U. S. NUCLEAR REGULATORY COMMISSION
REGION 1

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| Licensee: | Duquesne Light Company<br>One Oxford Center<br>301 Grant Street<br>Pittsburgh, PA 15279 |
| Facility: | Beaver Valley Power Station, Units 1 and 2 |
| Location: | Shippingport, Pennsylvania |
| Inspection Period: | December 1 - 31, 1990 |
| Inspectors: | J. E. Beall, Senior Resident Inspector<br>P. R. Wilson, Resident Inspector<br>Ram Bhatia, Reactor Engineer, DRS |

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Reactor Projects Section No. 4B

Inspection Summary

This inspection report documents routine and reactive inspections during day and backshift hours of station activities including: plant operations; radiological protection; surveillance and maintenance; emergency preparedness; security; engineering and technical support; and safety assessment/quality verification.

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*The NRC manual inpection procedure (IP) or temporary instruction (TI) is listed for each applicable report section.

EXECUTIVE SUMMARY
Beaver Valley Power Station
Report Nos. 50-334/90-23 & 50-412/90-23

Plant Operations
Two operational events were reviewed. A non-cited violation was identified concerning the failure to lock out a Unit 1 auxiliary river water pump discharge valve as required. This resulted in an automatic start of the standby river water pump. Appropriate operator response and root cause analysis were noted following the full closure of a Unit 1 main steam trip valve which resulted in a forced plant shut down. Both events were found to be of minimal safety significance. The Work Activity Surveillance Program was reviewed and found to be a notable strength. Housekeeping at both units was excellent.

Radiological Protection
Routine review of the area identified no noteworthy observations.

Surveillance and Maintenance
The vibration monitoring, infrared thermograph, and oil/grease analyses portions of the Plant Maintenance Program were reviewed. The initiatives were found to be aggressive and a noteworthy strength. The licensee's efforts to upgrade the quality of maintenance procedures were reviewed. The new procedures were found to be of high quality and had significant human factors improvements. The licensee's corrective actions for weaknesses identified in an NRC Maintenance Team Inspection were reviewed. All identified weaknesses were found to have been appropriately corrected.

Emergency Preparedness
Routine review of this area identified no noteworthy observations.

Security
Routine review of this area identified no noteworthy observations.

Engineering and Technical Support
Strong engineering support was demonstrated in the licensee's identification and evaluation of the Unit 1 main feedwater line thermal stratification phenomena. The inspector reviewed the licensee's resolution of two previously NRC identified concerns. Unit 1 motor operated valve thermal overload relay sizing concerns and Unit 1 emergency lighting concerns were adequately resolved.

Safety Assessment/Quality Verification

The tracking and closure identified by the DLC's Safety System Functional Evaluation Program was reviewed. The inspector found the program to be a notable strength with excellent observations and good tracking to closure. A non-cited violation was identified concerning the failure to perform a boric acid analysis on the Boric Acid Storage Tank within the required periodicity.

## DETAILS

### 1.0 SUMMARY OF FACILITY ACTIVITIES

At the beginning of the inspection period both Unit 1 and Unit 2 were operating at full power. On December 21, Unit 1 lowered power to approximately 30 percent to perform a boric acid soak of the steam generator secondary sides. On December 26, Unit 1 was shut down to Hot Standby (Mode 3) following the unexpected closure of a main steam trip valve during surveillance testing (see Detail 2.3.2). Unit 1 returned to power operation on December 29 and operated at approximately 30 percent power for the remainder of the period. Unit 2 operated at full power throughout the period.

### 2.0 PLANT OPERATIONS (IP 71707, 71710, 93702, 71711)

### 2.1 Operational Safety Verification

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 Area Fence Line
- Spent Fuel Building
- Containment Penetration Areas
- Safeguard Areas
- Service Buildings
- Turbine Buildings
- Intake Structure
- Yard Areas
- Diesel Generator Buildings

During the course of the inspection, discussions were conducted with operators concerning 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. The inspectors found that control room access was properly controlled and a professional atmosphere was maintained. Inspector 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 inspector also examined the condition of various fire protection, meteorological, and seismic monitoring systems.

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

2.2 Engineered Safety Features System Walkdown

The operability of selected engineered safety feature systems was verified by performing detailed walkdowns of the accessible portions of the systems. The inspectors confirmed that system components were in the required alignments, instrumentation was valved-in with appropriate calibration dates, as-built prints reflected the as-installed systems and the overall conditions observed were satisfactory. The systems inspected during this period include the Emergency Diesel Generators, Safety Injection Auxiliary Feed and Recirculation Spray systems. No concerns were identified.

2.3 Event Followup

During the inspection, the inspectors provided onsite coverage and followup of unplanned events. Plant parameters, performance of safety systems, and licensee actions were reviewed. The inspector confirmed that the required notifications were made to the NRC. The following events were reviewed:

2.3.1 Inadvertent Start of the Standby River Water Pump

On December 11, 1990, while Unit 1 was operating at 100 percent power, the "C" river water pump (1WR-P-1C) automatically started during surveillance testing due to low river water header pressure. This was an Engineered Safety Features actuation. At the time of the event, operators were performing Operations Surveillance Test (OST) 1.30.1B "[1WR-P-9B] Auxiliary River Water Pump Test."

The Unit 1 River Water System supplies cooling water to safety related heat loads. The system has three river water pumps which supply two independent headers with the "C" river water pump normally maintained in standby. One signal which generates an automatic start of the standby river water pump is a low pressure condition on the associated river water header.

As a backup source of cooling water, Unit 1 has two auxiliary river water pumps located in a separate intake structure. Each auxiliary river water pump supplies cooling water to its associated river water header downstream of the river water

pumps. The discharge valves associated with each auxiliary river water pump are normally closed and automatically open on a start signal to the auxiliary river water pump.

To verify the operability of the "B" auxiliary river water pump, the OST required the pump to be started and the flow directed to a recirculation flow path. To prevent the pump from discharging into its associated river water header, the OST directed the operator to place the control switch for the auxiliary river water pump's discharge valve in the "closed" position which would have prevented the valve from automatically opening on the pump start. The operator failed to perform this step and when the auxiliary river water pump was subsequently started, the pump's discharge valve opened. As the valve opened, the "B" river water header momentarily depressurized which caused the automatic starting of the standby river water pump. The auxiliary river water pumps discharge valve was subsequently closed and the auxiliary river water pump was stopped. The licensee reported the event as required by 10 CFR 50.72.

The cause of the event was operator error. The control room operator failed to perform the OST as written. As a corrective action, the licensee formally disciplined the operator involved.

The inspector reviewed the event and concluded the operator's failure to place the control switch for the auxiliary river water pump discharge valve in the "closed" position in accordance with OST 1.30.1B was an isolated event and was of minor safety significance (Severity Level V). The licensee reported the event to the NRC as required. The licensee's corrective action was adequate. In addition, no past similar occurrences were identified. Therefore the failure to follow OST 1.30.1B is a violation, but is not being cited because the criteria specified in Section V.G. of the Enforcement Policy were met (NCS 50-412/90-23-01).

2.3.2 Unit 1 Unplanned Shutdown

On December 26, 1990, Unit 1 was shut down following the full closure of the "B" main steam trip valve during partial stroke surveillance testing of the valve. At the time of the event, Unit 1 was operating at 30 percent power. While at this power, surveillance testing on the main steam trip valves, as required by Technical Specification 3.7.1.5, was performed.

The main steam trip valves are standard swing check valves. However, the valves are installed counter to normal flow. The valve disk is normally held out of the steam flow path by two air operators. To close the valve, air is vented from the operators via two redundant solenoid valves causing the disk to drop into the steam flow which rapidly closes the valve.

A third solenoid is provided for partial stroking of the valve. The purpose of the partial stroke surveillance test is to confirm that the valve is not mechanically bound in the open position. A local test push button energizes the third solenoid to vent air until the trip valve strokes three degrees. A valve position limit switch then de-energizes the solenoid to return the trip valve to its full open position.

While performing partial stroke testing of the "B" main steam trip valve, the valve unexpectedly fully shut. Because the unit was at such low power (30 percent), the resulting transient did not cause a reactor trip or other Engineered Safety Feature actuation. As required by Unit 1 procedures, control room operators commenced an emergency shutdown and entered Hot Standby (Mode 3) approximately 30 minutes after the closure of the valve. The event was reported to the NRC in accordance with 10 CFR 50.72.

An identical event occurred on October 6, 1990 (see IR 50-334/90-20; 50-412/90-20). The "B" main steam trip valve fully closed during the same partial stroke testing and resulted in an emergency shutdown. Following the October 6 event, the licensee conducted a detailed root cause evaluation. However, an exact cause of the event could not be determined.

Following the December 26 event, the licensee determined that the three degree position limit switch was operating only intermittently. This allowed the trip valve to stroke closed beyond the three degree position and for the valve disk to enter the main steam flow path, rapidly shutting the valve. The limit switch was subsequently replaced and the valve was satisfactorily tested.

After the October 6 event, the licensee thoroughly examined and tested the above limit switch as part of the event investigation. No deficiencies were identified. The licensee recognized that one of the possible causes of the October 6 event was the limit switch; however, due to the intermittent nature of the fault, it was not detected.

The inspector found the operators' response to the event to be appropriate. The licensee root cause evaluations for both events were thorough and detailed. The inspector found that due to the intermittent nature of the fault, it was reasonable that the initial root cause evaluation did not detect the faulted switch.

The inspector found that the event was of minor safety significance. The closure took place at 30 percent power. Closure at 100 percent power is a transient which, according to the Nuclear Steam Supply System vendor, is bounded by the loss of External Electrical Load or Turbine Trip transient analyzed in FSAR Section 14.1.7.

2.4 Work Activity Surveillance Program

The inspector conducted a review of the licensee's work activity surveillance program to determine if the program was being effectively implemented and whether any identified weaknesses were being corrected in a timely manner.

In May 1987, DLC implemented a work activity surveillance program. The program is designed to provide an additional means of detecting weaknesses and trends in the performance of work activities affecting plant operation. Each month, front line supervisors are assigned to physically observe and evaluate designated work activities. The supervisors are required to document their observations and then forward the observations to the appropriate department management for corrective action. The program requires the supervisor to immediately notify the responsible management, if the work activity is being unsatisfactorily performed. Once reviewed and appropriate corrective action initiated, the documented observations are forwarded to the program coordinator. The program coordinator then collates the surveillance reports and prepares a monthly report to the plant manager describing the weakness observed and any trends.

The inspector found the program to be effectively implemented with over 100 work activities being observed each month. Corrective actions for observed weaknesses were generally initiated immediately. All site groups were actively participating in the program. The inspector found that surveillance program results were being collated and evaluated as required. The evaluations and trends were being reported to the plant manager. The inspector concluded that the Work Surveillance Program was an excellent initiative and was a notable strength.

3.0 RADIOLOGICAL CONTROLS (IP 71707)

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.

There were no notable observations.

4.0 MAINTENANCE AND SURVEILLANCE (IP 61726, 62703, 71707)

4.1 Maintenance Observation

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 901894 Inspect and Repair Oil Leak on Charging Pump 1CH-P-1A

MWR 906822 Repair Diesel Start Air Compressor 2EGA-C22B

MWR 906877 Inspect and Repair Governor for Turbine Driven Auxiliary Feedwater Pump 2FWE*23

There were no notable observations.

4.2 Plant Predictive Maintenance Program

To improve plant safety and reliability through the early detection of equipment problems, the licensee performs predictive analyses. The licensee uses several different techniques to analyze equipment performance. The inspector reviewed three of these techniques. These included vibration monitoring, oil/grease analysis, and infrared thermography.

The inspector found that the vibration monitoring program was well established. State of the art vibration monitoring equipment was being utilized. Vibration data from rotating machinery was being recorded on a routine basis and was then down loaded into a computer for diagnoses and trending. Every other week, vibration data was recorded on operating machinery. For plant components which normally were shut down, vibration data was recorded during the routine surveillance testing of those components. Once the data is down loaded into the computer, an analysis was performed to determine displacement, velocity, and acceleration parameters. The results were then trended to determine if any component was degrading.

The inspector also reviewed the infrared thermography program. This initiative had only recently been initiated and at the time of the inspection, the licensee was in the process of obtaining base line data for plant components. State of the art equipment was also being utilized for this effort. Component heat profiles were being recorded on video tape and down loaded into a computer for diagnosis and trending.

The lube oil/grease analysis program was also well established. Grease and lube oil samples were routinely taken. The samples were then sent to an independent laboratory for analysis. Analysis performed on lube oil included viscosity, moisture detection of containments. Ferrography was also used to detect metal wear products in the oil samples. Grease was being analyzed for color, order, and consistency. The laboratory results were recorded in a computer data base and then trended.

With one exception, the predictive maintenance programs described above has not identified impending equipment failures. However, none of the components monitored by the program have failed since the implementation of the effort. Infrared thermography did identify a failed Unit 1 pressurizer heater cabinet fan.

The inspector concluded that the licensee predictive maintenance program was aggressive. The strong commitment to predictive maintenance was evident from the comprehensiveness of the analyses performed and by the use of state of the art equipment. This program was found to be a notable strength.

4.3 Status of Maintenance Team Inspection Findings

The inspector reviewed the status of findings identified during an NRC maintenance team inspection (MTI) conducted between September 11-29, 1989 (see NRC Inspection Report 50-334/89-80; 50-412/89-80). During the MTI, six weaknesses were identified concerning the licensee's conduct of maintenance. The inspector review of these items was performed through discussions with licensee personnel, documentation reviews, and field inspection.

4.3.1 (Closed) Weakness No. 1

Lack of a unified and comprehensive document that provided site-wide guidance on the policy, objectives, constraint and structure of maintenance functions. In the written response to the MTI finding, DLC stated that site organization and responsibilities of each site group would be delineated in a new Nuclear Group Administrative Manual (NGAM). In addition, detailed group work functions and interface with other site groups would be incorporated into the administrative procedures for the various site groups. The response also stated that the Maintenance Manual and the Instrumentation and Control (I&C) Manual would be combined into one unified document.

The inspector found that the NGAM contained the Nuclear Group directives which defined the Nuclear Group's mission, organizational structure, and expectations for all site departments, including maintenance.

The inspector also reviewed the applicable portions of the new Maintenance Manual. The inspector found that the old Maintenance Manual the and I & C Manual were successfully merged into one document. In addition, the new Maintenance Manual contained new sections delineating the maintenance department's mission, organization, and performance standards. Also, the manual contained sections describing how the maintenance department was to interface with the various site support groups.

The inspector found that the applicable sections of the NGAM and the new Maintenance Manual satisfactorily corrected the identified weakness and had no further questions.

4.3.2 (Closed) Weakness No. 2

Lack of a graded response to failures to assure that a root cause analysis was performed before a potentially serious event or multiple failures occurred in a component. The item was previously reviewed in NRC Inspection Report 50-334/90-20; 50-412/90-20 where the inspector found that the licensee had implemented an effective root cause analysis program. The program included a graded response to failures and a formal root cause analysis process for high priority repairs.

4.3.3 (Closed) Weakness No. 3

Lack of rigor and consistency in the implementation of Maintenance Work Request (MWR) process. The inspector reviewed several licensee initiatives implemented to correct the identified weakness. The MWR form was revised to clearly delineate the lines of responsibility and provide separate blocks for all key action requirements and information. A work control group was established which prepares work packages prior to issue. For site management to monitor compliance with MWR requirements, quality control inspectors were instructed to immediately report those maintenance deficiencies observed which were immediately corrected in the field and had no significant impact on the maintenance activity in progress. Additionally, senior site management stressed to all site personnel the importance of attention to detail and procedure compliance.

The inspector reviewed over 25 MWRs associated with maintenance in progress and no documentation deficiencies were identified. The work packages were complete and correct. The inspector found the licensee's corrective action to be effective and had no further questions.

4.3.4 (Closed) Weakness No. 4

Insufficient supervisory oversight on radiological work activities with cumbersome RWP package forms. This item was reviewed in NRC Inspection Report 334/90-19; 50-412/90-19 and is considered closed.

4.3.5 (Closed) Weakness No. 5

Lack of formal procedures governing scope and material control in maintenance shops. The licensee developed and implemented a Maintenance Manual procedure which defined the work scope and control requirements of maintenance activities performed in various maintenance shops. The inspector found that the procedure contained requirements for work authorization, material control, and housekeeping, expendable products, and welding. The inspector found the procedure to be adequate and had no further questions.

4.3.6 (Closed) Weakness No. 6

Incomplete coordination and work control in areas where multiple craftsmen were working on different MWRs. To prevent recurrence, the licensee implemented more a detailed process of scheduling outage activities. Each work area was assigned a computer code number. This permitted outage planners and schedulers to determine, in advance, areas where more than one work activity was scheduled simultaneously. Once identified, the outage schedulers were able to reschedule conflicting activities, if possible. In addition, the licensee assigned area coordinators to coordinate activities in the work areas. One responsibility of the work coordinators was preventing conflicting work activities in their assigned areas. During the most recent Unit 2 refueling outage, the inspector did not observe any recurrence of the above weakness. The inspector found that the licensee's corrective action appeared to be effective and had no further questions.

4.4 Maintenance Procedure Upgrade Program

In an effort to improve the quality of the all site procedures, the licensee initiated an extensive procedure upgrade program. The inspector conducted a review of the maintenance procedure upgrade portion of this initiative. The purpose of the upgrade program is to incorporate the latest human factor considerations into the procedures as recommended by nuclear industry guidance. The program required the use of standardized phraseology and procedure format. In addition, procedure drawings were to improve along with other graphic upgrades. The major goal of the program was to improve procedure usability and minimize error. Approximately 3000 maintenance procedures are scheduled to be upgraded. At the end of the inspection period, 20 procedures had

been completed and approved for use.

The inspector interviewed maintenance procedure writers to determine what controls were utilized while preparing the procedures. The inspector found that a maintenance procedure writer's guide had been used to ensure that standard phraseology and format were maintained in each procedure. In addition, each upgraded procedure was subjected to a validation and verification process prior to approval. The inspector reviewed the procedure writer's guide and found it to be detailed and comprehensive.

The inspector reviewed several of the approved upgraded procedures. The procedures were found to be of high quality. No deviations from the procedure writer's guide were identified. The initial conditions, acceptance/completion criteria, precautions, and procedure prerequisites were clearly delineated. Instruction steps were short and concise following a logical sequence. Procedure cautions were well highlighted. Drawings were provided in the body of the procedures where needed.

The inspector found that the upgraded procedures had significant human factors improvements. The licensee expects to complete the upgrade program in June, 1993. The inspector will continue to review newly upgraded maintenance procedures during routine maintenance observations.

5.0 EMERGENCY PREPAREDNESS (IP 71707)

The resident inspectors had no noteworthy findings during this inspection in this area.

6.0 SECURITY (IP 71707)

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 maintained and that persons in Vital Areas were 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.

There were no noteworthy observations.

## 7.0 ENGINEERING AND TECHNICAL SUPPORT (IP 37700, 37828, 71707)

### 7.1 Unit 1 Main Feedwater Line Thermal Stratification

The licensee identified a potentially unanalyzed condition concerning a main feedwater line while performing an engineering study of feedwater pipe behavior in containment. The study found that, based on previously unanalyzed stresses and the apparent failure of two monoball pipe supports, the potential existed for pipe and pipe support damage during a seismic event of magnitude below the licensed Operating Basis Earthquake (OBE). The study concluded that there was no immediate safety issue since no pipe failure scenarios were identified up to and including the Safe Shutdown Earthquake.

The data indicated that at low power levels (below 30 percent), horizontal runs of feedwater piping experienced temperature stratification. This condition was unexpected, was not accounted for in previous stress analyses, and may represent a new generic issue. The study also found that two monoball pipe supports on one main feedwater line appeared to have seized (a similar failure was noted in NRC Inspection Report 50-334/89-22; 50-412/89-21). The combination of the above two factors led the licensee to determine that damage may occur below OBE.

The observed thermal stratification was detected using instrumentation installed to monitor feedwater line behavior following the previous monoball problem. The instrumented main feedwater line enters containment, rises about 20 feet, runs horizontally about 100 feet, penetrates the crane wall, forms a loop seal, and then enters the steam generator. Stratification was found in the horizontal pipe section on the order of 200 F with over 400 F observed near the steam generator inlet. Code requirements are for thermal stresses to be additive to other stresses (such as earthquakes) which indicate that the potentially generic stratification in the horizontal piping runs may result in an unanalyzed condition.

The results of the study were reviewed by the inspector and by metallurgy specialists of the NRR staff. On the basis of this review and the resultant discussion with the licensee, the NRC concurred that no immediate safety issue with respect to Beaver Valley. The inspector noted that the instruments which detected

the horizontal run stratification were not directly related to the immediate target of the study which had initially concentrated on system behavior around the feedwater nozzles. Rather, the instruments were added to give a more complete picture of system behavior even in areas outside the immediate study and were intended simply to confirm system characteristics. The inspector considered the study to be an example of strong engineering support. At the end of the report period, the licensee's evaluation of the study's results was still in a preliminary stage. The inspectors will continue to follow licensee actions to the above concerns.

7.2 Unit 1 Motor Operated Valve Thermal Overload Relays

Unit 1 motor operated valve (MOV) design utilizes thermal overload relays during normal and accident operation. Unit 2 thermal overloads are bypassed during certain conditions to assure that the safety function is performed. Unit 1 design specifies that overload protection shall be selected for 120 to 130 percent of the rated motor full load current. In the existing thermal overload sizing design, the licensee did not consider a potential locked rotor condition of the motor. If the thermal overload relays are undersized, premature tripping of the motor could occur before the required torque develops to support the operation of the MOV. During Inspection Report 50/334/89-10; 50-412/89-11, no thermal overload relay sizing calculations were available for review to assure the adequacy of the thermal overload relay settings.

The licensee's design philosophy for Unit 1 overload protection for MOVs is documented in Engineering Standard ES-E004, "Protective Relaying Philosophy and Practices for 4160V and 480V Systems." For the 480V MOVs, low current fault protection and some overload protection are provided by a three unit ambient compensated overload heater, selected to be at least 120 percent of the motor's nameplate full load current (IFL). High current faults are sensed by instantaneous clearing motor circuit protectors (MCP), selected to be approximately ten times the motor IFL. The licensee review of the thermal overload settings for the IEB 85-03 revealed that all met the less than or equal to 120 percent IFL criterion based on motor nameplate data. For the motor operated valves addressed by IEB 85-03, stroke test data revealed that the motor running currents slightly exceed the motor nameplate IFL. As a result, the licensee performed further analyses to verify that the present overload settings were adequate and would not result in premature tripping of the MOVs.

A sample review of the 480V MCPs device setting calculation revealed that thermal overload protection was adequate. Wherever the licensee found a thermal overload design deviation from the full load amps, the licensee performed an analysis to evaluate and justify the deviation.

Based on the review of the sample thermal overload relay sizing calculation and justification provided by the licensee, the inspector had no further questions. The licensee committed to review the operability of all safety related MOVs during their review of NRC Generic Letter 89-10.

7.3 Unit 1 Emergency Lighting Concern

In Inspection Report 50-334/90-01; 50-412/90-01, three emergency lighting units in the main steam valve area (MSVA) were found to be inoperable for an indeterminate amount of time. Site Administrative Procedure 9D, "Fire Protection," required the lights to be operable. The inspector reviewed the licensee's corrective actions for this concern.

The licensee's engineering department conducted an evaluation of the cause of the lighting failure and determined that the power feed circuit breaker had tripped on overload. This occurred following the excessive use of temporary equipment plugged into shared outlets. All three battery units of emergency lights receive power from a common incoming feed breaker. Due to this evaluation, the licensee had posted caution tags in the affected area above the appropriate wall outlets indicating maximum amperage that should be connected to these outlets. The inspector verified that the three emergency lights were operable and the appropriate caution tags were posted as required.

Additionally, the licensee developed Operating Surveillance Procedure OST 1.38.2, "Appendix R Emergency Lighting Test," to perform a functional test. This test was to be performed by operations department on a semiannual basis. Maintenance will continue to be performed per PMP-1-38BV-EL1E for the Appendix R emergency lights as per the SAP 9D requirements.

The inspector reviewed the completed OST 1.38.2 operating surveillance test for the emergency lights of August 10, 1990, and found the test to be adequate. Also, a walkdown of the emergency lights in the east and west cable vault areas, quench spray pump room, main steam valve area, and auxiliary feed pump room found the lights to be operable as required.

The inspector had no further questions.

8.0 SAFETY ASSESSMENT AND QUALITY VERIFICATION (IP 40500, 71707, 90712, 91700)

8.1 Review of Written Reports

The inspector reviewed LERs and other reports submitted to the NRC to verify that the details of the events 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 below listed LERs were reviewed.

In LER 90-024-00, the licensee identified that a weekly Unit 2 Technical Specification (TS) required boric acid storage tank sample was not taken within the required periodicity. TS 4.1.2.8.a.1 required the boric acid concentration in the storage tanks be determined every seven days. Due to an administrative error, the sample was not taken until two days after the required periodicity (outside the 25% grace period). The subsequent sample indicated that the boric acid concentration was within specification. The inspector concluded that the failure to perform the TS required surveillance within the specified periodicity was an isolated event and was of minor safety significance (severity level V). The inspector found that the corrective action description in the LER appeared to be adequate to prevent recurrence. The event was reported to the NRC as required. In addition, no past similar occurrences were identified. Therefore, the failure to perform TS 4.1.2.8.a.1 surveillance within the required periodicity is a violation, but is not being cited because the criteria of Section V.G of the NRC Enforcement Policy were met (NCS 50-412/90-23-02).

Unit 1:

LER 90-017-01 ESF Actuation - Radiation Monitor Alarm Causes Auxiliary Building Ventilation Realignment, Revision 1

Unit 2:

LER 90-019-00 ESF Actuations Caused by Partial Loss of Offsite Power Due to High Winds

LER 90-019-01 ESF Actuations Caused by Partial Loss of Offsite Power Due to High Winds, Revision 1

LER 90-020-00 Inadvertent Reactor Trip During RTD Verification Test

LER 90-021-00 ESF Actuation - Feedwater Isolation During Main Steam Isolation Valve Stroke Testing

LER 90-022-00 Inadequate Electrical Isolation Between Control and Protection Circuits

LER 90-023-00 ESF Actuation - Feedwater Isolation Due to Condenser Steam Dump Valve Response

LER 90-024-00 Missed Surveillance - Boric Acid Storage Tank

Samples

LER 90-024-01 Missed Surveillance - Boric Acid Storage Tank Samples, Revision 1

LER 90-025-00 ESF Actuation - Service Water System Seal Water Supply Realignment

The above LERs were reviewed with respect to the requirements of 10 CFR 50.73 and the guidance provided in NUREG 1022. Generally, the LERs were found to be of high quality with good documentation of event analyses, root cause determinations, and corrective actions.

8.2 Safety System Functional Evaluation Program

In 1987, DLC initiated the Safety System Functional Evaluation (SSFE) program to reconstitute the design bases of the much-modified Unit 1 safety systems. Each SSFE has been a broad-based technical audit involving over 3000 man hours of effort. The individual SSFEs have been reviewed during previous inspections (e.g., 50-334/88-25) and program assessment has been documented as part of the NRC Systematic Assessment of Licensee Performance (SALP) process (e.g., 50-334/88-99). During the current period, the inspector reviewed the aspects of the SSFE program related to the tracking and closure of items identified by the SSFEs.

The inspector found that SSFE findings were given prompt attention where appropriate, that items were documented in a tracking system, and that items were followed to closure. Of the approximately 300 items identified in the seven SSFEs, about 20 percent were still open at the time of the inspection. The inspector reviewed the historical data and noted that SSFE items were being consistently resolved and the information was provided to management monthly. A few items were found to be substantially overdue (greater than 18 months) but the inspector found the items not to be safety significant.

The inspector also reviewed a sample of 25 SSFE items (roughly 10% of the total) and identified no operability problems. The inspector noted that many of the items represented system enhancements, calculation confirmations, and documentation issues. The inspector concluded that the absence of safety concerns to be indicative of good original design and engineering.

The inspector found the SSFE program to be a notable strength with excellent observations and good tracking to closure.

9.0 STATUS OF PREVIOUS INSPECTION FINDINGS (IP 71707, 90702, 92701)

The NRC Outstanding Items 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.

9.1 (Closed) Unresolved Item (50-334/89-10-02)

This item concerned the nonavailability of calculations to demonstrate the adequacy of the sizing of motor operated valve thermal overload relays. This review is documented in Detail 7.3.

9.2 (Closed) Unresolved Item (50-412/89-23-001)

The licensee reflected the range of primary plant demineralized water storage tank water level in the submittal to the NRC dated September 12, 1983, and Table 7.5-1 of the FSAR for this variable to be 0 to 350 inches, as compared to the range observed in the Unit 2 control room, 0-330 inches.

A licensee review of related documentation indicated that Table 7.5-1 of the FSAR for the above variable range of 0-350 inches was taken from vertical board section panel C6, engineering drawing 10080-RE-25R. This drawing had an apparent typographical error. The licensee revised this drawing to the correct range and UFSAR change request was approved on April 5, 1990, to update the Table 7.5-1 of FSAR in the next upcoming revision of the FSAR.

The inspector had no further questions.

9.3 (Closed) Deviation Item (50-412/89-23-01)

This item concerned the lack of common designation for the Unit 2 Post Accident Monitoring (PAM) recorders as required by NRC Regulatory Guide 1.97. The inspector had noted that PAM 1 and PAM 2 labels were in place for PAM indicators. However, no labels were provided for recorders with the post accident instrumentation. The licensee revised Site Administrative Procedure (SAP) 59, "Guidelines for Plant Labeling and Tagging," to include Regulatory Guide 1.97 concerns. The Unit 2 PAM recorders were found to be properly labeled in accordance with Regulatory Guide 1.97. The inspector had no further questions.

9.4 (Closed) Unresolved Item (50-334/90-01-01)

This item concerned the failure of emergency lighting in the Unit

1 main steam valve area. The licensee's corrective actions are reviewed in Detail 7.3.

## 10.0 EXIT MEETING

### 10.1 Preliminary Inspection Findings Exit

Meetings were held with senior facility management throughout the inspection to discuss the inspection scope and findings. A summary of the findings was further discussed with the licensee at the conclusion of the report period on January 7, 1991.

### 10.2 Attendance at Exit Meetings Conducced by Region-Based Inspectors

| Dates | Subject | Inspection Report No. | Reporting Inspector |
|---|---|---|---|
| 12/17-21/90 | Mid-Loop Operations | 50-334/90-28; 50-412/90-28 | Moy |