull-to-lock position). The inspectors questioned the operators to determine if there was any problem found with the motor but were informed that the activity was complete and the paper work was currently being closed out by the electricians. Subsequent follow-up by the inspectors determined that the physical maintenance checks had been completed 4.5 hours earlier at 10:00 a.m. The inspectors questioned the electricians on why the pump was not returned to the operations department for post-maintenance testing earlier in the day following completion of the PM checks. After completion of the motor PMs, the electricians had started a second, non-related, maintenance job on non-safety related equipment and lost focus between the two tasks and the importance of returning safety-related equipment to service in a timely manner. The inspectors concluded that better line supervision could have ensured the pump

was returned to Operations without the unnecessary delay. The inspectors have noticed that upper management has emphasized the need to return equipment to service without delay following the completion of the maintenance.

3.2 Surveillance Observations

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 operational surveillance tests (OSTs), and Beaver Valley Test (BVT) listed below were observed and reviewed. Unless otherwise indicated, the activities observed and reviewed were properly conducted without any notable deficiencies.

1BVT 1.47.5 Type-C Leak Test

The inspectors observed leak testing of valves 1HY-197 and 1HY-111 in the train-B hydrogen recombiner/analyzer return line. The tests were performed by knowledgeable personnel, with very good test coordination and procedural controls.

1/2OST	1.36.11	Security Diesel Generator Auto Start Test (see Section 5.2)
2OST	1.12.B	Safeguards Protection System Train B Test
2OST	1.36.2	Emergency Diesel Generator Monthly Test

3.3 On-Line Maintenance - TI 2515/126

The inspectors reviewed the licensee's procedures and practices involving the removal of equipment from service for scheduled on-line maintenance. Specifically, the inspectors reviewed all of the licensee's procedures pertaining to non-outage maintenance scheduling and planning, interviewed maintenance planning personnel, reviewed all available Unit 2 maintenance schedules for the current cycle, and evaluated equipment outage configurations at Unit 2 for the period from January to October 1994. Evaluation of past equipment configurations was not specified by the inspection procedure, but was done to assess the risk information compiled for Unit 2 during the recent Customized Inspection Planning Process Team Inspection. On-line maintenance schedules were not available for Unit 1 because of the refueling outage but equipment configurations were reviewed by the CIPP for the previous cycle.

The inspectors did not identify any concerns with on-line maintenance at Beaver Valley. The licensee's requirements for removing equipment from service are primarily in Nuclear Power Division Administrative Procedure (NPDAP) 3.4, "Clearance Procedure." NPDAP 3.4 requires the use of an Emergency Safeguards Equipment Clearance Checklist for scheduled safety-related equipment maintenance. The checklist focuses on verification of standby equipment (opposite train) operability, and has only limited requirements on removal of combinations of equipment. The Operations Department must, however, evaluate and approve removing all equipment from service, and historically has been very conservative in this area. The

inspectors did not identify any risk significant combinations of inoperable equipment during the reviews of maintenance schedules and equipment outage histories.

The licensee has implemented a non-outage 12 week maintenance planning process at Unit 2. The process involves working on specific systems during each of the 12 weeks, with each system being scheduled at a minimum of once per 12 week period. Guidelines for the 12 week process require risk and safety benefit evaluations by the system engineers prior to removing equipment from service, but the licensee has not progressed to actually performing these evaluations.

4.0 ENGINEERING (37551)

On December 23, 1994, a small pinhole leak was observed downstream of chlorine injection check valve WT-383 in the 'A' train of the Unit 1 river water header. Within the 72 hours allowed by the Technical Specification 3.7.4.1 action statement the license completed a code repair of the 'A' train and determined through nondestructive examination that the opposite train had adequate wall thickness. The leak was repaired by replacing the affected piece of piping with a blind flange. The inspectors found that this Temporary Modification 1-94-33 'Installation of Blind Flange on 3" HR-232-151-Q3' was properly evaluated by the system engineer and approved by the onsite safety committee. The licensee has scheduled to make permanent repairs to this line during the current refueling outage.

5.0 PLANT SUPPORT (71750)

5.1 Radiological Controls

5.1.1 Unit 1 Refueling

Radiological Controls during the head lift and fuel movements were very good. Some airborne activity was expected during the head lift and was appropriately briefed prior to the evolution. The maximum airborne activity level in containment reached approximately 2.5 DAC during the lift, which was well below the 10 DAC level for which respirators were required. The activity probably came from air movement along the refueling cavity walls during cavity flood-up. Airborne activity levels were closely monitored by health physics personnel in all potential airborne activity areas, and the containment was posted as an airborne activity area when levels reached .3 DAC. Radiation levels were also closely monitored by health physics personnel during refueling operations, and access was limited to areas where radiation levels were elevated.

5.1.2 Unit 2 Reactor Coolant Spill

During a routine tour of the Unit 2 primary auxiliary building, the inspectors were able to observe the licensee's response to a radiological spill. The shift radiation technician identified water on the floor (10 x 3 foot area) adjacent to the post accident sampling system and determined that the spill measured 0.5 mrem per hour. The technician's immediate actions included

taping off the area with radiation barrier tape and notification to the control room. Water and air sampling was initiated and rags were placed over the spill to contain the water. Operations provided good spill response by dispatching operators and the assistant shift supervisor to determine the water source and by monitoring the radiation monitoring system for indications of airborne activity. The field airborne evaluation (particulate and iodine) indicated no isotopes but the evaluation of the water sample indicated an activity level of 3.76 E-2 μCi/ml; thus, reactor coolant water was suspected. Chemistry personnel also provided rapid response to the spill and were able to locate and isolate the source of the leak. A primary coolant hot leg isolation valve was found to be leaking-by into a waste drain tank which overflowed. Overall, the radiation technician performed the required actions for the spill in a timely and competent manner. However, follow-up response by health physics supervision was slow, as the technician did not receive any health physics support for over an hour despite his calls for assistance.

5.2 Security

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 their packages were properly searched and access control was in accordance with approved licensee procedures; security access controls to vital areas were maintained and persons in vital areas were authorized; security posts were properly staffed and equipped, security personnel were alert and knowledgeable regarding position requirements, that written procedures were available; and lighting was sufficient.

The inspectors observed the refueling frequency security diesel generator auto start test, 1/2OST 1.36.11. The test was properly implemented in accordance with physical security plan commitments and site procedures. The operator performing the surveillance test did a thorough review of the procedure and system in preparation for the surveillance. This was evident by his identification of several errors in this procedure which dated from 1988. The operator properly processed a procedure change request (OMCR) to correct these errors. These errors would not have affected performance of the OST. During this surveillance test the inspectors verified that the power supply system operated properly. This was shown by the required loads being picked up by the secondary power system, annunciation of the switch to secondary power, annunciator panels and communications remaining operational, and no alarms were lost during the changeover.

5.3 Housekeeping

Plant housekeeping controls were monitored, including control and storage of flammable material and other potential safety hazards. The inspectors conducted detailed walkdowns of accessible areas of both Unit 1 and Unit 2. Housekeeping at both units was acceptable.

6.0 ADMINISTRATIVE

6.1 Preliminary Inspection Findings Exit

At periodic intervals during this inspection, meetings were held with senior plant management to discuss licensee activities and inspector areas of concern. Following conclusion of the report period, the resident inspector staff conducted an exit meeting on January 27, 1995, with Beaver Valley management summarizing inspection activity and findings for this period.

6.2 Attendance at Exit Meetings Conducted by Region-Based Inspectors

During this inspection period, the inspectors attended the following exit meetings:

Dates	Subject	Inspection Report No.	Reporting Inspector
1/6/95	Customized inspection planning process	94-81	R. Conte
1/12/95	Outage radiological controls	95-03	J. Nick, L. Eckert
1/13/95	Inservice inspection	95-02	P. Patnaik

6.3 NRC Staff Activities

Inspections were conducted on both normal and backshift hours: 38 hours of direct inspection were conducted on backshift; 29 hours were conducted on deep backshift. The times of backshift hours were adjusted weekly to assure randomness.

R. Maiers, Pennsylvania Department of Environmental Resources, visited the inspectors on December 22 and discussed inspection activities and the licensee's performance.

T. Reeves, Ohio Emergency Management Agency, visited the inspectors on January 6 and discussed inspection activities and the licensee's performance as documented in NRC Inspection Report 334/412-94-27/28, December 20, 1994 to January 23, 1995.