

U. S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-334/86-04

Docket No. 50-334

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

Facility Name: Beaver Valley Power Station, Unit 1

Location: Shippingport, Pennsylvania

Dates: February 1 - March 10, 1986

Inspectors: W. M. Troskoski, Senior Resident Inspector  
A. A. Asars, Resident Inspector

Approved by:

*L. E. Tripp*

L. E. Tripp, Chief, Reactor Projects Section 3A

3/19/86  
Date

Summary: Inspection No. 50-334/86-04 on February 1 - March 10, 1986

Areas Inspected: Routine inspections by the resident inspectors (141 hours) of licensee actions on previous inspection findings, plant operations, housekeeping, fire protection, radiological controls, physical security, engineered safety features verification, maintenance activities relating to the river water system, surveillance testing, control room annunciator survey and followup on special reports.

Results: No violations were identified. Significant items reviewed included a full power trip due to a malfunction in the steam generator level control system (Detail 4.b.2), a RCS valve packing leak inside containment (Detail 4.b.1), secondary system safety-related valve steam leaks (Detail 4.b.4), inadvertent partial actuation of the cable tray Cardox system (Detail 4.e), and a potential unreviewed safety question concerning permissive P-10 of the RPS (Detail 9.b).

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TABLE OF CONTENTS

	<u>Page</u>
1. Persons Contacted.....	1
2. Plant Status.....	1
3. Followup on Outstanding Items.....	1
4. Plant Operations.....	4
a. General.....	4
b. Operations.....	5
c. Plant Security/Physical Protection.....	8
d. Radiation Controls.....	8
e. Plant Housekeeping and Fire Protection.....	8
5. Engineered Safety Features (ESF) Verification.....	9
6. Maintenance Activities.....	10
7. Surveillance Testing.....	11
8. Control Room Annunciator Survey.....	12
9. Followup on Special Reports.....	13
10. Exit Interview.....	14

Attachment 1 - Annunciator Survey

## DETAILS

### 1. Persons Contacted

J. J. Carey, Vice President, Nuclear Group  
R. J. Druga, Manager, Technical Services  
T. D. Jones, General Manager, Nuclear Operations  
W. S. Lacey, Plant Manager  
J. D. Sieber, General Manager, Nuclear Services  
N. R. Tonet, General Manager, Nuclear Engr. & Constr. Unit

The inspector also contacted other licensee employees and contractors during this inspection.

### 2. Plant Status

The plant operated at full power throughout the inspection period with the exception of one trip (discussed in detail 4.b) on February 10, 1986, and a four day power reduction to about 65% on February 14 - 18, 1986, to allow repair of the B main feedwater pump (Detail 4.b).

### 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 OI's had been satisfactorily completed. The overall status of previously identified inspection findings were reviewed, and planned and completed licensee actions were discussed for those items reported below:

(Closed) IFI (85-15-03): Review performance and documentation of radiological surveys at appropriate intervals by qualified technicians. This item was opened after it was determined that rad technicians in training were conducting routine surveys unsupervised. The routine survey program, Appendix 4 to the BVPS Radcon Manual, has since been revised to include requirements that the surveys be conducted by personnel qualified to ANSI N18.4 - 1971, or by technicians undergoing on-the-job training who are directly supervised by a qualified individual. Surveys conducted as part of on-the-job training will be so documented on the survey sheet. The inspector reviewed several monthly, weekly, and daily surveys to verify that they are being performed and documented adequately. This item is closed.

(Closed) IFI (85-22-07): Review dosimetry issue and site specific worker radiation training for visiting NRC inspectors. This item was previously addressed in Inspection Reports 334/85-21, 85-22 and 86-01. The licensee has developed and implemented adequate guidelines to aid in the timely access of NRC inspectors to radiologically controlled areas. The inspector reviewed the guidelines and observed the performance of the brief site specific radi-

ation worker training and found no inadequacies. The inspector also verified that modified exposure history forms for NRC inspectors are readily available in the dosimetry booth. This item is closed.

(Open) IFI (86-01-03): Update on replacement of the deformed river water system expansion joint and determination of the cause of deformation. The effluent header expansion joint deformation was identified on January 2, 1986. The licensee developed a temporary operating procedure should it fail and made plans to install an emergency patch until the expansion joint could be replaced during the upcoming refueling outage scheduled for May, 1986. The emergency patch has not yet been installed. The patch design required specific materials for which the licensee is having difficulty obtaining the required quality assurance documentation. The inspector has observed no appreciable changes in the appearance of the expansion joint since the problem was initially identified. The inspector noted that resolution of this problem has been slow. This item remains open.

(Closed) Unresolved Item (85-16-02): Determine how the reactor vessel head vent high pressure alarm knife switch had been incorrectly identified. The vessel head vent alarm had been lit because of leakage past a solenoid operated valve in containment. A second in-line solenoid operated valve blocks further leakage to either the PRT or containment. The licensee had changed the alarm background from red to green signifying a normally lit condition. The licensee stated that the alarm color was changed because when the associated knife switch was pulled, the annunciator failed to clear as expected. At that time, it was believed that the switch was mislabeled. Review of the reactor vessel head vent system design revealed that the high pressure alarm circuit is designed to alarm when field contacts on the pressure instruments open. Therefore, opening the knife switch will not clear the alarm because this is interpreted as an open contact. To clear it, the knife switch must be opened and the annunciator side contact must be shorted with a jumper. The licensee verified that the knife switch was properly labeled and wired by demonstrating the process to clear the alarm. This item is closed.

(Closed) IFI (86-01-04): Observe data collection and review results in determination of motor driven auxiliary feedwater pump 3B operability. The inspector observed performance of TOP 86-03, FW-P-3B Operability Data Collection, on February 12, 1986. The collection data was compared to the pump manufacturer's curve and the pump requirements of the FSAR. The data from FW-P-3B matched the manufacturer's curve and exceeded the FSAR minimum requirements of 350 gpm delivered to two steam generators against an extrapolated steam generator pressure of 1108 psig. The inspector also noted that the licensee had obtained from Westinghouse a safety evaluation to assess the impact of reduced minimum auxiliary feedwater flow during the postulated loss of coolant accident, loss of normal feedwater and feedwater pipe rupture accidents. The LOCA was reanalyzed using reduced auxiliary feedwater flow from the motor driven pump of 310 gpm, and the feedwater accidents were reanalyzed using a flow of 325 gpm. These analyses determined that the conclusion of FSAR, Chapter 14, remain valid at the reduced flow rates. From the data

analysis of TOP 86-03, FW-P-3B was shown to be capable of delivering the required 350 gpm flow to two steam generators against the required pressure. This item is closed.

(Closed) Unresolved Item (85-17-09): DLC to issue supplemental response to item 3.6 of IEB: 82-02. By letter dated February 13, 1986, the licensee provided a description of the types and compositions of fastener lubricants and injection sealant materials that have been used in the reactor coolant pressure boundary. This item is closed.

(Closed) Violation (85-26-01): Failure to issue photo-identification badge to employee prior to granting access to the protected area. This item was discussed by representatives of the licensee with Region I management at an Enforcement Conference held on December 19, 1985. The licensee formally responded to the violation in a letter dated February 27, 1986. The inspector reviewed the corrective actions taken for the card key control of the protected area entry turnstiles and other actions taken to prevent reoccurrence as specified in the letter. Licensee actions were determined to be satisfactory and this item is closed.

(Closed) Unresolved Item (85-27-01): Update appropriate procedures to require that the containment airlock door is de-energized when not in use. Station Administration Procedure No. 28, Reactor Containment Entries, was revised on March 5, 1986, to include this requirement. This item is closed.

(Open) Violation (85-25-04): Lack of emergency lighting for safe shutdown access and egress routes. An inspection of the licensee's compliance to Appendix R requirements identified four plant areas in the various routes required for safe shutdown that lacked a required 8 hour battery supply source. The licensee's response to this violation dated February 11, 1986, indicated that a light would be installed in the Clean Shop Area and that an exemption request from the Section III.J requirements of 10 CFR 50, Appendix R, would be submitted requesting credit for the security perimeter lighting for the other areas. The inspector verified that the Clean Shop emergency light had been added. Though the use of the security diesel power light system appears acceptable in place of the 8 hour battery power supply, this item remains open pending final NRR resolution.

(Open) TI (25-15-73): Inspection requirements for IEB: 85-03, MOV Common Mode Failures. This item has been opened to track future licensee actions in this area.

(Closed) Unresolved Item (84-30-02): Establish measures to control material and parts to prevent inadvertent use of uncontrolled items in safety-related applications. This concern resulted from the identification of an untagged circuit breaker observed on the floor inside a safety-related 125 Volt DC switchboard. After researching this concern, the licensee determined that the circuit breaker was included in the scope of work conducted under Design Change Package 556. This DCP replaced a spare 70 amp circuit breaker with a 25 amp breaker. The 70 amp breaker was left in the cabinet untagged after

the work was complete. The breaker has subsequently been placed in the storeroom for use on non-safety systems. To prevent recurrence, the licensee revised Procedure CDN 3.4, Section 17.0, Retirement and Reclamation of Material, to assure that existing plant material maintains traceability after replacement. This item is closed.

(Closed) Violation (85-22-04): Failure to issue 10 CFR 20.408 Termination Exposure Reports. The inspector reviewed the actions specified in DLC letter of December 16, 1985. The Security Department provides a 45 day badge report compiled from the inactive and revoked badges printout once every two weeks to the Dosimetry Laboratory to allow a double check of personnel termination records issued by the first line supervision. In addition, the inspector reviewed radiation worker termination notifications issued since January, 1986, and verified compliance with Nuclear Group Directive No. 28. No discrepancies were identified and this item is closed.

#### 4. Plant Operations

##### a. General

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

- Control Room
- Primary Auxiliary Building
- Turbine Building
- Service Building
- Main Intake Structure
- Main Steam Valve Room
- Purge Duct Room
- East/West Cable Vaults
- Emergency Diesel Generator Rooms
- Containment Building
- Penetration Areas
- Safeguards Areas
- Various Switchgear Rooms/Cable Spreading Room
- Protected Areas

Acceptance criteria for the above areas included the following:

- BVPS FSAR
- Technical Specifications (TS)
- BVPS Operating Manual (OM), Chapter 48, Conduct of Operations
- OM 1.48.5, Section D, Jumpers and Lifted Leads
- OM 1.48.6, Clearance Procedures
- OM 1.48.8, Records
- OM 1.48.9, Rules of Practice

- OM Chapter 55A, Periodic Checks, Operating Surveillance Tests
- BVPS Maintenance Manual (MM), Chapter 1, Conduct of Maintenance
- BVPS Radcon Manual (RCM)
- 10CFR50.54(k), Control Room Manning Requirements
- BVPS Site/Station Administrative Procedures (SAP)
- BVPS Physical Security Plan (PSP)
- Inspector Judgement

b. Operations

The inspector toured the Control Room regularly to verify compliance with NRC requirements and facility technical specifications (TS). Direct observations of instrumentation, recorder traces and control panels were made for items important to safety. Included in the reviews were the rod position indicators, nuclear instrumentation systems, radiation monitors, containment pressure and temperature parameters, onsite/offsite emergency power sources, availability of reactor protection systems and proper alignment of engineered safety feature systems. Where an abnormal condition existed (such as out-of-service equipment), adherence to appropriate TS action statements was independently verified. Also, various operation logs and records, including completed surveillance tests, equipment clearance permits in progress, status board maintenance and temporary operating procedures were reviewed on a sampling basis for compliance with technical specifications and those administrative controls listed in Paragraph 4a.

During the course of the inspection, discussions were conducted with operators concerning reasons for selected annunciators and knowledge of recent changes to procedures, facility configuration and plant conditions. The inspector verified adherence to approved procedures for ongoing activities observed. Shift turnovers were witnessed and staffing requirements confirmed. Except where noted below, inspector comments or questions resulting from these daily reviews were acceptably resolved by licensee personnel.

- (1) A small primary reactor coolant system leak developed inside containment on February 5, 1986. At about 4:30 a.m., containment gaseous and particulate rad monitors (RM-215A and B) started to increase from a 400 cpm normal background level to about 4000 cpm. About an hour prior to that, control room personnel noted an increased makeup rate to the VCT. The licensee initiated OST 1.6.2, RCS Inventory Calculations, and noted that the containment sump pumpout rate had also increased from about 7 to 40 gallons per hour. The initial RCS inventory calculation identified the magnitude of the leak as being approximately .9 gpm. A containment entry was made and operators visually identified the source as being one of the 3/4" high pressure isolation instrument valves for the loop bypass flow instrument, located next to the RTD manifold in the C pump cubicle.

Photographs taken during the containment entry identified the source of the leak as being from the valve packing. Discussions with licensee personnel indicated that it was believed that the manual valve was off of its backseat and that manually repositioning the valve would terminate the leak. Initial radiation surveys of the area indicated that background dose rate was approximately 20 rad per hour. Consequently, the licensee preplanned the next containment entry to use a long handle tool to turn the valve, thus minimizing personnel exposure.

A second containment entry was made and the leak terminated. The VCT makeup rate immediately returned back to normal. Inspector discussions with radcon personnel and operators who made the containment entry indicated that the maximum exposure was about 385 mR, indicating that the ALARA considerations effectively minimized exposure.

Subsequent RCS inventory calculations indicated that the leak had been reduced to less than 0.1 gpm and the containment radiation monitors returned to normal background readings several hours after the leak stopped. The inspector had no further concerns.

- (2) A steam generator (SG) high level turbine trip - reactor trip occurred from full power at 7:27 p.m. on February 10, 1986. The high level (75%) in the A SG was caused by a malfunction in the main feedwater control system due to a blown 500 amp main power fuse in the No. 3 vital bus inverter. When the No. 3 vital bus power was lost, all three SG level control channels failed down scale and each feedwater reg valve control signal called for full open in response to the erroneous demand. Control room operators immediately switched the level control systems from automatic to manual control. Review of the computer data indicated that the operators were successful in turning the B and C SG levels around; however, the A SG feedwater reg valve failed to respond to the manual demand signals. Feedwater flow increased to about 140% of normal and quickly filled the SG to its high level trip setpoint. About eleven minutes into the transient, the vital bus was powered back up by its auxiliary power supply.

This was the third trip related to the No. 3 vital bus since January, 1985. The first trip was an apparent breaker malfunction that occurred during performance of a maintenance surveillance test. The second trip occurred on October 4, 1985, and was due to the failure of the same 500 amp main power fuse (see Detail 3.b.1 of Inspection Report 334/85-22). Subsequent discussions with the I&C Supervisor indicated that licensee personnel found that the apparent cause of these fuse failures was due to a malfunction of the thyristor gating board due to overheating. Specifically, a "thermal dot" indicated that the board had been subjected to a localized temperature of 150 F. The licensee replaced it with a spare, but maintained the No. 3 vital bus power supply from the auxiliary source.

The licensee subsequently brought a vendor representative on site to inspect the inverter (Cyberex). It was determined that several other circuit board cards also showed signs of slow, prolonged heating. These cards were replaced with spares. Discussions with the I&C Supervisor indicated that all cards would be reinspected during the next refueling outage for indications of overheating. Determination of the cause of this condition is Unresolved Item (86-04-01).

After the trip, control room personnel noted that source range monitor NI-31 failed to respond. Investigation revealed that the detector located in an instrument well adjacent to the reactor vessel, had failed. To replace this detector, intermediate range monitor NI-35 which is located in the lower half of the same instrument well, had to be removed. To allow the I&C technicians to do this, control room personnel removed the power and instrument fuses without bypassing the trip. Since the IRM reactor trip is a one out of two logic fail safe trip, the reactor protection system was inadvertently activated and the shutdown banks inserted. The licensee made the appropriate ENS notification. This work was performed under the maintenance work request system without benefit of a corrective maintenance procedure as it was considered within the skills of the trade. Review of corrective actions to preclude recurrence is Unresolved Item (86-04-02).

- (3) The reactor was restarted at about 2:40 p.m. on February 12, 1986, and full power was achieved without incident. Operations personnel noted that earlier vibration anomalies on the 1B main feedwater pump had increased by about 0.9 mils on February 14, 1986. It was decided to remove the pump for maintenance and power was reduced to 65%. The inspector observed the maneuver and identified no concerns.

During maintenance activities on the 1B feedwater pump, the licensee found that a 5" x 1" metal stud was responsible for the vibration. This is the second time such a metal stud has been found in the 1B pump. The licensee is currently investigating the source of this foreign material and developing appropriate corrective actions to prevent future introduction. Licensee action to limit the introduction of foreign material into the secondary system is Inspector Follow Item (86-04-03).

- (4) During a tour of the plant on March 5, 1986, the inspector noted steam admission from the atmospheric exhaust of the turbine driven auxiliary feedwater pump. This indicated that one of the two parallel steam line isolation trip valves (TV-MS-105A, B) to the Terry Turbine was leaking by. Discussions with operations and maintenance personnel indicated that the licensee intended to repair these valves (lap the seat) during the next refueling outage scheduled for May, 1986. In the interim, condensate buildup in the turbine is being drained once per shift as necessary.

During the same tour, the inspector also noted that several steam generator safety valve exhausts were emitting slight whiffs of steam indicating leak-by and possible steam cutting of the safety valve seats. This was also brought to the Maintenance Supervisor's attention. Followup to determine what corrective maintenance will be necessary during the next refueling outage is Inspector Follow Item (86-04-04).

c. Plant Security/Physical Protection

Implementation of the Physical Security Plan was observed in the areas listed in Paragraph 4a above with regard to the following:

- Protected area barriers were not degraded;
- Isolation zones were clear;
- Persons and packages were checked prior to allowing entry into the Protected Area;
- Vehicles were properly searched and vehicle access to the Protected Area was in accordance with approved procedures;
- 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 lighting was maintained.

No discrepancies were observed.

d. Radiation Controls

Radiation controls, including posting of radiation areas, the conditions of step-off pads, disposal of protective clothing, completion of Radiation Work Permits, compliance with the conditions of the Radiation Work Permits, personnel monitoring devices being worn, cleanliness of work areas, radiation control job coverage, area monitor operability (portable and permanent), area monitor calibration and personnel frisking procedures were observed on a sampling basis.

No deficiencies were observed.

e. Plant Housekeeping and Fire Protection

Plant housekeeping conditions including general cleanliness conditions and control of material to prevent fire hazards were observed in areas listed in Paragraph 4a. Maintenance of fire barriers, fire barrier penetrations, and verification of posted fire watches in these areas were also observed. The inspector identified no concerns.

A partial test for the cable tray mezzanine fire dampers was conducted per OST 1.33.13, Fire Protection System Detection Instrumentation Test, on March 6, 1986. It was conducted as a post-modification test for four fire dampers to ensure closure upon activation of the cardox blow-out feature (See Unresolved Item 85-11-01). One of the four modified dampers (VS-D-85B) and one unmodified damper (VS-D-90B) failed to close. Appropriate maintenance work requests were initiated to repair the hardware and the one hour fire patrols continued. The unresolved item remains open pending damper repair and testing.

During the test, a procedure deficiency was identified. The test is conducted by manual isolation of the CO2 line from its 10-ton source and pressing the local discharge button. This starts a six minute timer that controls the discharge sequence, which allows time for personnel to evacuate the local area and limit the amount of CO2 discharged. After the puff test, the local alarm panel was reset; however, there is no reset for the timer, which was still calling for system actuation. When the local control panel was returned to normal, the discharge started. The panel was immediately de-energized by the operator, limiting the discharge duration to only several seconds. There were no personnel injuries as access to the area was restricted by security personnel per the OST.

Discussions with the station personnel indicated that OST 1.33.13 would be revised to allow the timer to sequence out prior to resetting the system. Additionally, other fire protection tests would be reviewed and modified similarly. The inspector had no further concerns.

#### 5. Engineered Safety Features (ESF) Verification

The operability of the Hydrogen Recombiners were verified during the week of March 3, 1986, by performing walkdowns of accessible portions that included the following as appropriate:

- (a) System lineup procedures matched plant drawings and the as-built configuration.
- (b) Equipment conditions were observed for items which might degrade performance. Hangers and supports were operable.
- (c) The interior of breakers, electrical and instrumentation cabinets were inspected for debris, loose material, jumpers, etc.
- (d) Instrumentation was properly valved in and functioning; and had current calibration dates.
- (e) Valves were verified to be in the proper position with power available. Valve locking mechanisms were checked, where required.

No deficiencies were identified.

## 6. Maintenance Activities

The inspectors observed portions of selected maintenance activities on safety-related systems and components to verify that those activities were being conducted in accordance with approved procedures, technical specifications and appropriate industrial codes and standards. The inspectors conducted record reviews and direct observations to determine that:

- Those activities did not violate a limiting condition for operation.
- Redundant components were operable.
- Required administrative approvals and tagouts had been obtained prior to initiating work.
- Approved procedures were used or the activity was within the "skills of the trade."
- The work was performed by qualified personnel.
- The procedures used were adequate to control the activity.
- Replacement parts and materials were properly certified.
- Radiological controls were properly implemented when necessary.
- Ignition/fire prevention controls were appropriate for the activity.
- QC hold points were established where required and observed.
- Equipment was properly tested before being returned to service.
- An independent verification was conducted to verify that the equipment was properly returned to service.

The following activities were reviewed:

- a. The "B" River Water Subsystem was declared inoperable per Technical Specification 3.7.4.1 due to an inoperable river water pump discharge valve coincident with extensive maintenance being performed on the "B" river water pump. On February 6, 1986, during routine performance of OST 1.30.6, Reactor Plant River Water Pump 1C Test, the motor operated discharge valve on pump 1C to the "B" header (MOV-RW-102C1) failed to automatically close as required when the pump was secured. The valve electrically closed after the handwheel was turned slightly in the closed direction. The inspector observed maintenance performed per Corrective Maintenance Procedure 1.75.79, Limitorque Motor Operator Repair Maintenance. The valve open limit was discovered set too close to the manual stop. Therefore, when the valve opened, it jammed - turning the handwheel had freed the valve and allowed it to close by the operation of

the motor operator. The licensee reset the open limit to one-half turn more towards the closed direction to preclude any further jamming for this reason. The surveillance test was performed successfully and the river water subsystem was declared operable.

On March 5, 1986, MOV-RW-102C1 failed to stroke test from the control room. Subsequent investigation determined that the line starter coil was hanging up on a small plastic clip from the linestarter housing. After removal, the valve was successfully stroked several times and returned to service the same day.

- b. On February 21 and 22, 1986, the licensee observed a relatively large increase in pressure differential across the A and B Reactor Plant Component Cooling Heat Exchanger tubes which contain river water. The licensee attributed this pressure increase to silt accumulation in the heat exchanger tubes as a result of running Auxiliary River Water Pump 9A for a monthly surveillance test on February 21, 1986. During recent high river water levels, silt, mud and debris had collected on the traveling screen in the Auxiliary Intake Structure. Both heat exchangers were cleaned and returned to service.

The licensee discovered that the B charging pump speed increaser was leaking water out of the inboard and outboard shaft seals on February 24, 1986. Further investigation revealed that the speed increaser oil reservoir contained an oil - water mixture. River water to the speed increaser heat exchanger was isolated and the leak stopped. The B charging pump was taken out of service and the C pump replaced it as the standby charging pump. The licensee is currently replacing the speed increaser and its associated heat exchanger with spares. Investigation and determination of the cause of the lube oil heat exchanger failure is Inspector Follow Item (86-04-05).

- c. Two pinhole leaks were discovered in the river water discharge pipe between the C component cooling water (CCR) heat exchanger and manual isolation valve RW-199. The licensee placed a temporary rubber patch clamped over the holes as a short-term fix. The inspector noted that the side of the common RW effluent header that the C CCR heat exchanger effluent line discharges to visibly vibrates more than the other side. Discussions with station personnel indicates that the licensee believes the cause of the pinholes to be due to a localized eddy caused by a throttled butterfly valve used for pressure control. Review of long term corrective actions is Inspector Follow Item (86-04-06).

## 7. Surveillance Testing

To ascertain that surveillance of safety-related systems or components is being conducted in accordance with license requirements, the inspector observed portions of selected tests to verify that:

- a. The surveillance test procedure conforms to technical specification requirements.

- b. Required administrative approvals and tagouts are obtained before initiating the test.
- c. Testing is being accomplished by qualified personnel in accordance with an approved test procedure.
- d. Required test instrumentation is calibrated.
- e. LCOs are met.
- f. The test data are accurate and complete. Selected test result data was independently reviewed to verify accuracy.
- g. The test provides for independent verification of system restoration.
- h. Test results meet technical specification requirements and test discrepancies are rectified.
- i. The surveillance test was completed at the required frequency.

The following in-progress tests were witnessed by the inspector:

- MSP 1.04, Reactor Trip Breaker Test, on February 24, 1986.
- OST 1.30.3, Reactor Plant River Water Pump 1B Test, on March 7, 1986.

Revision 30 of MSP 1.04 was run for the first time when observed by the inspector. The I&C technicians noted that there were several steps that appeared to be out of sequence as a result of the revision. After discussing the procedural errors with the I&C Engineer, it was decided to restore the system to normal alignment and correct the procedure. A field revision was subsequently issued and the MSP completed. Though the original procedure review was inadequate, the I&C technicians were experienced, recognized the deficiency and acted to correct it. The inspector had no further questions at this time.

#### 8. Control Room Annunciator Survey

The inspector performed a snap-shot survey of control room annunciators on February 18, 1986. Noted were safety and non-safety-related annunciators which were alarmed red, alarmed green and yellow-tagged out-of-service or disabled (See Attachment 1, Annunciator Survey). Plant conditions during the survey were as follows: 99% power, diluting to compensate for Xenon concentration increases, and power range nuclear instrumentation NI-N43 calibration. The inspector identified 30 annunciators alarmed red, 29 alarmed green, and 15 out of service. Annunciators which are alarmed green are normally lit during plant operation and have had their background color changed to facilitate operator identification of abnormal alarms. Operator response to changes in green annunciator status is identical to that for red annunciators. The inspector discussed with licensee personnel the status of several alarms which

were unnecessarily lit. The licensee is currently investigating alarmed and out-of-service annunciator status and plans to make the necessary changes and repairs during the upcoming refueling outage (May, 1986). This issue is also being examined and tracked by NRR in the control room design review as a human factors concern.

9. Followup on Special Reports

- a. NRC Vendor Branch Inspection Report 99901033/85-01, issued December 27, 1985, concerned an inspection conducted at Power Inspection, Inc. This inspection report noted significant vendor QA program failures related to services provided to various utilities including Duquesne Light Company. This specifically concerned certification of personnel for non-destructive examination, and calibration of testing equipment used on ET of control room air conditioning condensers, component cooling water heat exchangers in the reactor and turbine plant, and other heat exchangers (diesel generator, recirculation spray, and blowdown). The inspector brought this to the attention of licensee personnel and requested that they evaluate the significance of these deficiencies upon the services provided to the station.

A licensee representative stated that PII had been placed on the QA Qualified Suppliers Hold List for Beaver Valley, Unit 1. Additionally, a review would be conducted to sort those eddy current examinations into two groups: (1) those performed in support of maintenance, and (2) those performed for ISI baseline data. No further action is planned for the first group, but a sample reinspection will be performed for the second. Review of licensee action to validate any ISI baseline data obtained by PII is Unresolved Item (86-04-07).

- b. Westinghouse notified the NRC of a potential unreviewed safety question on February 26, 1986, applicable to all reactor protection logic systems designed by them. The potential malfunction involved the P-10 permissive which is used to enable (3 out of 4 logic below 10%) and block (2 out of 4 logic above 10%) the low power flux trips provided by the source range, intermediate range and power range monitors. If one of the four power range monitors becomes inoperable while at power, technical specifications require tripping all bistables, including the P-10 permissive. Should power subsequently be reduced below 10%, and assuming a single failure of any one of the three remaining P-10 bistables, the low power flux trip would not be automatically reinstated. This is contrary to the assumptions used in the boron dilution and uncontrolled bank withdrawal from subcritical analysis of the FSAR and reduces the margin of safety as defined in the basis of the technical specification.

The Plant Manager informed the inspector that Westinghouse had informed the station of this concern. The shift supervisor turnover logs added a caution with regard to any power reduction below 10% as a short term action. Long term resolution will be tracked as Unresolved Item (86-04-08).

10. 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.

ATTACHMENT 1

ANNUNCIATOR SURVEY

<u>PANEL</u>	<u>ANNUNCIATOR</u>	<u>STATUS</u>	<u>DISCUSSION</u>
ANN.A1/12	VITAL BUS III TROUBLE	A/R	2-10-86 BLOWN CONTROL FUSE ON BUS INVERTER, CURRENTLY ALIGNED TO ALTERNATE FOR INVESTIGATION OF FAILURE.
ANN.1A/91	RIVER WATER PUMP 1B SEAL WATER PRESS. LOW	A/R	RW PUMP 1B MAINTENANCE
ANN.A2/38	STEAM GENERATOR DRAIN TANK LEVEL LOW	A/R	HOLDING TANK FOR LIQUID WASTE - NORMALLY EMPTY.
ANN.A2/51	LIQUID WASTE EVAPORATOR LEVEL HIGH	A/R	LW EVAPORATOR ON CLEARANCE
ANN.A2/53	LIQUID WASTE EVAP. BOTTOMS PUMP THERMAL OVERLOAD.	A/R	LW EVAPORATOR ON CLEARANCE
ANN.A2/54	LIQUID WASTE LOW LEVEL DRAIN TANK 3A LEVEL LOW.	A/R	NORMAL, TANK IS CURRENTLY EMPTY.
ANN.A2/56	LIQUID WASTE HIGH LEVEL DRAIN TANK 2A LEVEL HIGH.	A/R	LW EVAP. ON CLEARANCE
ANN.A2/57	LIQUID WASTE EVAP TEST TANK 5A LEVEL LOW.	A/R	NORMAL, TANK IS CURRENTLY EMPTY.
ANN.A2/61	CONTAMINATED SHOWER AND LAUNDRY DRAIN TANK 6A LOW LEVEL.	A/R	NORMAL, TANK IS CURRENTLY EMPTY.
ANN.A2/62	LIQUID WASTE LOW LEVEL DRAIN TANK 3B LOW LEVEL.	A/R	NORMAL, TANK IS CURRENTLY EMPTY.
ANN.A2/64	LIQUID WASTE HIGH LEVEL DRAIN TANK 2B LEVEL HIGH.	A/R	NORMAL, TANK IS CURRENTLY FULL BECAUSE LW EVAPORATOR ON CLEARANCE.

<u>PANEL</u>	<u>ANNUNCIATOR</u>	<u>STATUS</u>	<u>DISCUSSION</u>
ANN.A2/81	AUX. BOILER LOCAL PANEL TROUBLE.	A/R	NORMAL, BOILER CURRENTLY IN WET LAYUP, ALARM HAD NOT YET BEEN RESET.
ANN.A2/125	BORON EVAP. TEST TANK 2B LEVEL LOW.	A/R	NORMAL, TANK IS CURRENTLY EMPTY.
ANN.A3/4	BORON EVAP. BOTTOMS HOLD TANK LEVEL LOW	A/R	NORMAL, TANK IS CURRENTLY EMPTY.
ANN.A3/11	BORON EVAP. DISTILLATE ACCUMULATOR 1B LEVEL LOW.	A/R	B EVAPORATOR NOT IN SERVICE, ACCUMULATOR EMPTY.
ANN.A3/16	BORON EVAP. BOTTOMS COOLER DISCHARGE TEMP. HIGH.	A/R	NORMAL, FOR PREVENTION OF BORON SOLIDIFICATION
ANN.A4/49	LOOP OVERPOWER DELTA T	A/R	BISTABLES ARE CURRENTLY TRIPPED FOR MSP ON NI-N43
ANN.A4/50	LOOP OVERPOWER DELTA T AUTO TURBINE RUNBACK BLOCKED ROD WITHDRAWAL.	A/R	BISTABLES CURRENTLY TRIPPED FOR NI-N43 MSP.
ANN.A4/53	LOOP OVERTEMP. DELTA T	A/R	BISTABLES CURRENTLY TRIPPED FOR NI-N43 MSP.
ANN.A4/54	LOOP OVERTEMP. DELTA T AUTO TURBINE RUNBACK BLOCK ROD WITHDRAWAL.	A/R	BISTABLES CURRENTLY TRIPPED FOR NI-N43 MSP.
ANN.A6/6	POOL PURIFICATION PUMP 4A DISCHARGE PRESSURE LOW.	A/R	PUMP SHUTDOWN FOR FUEL POOL WORK ACTIVITIES.
ANN.A6/39	CHEMICAL ADDITION TANK TEMP. LOW CHANNEL I.	A/R	CHANNEL OOS 2-11-86 MWR 860212, FAILED LOW.
ANN.A6/66	COOLING TOWER DE-ICING SYSTEM TROUBLE.	A/R	LOW LEVEL IN GLYCOL TANK - INDICATOR TROUBLE. CURRENTLY UNDER INVESTIGATION.
ANN.A6/93	SCREENWASH PUMP TROUBLE.	A/R	PUMP OOS, RETIRED IN PLACE.

<u>PANEL</u>	<u>ANNUNCIATOR</u>	<u>STATUS</u>	<u>DISCUSSION</u>
ANN.A6/102	INTAKE STRUCTURE RIVER WATER LEVEL TEMP. ABNORMAL.	A/R	RIVER LEVEL CURRENTLY HIGH.
ANN.A7/71	STEAM GENERATOR BLOWDOWN FLASH TANK #1 LEVEL LOW.	A/R	SYSTEM NOT INSERVICE - NEW BLOWDOWN SYSTEM INSTALLED.
ANN.A9/128	FAULT RECORDER TROUBLE.	A/R	CURRENTLY OOS UNABLE TO LOCATE PROBLEM.
ANN.A11/104	METEROROLOGICAL BUILDING TROUBLE	A/R	UNDER INVESTIGATION - ALARMS WHEN LIGHTS ARE TURNED ON.
ANN.A11/125	HYDROPNEUMATIC TANK AIR COMPRESSOR THERMAL OVERLOAD.	A/R	FIRE PROTECTION SYSTEM COMPRESSOR OVERHAUL AFTER FAILURE.
ANN.A11/127	FIRE PROTECTION SYSTEM TROUBLE - WAREHOUSE.	A/R	FAILED POWER SUPPLY - CURRENTLY UNDER REPAIR.
ANN.A1/29	SI PUMP 1B SEAL WATER LEVEL LOW.	A/R YELLOW TAGGED	1-15-86 MWR 860093 SEAL ACCUMU- LATOR LEVEL SWITCH LOOSE WIRES.
ANN.A1/42	CONTAINMENT INST. PIT LEVEL HIGH.	DISABLED	5-16-85 MWR 830942 RECEIVED GROUND ON ANNUNCIATOR.
ANN.A1/35	CONTAINMENT AIR PARTIAL PRESS HIGH- LOW CHANNEL I.	DISABLED	9-25-84 DCP 612
ANN.A1/36	CONTAINMENT AIR PARTIAL PRESS HIGH-HIGH CHANNEL I.	DISABLED	3-16-84 DCP 612
ANN.A2/49	EVAPORATOR CIRC. WATER PUMP SEAL WATER FLOW LOW.	DISABLED	8-16-84 MWR 841941 - LOCAL FLOW GAUGE READS ZERO AND LOW FLOW ALARM IN, ADEQUATE SEAL FLOW PRESENT SENSING LINE MAY BE PLUGGED.
ANN.A2/122	BORON EVAP. CIRC. PUMP 6B DISCHARGE PRESS. HIGH-LOW.	DISABLED	6-24-85 MWR 821467 OFF SCALE LOW, NO TRANSMITTER.

<u>PANEL</u>	<u>ANNUNCIATOR</u>	<u>STATUS</u>	<u>DISCUSSION</u>
ANN.A3/31	BORIC ACID CONCENTRATION HIGH- LOW.	DISABLED	2-18-81 MWR 826531 BORONMETER WILL BE RETIRED IN PLACE.
ANN.A3/118	RCP 1C SEAL INJECTION BYPASS TO VCT FLOW LOW.	DISABLED	5-19-85 MWR 837701 INSTRUMENT CALIBRATION, NORMALLY ALARMED/ GREEN.
ANN.A4/14	PZR PORV LOW PRESS RELIEF PROTECTION INOPERABLE.	DISABLED	1-5-85 MWR 851286 GROUND IN SEQUENCE OF EVENTS RECORDER BAY 1.
ANN.A4/76	COMPUTER ALARM ROD DEVIATION/SEQUENCE NIS POWER RANGE TILTS.	DISABLED	11-19-80 NOTHING CAN BE DONE SHORT OF REDESIGNING RPI AND REPROGRAMMING P250 COMPUTER. ALARM MAY BE RETIRED.
ANN.A6/49	STEAM GENERATOR BLOWDOWN DRAIN STRAINER DIFFERENTIAL PRESSURE HIGH.	DISABLED	1-8-86 CLEARANCE #494107.
ANN.A6/96	AUX. CHLORINATION CHEMICAL FEED LOCAL PANEL TROUBLE.	DISABLED	6-30-85 OPEN KNIFE SWITCH ON ANNUNCIATOR - NUISANCE ALARM.
ANN.A7/95	TURNING GEAR SHAFT AT ZERO SPEED	A/R YELLOW TAGGED	10-9-85 SPEED INDICATOR SIGNAL ORIGINATED IN TURBINE SUPER- VISORY, WHICH IS ON CLEARANCE, AWAITING DCP 615 MODIFICATION.
ANN.A7/112	TURBINE SUPERVISORY INSTRUMENT POWER OFF.	A/R YELLOW TAGGED	1-28-85 NEW VIBRATION MONITORING SYSTEM IN SERVICE - OLD SYSTEM REMOVED. ANNUNCIATOR WILL BE MODIFIED.
ANN.A11/52	CONTROL ROOM EMERGENCY AIR COMPRESSOR TROUBLE.	DISABLED	10-18-85 CLEARANCE #514985 INSTALLING NEW COMPRESSOR.
ANN.A1/69	BIT TEMP. HIGH	A/G	NORMAL - PREVIOUS HIGH BORON CONCENTRATION REQUIRED HIGH TEMPERATURES.
ANN.A1/100	OUTSIDE RECIRC. SPRAY PUMP 21 SEAL- WATER LEVEL HIGH.	A/G	NORMAL.

<u>PANEL</u>	<u>ANNUNCIATOR</u>	<u>STATUS</u>	<u>DISCUSSION</u>
ANN.A1/124	OUTSIDE RECIRC. SPRAY PUMP 2B SEAL WATER LEVEL HIGH.	A/G	NORMAL.
ANN.A1/126	RESIDUAL HEAT REMOVAL SYSTEM DISCHARGE FLOW LOW.	A/G	NORMAL.
ANN.A2/18	H2 RECOMBINER LOCAL PANEL A TROUBLE.	A/G	NORMAL - DE-ENERGIZED DURING NORMAL OPERATION.
ANN.A2/19	H2 ANALYZER LOCAL PANEL 1 TROUBLE.	A/G	NORMAL - DE-ENERGIZED DURING NORMAL OPERATION.
ANN.A2/22	H2 RECOMBINER LOCAL PANEL B TROUBLE.	A/G	NORMAL - DE-ENERGIZED DURING NORMAL OPERATION.
ANN.A2/23	H2 ANALYZER LOCAL PANEL B TROUBLE.	A/G	NORMAL - DE-ENERGIZED DURING NORMAL OPERATION.
ANN.A2/31	N2 SUPPLY HEADER PRESS. LOW.	A/G	NORMAL - N2 NOT NORMALLY ALIGNED TO HEADER UNLESS IN USE.
ANN.A2/115	BORON EVAP. CIRC. PUMP 6A SEAL WATER FLOW LOW.	A/G	NORMAL - EXCESSIVE SEALWATER DILUTES EVAPORATOR.
ANN.A2/123	BORON EVAP. CIRC. PUMP 6B SEAL WATER FLOW LOW.	A/G	NORMAL - EXCESSIVE SEAL WATER DILUTES EVAPORATOR.
ANN.A3/60	LOOP FILL HEADER PRESS. HIGH.	A/G	NORMAL - SETPOINT 2300 PSIG, CHARGING PUMP DISCHARGE PRESS. 2500 PSIG, FILL HEADER NOT NORMALLY IN USE.
ANN.A3/102	RCP 1A SEALING BYPASS TO VCT FLOW LOW.	A/G	NORMAL - RETIRED IN PLACE.
ANN.A3/110	RCP 1B SEAL INJ. BYPASS TO VCT FLOW LOW.	A/G	NORMAL - RETIRED IN PLACE.
ANN.A4/7	PZR PORV N2 SUPPLY PRESS. LOW.	A/G	NORMAL - ADMIN. PROCEDURE REQUIRES LOW PRESSURE, PORV'S HAVE N2 ACCUMULATORS.
ANN.A4/29	RCS VENT SYSTEM PRESSURE HIGH.	A/G	SOLENOID VALVE LEAK.

<u>PANEL</u>	<u>ANNUNCIATOR</u>	<u>STATUS</u>	<u>DISCUSSION</u>
ANN. A4/33	PZR BACKUP HEATER GROUP ON MANUAL.	A/G	NORMAL, CURRENTLY DILUTING - PROVIDES FOR MIXING IN PZR.
ANN. A4/82	NIS SOURCE RANGE HI SHUTDOWN FLUX ALARM BLOCKED.	A/G	NORMAL - SOURCE RANGE BLOCKED WHEN AT POWER.
ANN. A4/85	NIS SOURCE RANGE LOSS OF CHANNEL I DETECTOR VOLTAGE.	A/G	NORMAL - DETECTOR DE-ENERGIZED WHEN AT POWER.
ANN. A4/87	NIS SOURCE RANGE LOSS OF CHANNEL II DETECTOR VOLTAGE.	A/G	NORMAL - DETECTOR DE-ENERGIZED WHEN AT POWER.
ANN. A6/10	FUEL POOL PUMP 1B DISCHARGE PRESS. LOW	A/G	NORMAL - USUALLY RUN 1A PUMP ONLY.
ANN. A6/14	POOL PURIFICATION PUMP 4B DISCHARGE PRESS. LOW.	A/G	NORMAL - USUALLY RUN 4A PUMP ONLY.
ANN. A6/16	REFUELING CAVITY LEVEL LOW.	A/G	NORMAL - DRAINED DURING POWER OPERATION.
ANN. A6/38	CCR HX 8" DISCHARGE LINE LOW FLOW.	A/G	NORMAL - LOW LOAD ON CCR HEADER.
ANN. A6/87	H2 BLANKETING SYSTEM PRESS. LOW	A/G	SYSTEM USUALLY NOT IN SERVICE AT POWER OPERATION.
ANN. A8/40	BULK H2 STORAGE TANKS PRESS. LOW	A/G	NORMAL - H2 ISOLATED TO MAIN GENERATOR.
ANN. A9/100	125V DC BATTERY CHARGER 1 FAILURE.	A/G	NORMAL - ALARM SETPOINT HIGHER THAN CURRENT CHARGER OUTPUT.
ANN. A9.108	125V DC BATTERY CHARGER 3 FAILURE.	A/G	NORMAL - ALARM SETPOINT HIGHER THAN CURRENT CHARGER OUTPUT.
ANN. A9/112	125V DC BATTERY CHARGER 4 FAILURE.	A/G	NORMAL - ALARM SETPOINT HIGHER THAN CURRENT CHARGER OUTPUT.

## KEY:

A/R - ANNUNCIATOR ALARMED RED

A/G - ANNUNCIATOR ALARMED GREEN