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U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 50-334/82-01

Docket No. 50-334

License No. DPR-66 Priority -- Category C

Licensee: Duquesne Light Company
435 Sixth Avenue
Pittsburgh, Pennsylvania

The report details contain
Safeguards Info
(Pages 49-51)

Facility Name: Beaver Valley Power Station, Unit 1

Inspection at: Shippingport, Pennsylvania

Inspection conducted: January 4 - February 16, 1982

Inspectors: D. A. Beckman
D. A. Beckman, Senior Resident Inspector

3/2/82

date signed

W. M. Troskoski for
W. M. Troskoski, Resident Inspector

3/2/82

date signed

W. J. Lazarus
W. J. Lazarus, Reactor Inspector

3/11/82

date signed

S. D. Reynolds
S. D. Reynolds, Reactor Inspector

3/15/82

dated signed

Approved by: E. G. Greenman
E. G. Greenman, Chief, Reactor Projects
Section No. 2A, Projects Branch No. 2

3/18/82

date signed

Inspection Summary: Inspection on January 4-February 16, 1982 (Report No. 50-334/82-01).
Areas Inspected: Routine inspections by the resident inspectors (191 hours) and two region-based inspectors (26 hours) of licensee action on previous inspection findings, followup on NRC Performance Appraisal Section findings, plant operations, housekeeping, fire protection, radiological controls, surveillance testing, maintenance, physical security, radwaste system operation, in-office review of licensee event reports, onsite event followup, refueling preparations, IE Bulletin followup, TMI lessons learned followup, EPP drill observations, potential design deficiency review, piping NDE review, and area devitalization.

REVIEWED BY:

(NAME)

(SIGNATURE)

(ORGANIZATION)

(DATE)

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WARNING

UNAUTHORIZED REGION I FORM 12 PROHIBITED
SECTION (Rev April 77)

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Results: Violations: None in seventeen areas. Seven in two areas (Failure to post fire watches for nonfunctional penetration, paragraph 3.e(3); Failure to administer/document maintenance training, paragraph 2.b; ORC failed to review violations required by TS, paragraph 2.b; Failure to establish and execute inspection program for operating activities, paragraph 2.b; Failure to document bases for 10CFR50.59(b) safety evaluations, paragraph 2.b; QA Audit deficiencies, paragraph 2.b; and, Inadequate ORC/Management Audit and ORC Training Audit, paragraph 2.b.)

DETAILS

1. Persons Contacted

D. Beron, Warehouse Supervisor, Stores Dept.
F. Bissert, Manager, Nuclear Support Services
J. Carey, Vice President, Nuclear Division
K. Grada, Superintendent of Licensing and Compliance
R. Hansen, Maintenance Supervisor
H. Harper, Security Assistant
T. Jones, Manager, Nuclear Operations
J. Kosmal, Radcon Supervisor
W. Lacey, Chief Engineer
V. Linnenbom, Radiochemist
J. Lukehart, Security Director
J. McGee, Director, Administrative Services
L. Schad, Operations Supervisor
J. Sieber, Manager, Nuclear Safety and Licensing
J. Vassello, Training Supervisor
H. Williams, Station Superintendent
J. Wenkous, Reactor Control Chemist

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

2. Licensee Action on Previously Identified Inspection Findings

- a. The NRC Outstanding Items (OI) List was reviewed with responsible licensee personnel. Items selected by the inspectors were subsequently reviewed through discussions with licensee personnel, documentation review, 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 and completed licensee actions were discussed for those items not reported below.

(Closed) Unresolved Item (79-12-02): Type C penetration non-conservative test results. In several Type C tests performed using OST 1.47.4, Containment Isolation Valve Leakage Test, Type C, the licensee recorded the leakage as zero, which is non-conservative in that: 1) the rotameters used to measure leakage are only accurate above a given minimum sensitivity, and 2) the accuracy of leakage measurement using the "downstream method" is not assured because no verification is done for leak tightness of downstream boundaries. The licensee committed to revising the procedure to specify the use of the tests minimum sensitivity when appropriate and to specify that additional verifications be made when using the "downstream method."

The inspector reviewed OST 1.47.4, Containment Isolation Valve Leakage Test, Type C, Revision 39. This procedure includes a note requiring that, if no indication of flow can be obtained using the most sensitive rotameter then the minimum sensitivity for the flow leakage shall be assigned as 0.01 SCFH, which corresponds to the minimum sensitivity for the most accurate rotameter used. Another note also specified that the make-up air test method is to be used instead of the downstream method for verifying test boundary leakage. The downstream method was outlined and available for trouble-shooting only. The inspector had no further questions at this time.

(Closed) Unresolved Item (79-12-04): Type B containment leakage test - nonconservative results. MSP 47.01, Type B Containment Leakage Test - Electrical Penetrations, was determined to be inaccurate when computing leak rate by the Pressure Decay Method in that temperature variations over the 72 hour test period were not measured nor compensated for in the calculations. In addition, pressure gauges used in the test were not calibrated. The inspector reviewed Revision 2 to MSP 47.01 and determined that the use of both calibrated test gauges and thermometers were specified for conducting the test. The inspector also verified that the temperature compensation was included in leak rate calculations. The inspector had no further questions on this item.

(Closed) Unresolved Item (79-12-06): Airlock door bypass leakage. During performance of the last containment integrated leak rate test (CILRT), the airlock inner door equalizing solenoid valves leaked by even though they had satisfactorily passed their local leak rate test (LLRT). In order to maintain containment integrity, a manual isolation valve in the line 1-VS-153 must be kept closed. The licensee committed to include this valve in the Type C LLRT program and to incorporate checks of this valve position into a periodic containment integrity verification.

The inspector reviewed surveillance test OST 1.47.1, Containment Air Lock Test, Revision 22, performed on a 72 hour basis to verify that detectable seal leakage is within containment integrity limits. To limit any leakage from the inner door equalizing solenoids, the OST requires valve 1-VS-153 to be closed. The inspector also reviewed surveillance test OST 1.47.30, Personnel Air Lock Isolation Valve (1VS-153) Type C Leak Test, Revision 42, and verified valve testing per the licensee's Type C leak rate test program. The inspector had no further questions on this item.

(Closed) Unresolved Item (79-12-07): Electrical penetration surveillance. During a field inspection of electrical penetrations, the inspector noted that all pressure indicating gauges were isolated and not indicating the status of the penetration canisters or O-ring seals. When several of the isolation valves were opened, two were found to be at zero pressure and two others at 15 psig. Although these canisters are normally pressurized at or above 45 psig, no routine surveillance was performed to verify proper pressurization. The licensee had committed to issuing a routine surveillance to monitor the pressure.

The inspector reviewed Maintenance Surveillance Procedure (MSP) 47.01, Type B Containment Leakage Test - Electrical Penetrations, Revision 2. The MSP provides detection of local leakage from the containment electrical penetrations by periodically testing their pressure integrity and comparing test data to the overall containment integrated leakage rate acceptance criteria specified in TS 4.6.1.2, Containment Leakage - Surveillance Requirements. The MSP is performed during each refueling outage to meet the requirement of 10CFR50, Appendix J, Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors. The inspector had no further questions on this item.

(Closed) Unresolved Item (79-22-01): Licensee to evaluate calibration program for MCB PR-NI. During a review of the Main Control Board (MCB) instrumentation, the inspector noted that the MCB power range (PR) nuclear instrument (NI) meters were reading up to 6% full power greater than the NI rack indicators. This difference is attributed to the MCB indicators being driven by an isolation amplifier that was not routinely recalibrated during daily NI calorimetric calibrations. Calorimetric calibrations result in adjustment of the circuit's principal summing and level amplifier which provides signals to the NI rack indicators and all protection functions. The meters' isolation amplifier receives its signal from the summing and level amplifier and will deviate from the NI rack indication if it is not adjusted after a summing amplifier gain adjustment.

The inspector reviewed MSP 2.04, Power Range Neutron Flux Channel (N-NI-42) Quarterly Calibration, Revision 13. This revision includes adjusting the isolation amplifier signal to the main control board instrumentation whenever a deviation greater than plus or minus 1.5% exists between the NI rack indicators and MCB meters during calorimetric calibration. The inspector had no further questions on this item.

(Closed) Unresolved Item (80-16-02): Review licensee action for NRC identified gouges on cold leg safety injection line. During a tour of the containment building on June 4, 1980, the inspector noted several gouges on a 6 inch cold leg safety injection line adjacent to vent valve SI-330. This was brought to the attention of the QC Supervisor for evaluation and corrective action. A NSQC General Inspection Report, dated June 25, 1980 identified the line as SI-73-1502-Q1, a 6 inch schedule 160 pipe and reported a dial depth micrometer (No. 644, calibrated January 1, 1980) measurement of gouge depth as a maximum wall penetration of 0.011 inches. The condition was accepted as-is pending a final Station Engineering evaluation of minimum wall thickness acceptance criteria.

Engineering Memorandum (EM) 30086, approved December 21, 1981 compared the as-found wall thickness to Power Piping Code B.31.1 requirements applicable to BVPS-1. Nominal wall thickness for 6 inch, schedule 160 pipe is 0.719 inches, minus 12.5% for conservatism tolerance equals a minimum expected wall thickness of 0.629 inches for standard pipe. Subtracting the 0.011 inch maximum gouge depth yields a wall thickness of 0.618 inches. This exceeded the B31.1 acceptance criteria of 0.484 inches.

The inspector noted that the request for evaluation of minimum wall thickness acceptance criteria was not forwarded to engineering via EM 30086 until December 15, 1981.

b. Followup on NRC Performance Appraisal

On October 19-30 and November 12-20, the NRC Performance Appraisal Section (PAS) conducted a Performance Appraisal Inspection (50-334/81-29) at Beaver Valley, Unit 1. The following items were identified as possible violations of NRC requirements and were reviewed by the resident inspectors to determine the need for additional enforcement action.

(Closed) Unresolved Item (81-29-02): ORC failed to review certain documents containing violations of license requirements per TS 6.5.2.7.e. That TS requires the Offsite Review Committee (ORC) to review violations of applicable statutes, codes, regulations, orders, TS, license requirements, or of internal procedures or instructions having nuclear safety significance. The PAS found that the ORC did not review Nonconformance and Action Reports, incident reports, and QA Surveillance Reports, all of which contain examples of such violations. The PAS further found that the ORC may have relied upon Onsite Safety Committee minutes review to meet this requirement but that the information contained in the OSC minutes was inadequate to permit a thorough review.

The inspector discussed this matter with the DLC Manager, Nuclear Safety and Licensing, (ORC Chairman) and reviewed the following:

- ORC Minutes, Meeting #80 (June 27, 1980) through #101 (December 22, 1981).
- Operations Quality Control Nonconformance and Corrective Action Reports (NCARs), #234 (March 4, 1980) through #275 (December 3, 1981).
- BVPS Licensee Event Reports (LERs) 80-01 through 81-100.
- BVPS Incident Reports (not issued as Licensee Event Reports) Nos. 81-10 (January 12, 1981) through 81-52 (April 2, 1981).
- Quality Assurance Department Outage Surveillance Reports, 1980 Outage. All reports reviewed (about 250).

The inspector found that the ORC meeting minutes only documented review of NRC inspection findings and DLC responses, DLC QA Audit findings, prompt (24 hour) Licensee Event Reports, several 30 day Licensee Event Reports, and the running status of NRC and QA audit corrective actions. No NCARs, Incident Reports, or Surveillance Reports were listed. Neither were onsite contractor nonconformance reports. The ORC Chairman advised the inspector that, although individual ORC members receive and review such documents as part of their non-committee duties, no formal system for referral to the ORC was used. The chairman also stated that such items were occasionally discussed in committee but apparently were not documented in the minutes. The inspector further noted that the QA Surveillance Reports were not distributed outside the QA Department. The chairman further advised that, although ORC minutes are routinely reviewed by the ORC, they were not used as the document of record for review of violations per TS 6.5.2.7.e. Reviews intended to satisfy that requirement were conducted by use of the actual document (LER, NRC Inspection Report, etc.), generally presented by a committee member.

Typical violations of the type subject to ORC review but not documented in the committee's minutes include:

- High Radiation Area/Contamination Area procedure and TS violations documented in QA Surveillance No. 007, February 26, 1980.
- Safety Injection System modification Weld Data Sheets not complied with and Weld Data Sheets completed prior to weld completion; documented in QA Surveillance Nos. 024, March 17, 1980; 068, April 2, 1980; and, 070, April 3, 1980.

- Chronically recurrent cases of weld rod control procedure violations documented in several dozen QA Surveillances.
- Unplanned or unmonitored radioactive releases documented in Incident Reports 81-11, January 12, 1981 and 81-14, January 22, 1981.
- Personnel errors and procedure violations documented in LERs 81-06, 81-21, 81-17, 81-18, 81-53, 81-66, and others.
- Recurrent procedure violations: QC Hold Tags, installation of material without receipt inspection, cable routing errors, safety related rigging procedures, and safety related snubber fill procedures, documented in QC NCARs.

The inspector advised the ORC Chairman that TS 6.5.2.7.e does not require review of all violations but that an appropriate sample of all types of violations and/or documents identifying violations must be reviewed in committee with the goal of evaluating both the significance of the violation and the effectiveness of preventive and corrective actions.

Failure of the ORC to review documents such as described above constitutes violation of TS 6.5.2.7.e. (82-01-01).

(Closed) Unresolved Item (81-29-03): No inspection of operating activities as required by the OQA Program. The PAS found that, while certain activities such as maintenance and modification, were subject to inspection by the licensee and contractor quality control organizations, operating activities were not subject to any in process inspection. These uninspected activities included, but were not limited to:

- Routine plant evolutions such as plant startup, shutdown, and routine system operation.
- Reactor engineering activities.
- Operating Surveillance Testing.
- Equipment lubrication activities.
- Chemistry activities.
- Equipment clearance (tagout) activities, other than independent system operability and equipment position verifications.

10CFR50, Appendix B, Criterion X, requires that a program for inspection of activities affecting quality be established and executed to verify conformance with the documented instructions, procedures, and drawings for accomplishing the activity. The BVPS FSAR, Section A.2, contains the same requirement. BVPS FSAR, Section A.2.2.2, states that the OQA Program applies to plant operations associated with safety related (Category I) structures, systems, and components. The DLC Quality Assurance Policy, issued by the President, DLC, as part of the BVPS OQA Manual, requires, in Section 10, that a program for the inspection of activities affecting quality be established and provide for inspections during operations.

Through discussions with licensee management, including the Manager, Nuclear Operations, and review of the BVPS OQA Manual, the inspector found that no program for the inspection of operating activities had been established or executed. Although OQA Manual Procedure OP-9, Technical Procedure for Control of Operations and Maintenance, Revision 1, assigns responsibility for periodic test and inspection (Section 9.5.4), the procedure addresses only tests and inspections for equipment and does not address inspection of the operating activities above. No implementing procedures for such inspections were identified.

The licensee does, however, provide for redundant and independent verification of certain operating and surveillance test activities such as clearance tagouts, jumper and lifted lead placement/removal, valve lineup verifications, switch lineup verifications, etc. These verifications are accomplished by individuals performing the operations activity and do not meet independence requirements of Criterion X and the OQA Program. Similarly, the example activities above are variously subject to supervisory review of documentation and results and/or supervisory observation of performance. Post performance results review does not satisfy requirements for activity inspection. Supervisory observation may not provide the required inspection independence and generally does not meet the OQA program requirements for a formalized, documented inspection activity.

Failure to establish and execute an inspection program for operating activities such as provided above constitutes a violation of 10CFR50, Appendix B, Criterion X and the licensee's OQA Program. (82-01-02).

(Closed) Unresolved Item (81-29-04): Changes made to the facility via Temporary Operating Procedures (TOPs) and Special Operating Orders (SOOs) without adequate reviews as required by 10CFR50, Appendix B, or 10CFR50.59. The PAS identified four examples of potential noncompliance:

- (1) TOP 80-27, Filling the RWST from the Boron Recovery Tanks. The TOP provided a temporary hose flowpath for transferring water between the tanks. The flowpath used was different than the system arrangement described in Sections 9.1 and 9.2 of the Final Safety Analysis Report. These sections describe the expected operation of the Chemical and Volume Control System (CVCS) and Boron Recovery System, including the normal flow paths for processing Boron Recovery Tanks. The Figures of FSAR Section 9 (Flow diagrams) provide the normal flow paths, including makeup flowpaths to the Refueling Water Storage Tank.

The inspector found that TOP 80-27 had been approved via Onsite Safety Committee (OSC) poll on August 15, 1980, that the poll had been reviewed in committee on August 25, 1980 (Minutes No. BV-OSC-104-80), and that the minutes did include a safety evaluation as required by 10CFR50.59. The minutes stated that the poll had been reviewed and that "no changes to procedures or equipment as described in the SAR result and that no unreviewed safety questions results." No basis for the above determination was provided nor was the temporary hose flow path addressed relative to the systems as described by the FSAR.

10CFR50.59(a)(1) permits the licensee to make changes in the facility and procedures as described in the safety analysis report unless a change to technical specifications or an unreviewed safety question are involved. 10CFR50.59(b) requires that the licensee maintain records of these changes, including a written safety evaluation which provides the bases for the determination that the change does not involve an unreviewed safety question. Failure to document the bases for the acceptability of TOP 80-27 constitutes a violation of 10CFR50.59(b). An additional example of further violation is discussed below. (82-01-03).

- (2) TOP 81-27, Operating the Temporary Liquid Waste Demineralizer (LW-I-2). LW-I-2 was first installed and operated by TOP 80-33 (September 4, 1980) to augment the capacity of the permanently installed Liquid Radwaste System. The permanently installed system was unable to process sufficient volume, resulting in undesirable backlogs of unprocessed waste. The temporary system, consisting of temporary filters, demineralizers and plastic piping, had been installed as an "experiment" but had remained in use, with some modification, through 1981.

TOP 81-27 was issued on July 17, 1981 to reflect the use of a different style demineralizer. OSC Meeting Minutes BV-OSC-84-81 (July 17, 1981) documented review of the original safety evaluation (TOP 80-33, Minutes BV-OSC-80-108 (September 4, 1980)) and the committee's determination that the original evaluation remained valid. The inspector reviewed the 80-33 safety evaluation, finding that it addressed consideration of each of the items recommended by IE Circular 80-18, 10CFR50.59 Evaluations for Changes to Radioactive Waste Treatment Systems, and included the bases for the committee determination that no unreviewed safety question nor technical specification change were involved.

During discussions with the DLC Chief Engineer, Station Engineering Supervisor, and cognizant Operating Foreman, the inspector learned that the system had not been formally designed but rather, had been assembled in place using commercially available components and piping. The BVPS Operations Quality Assurance Program (FSAR Appendix A.2); QA Procedure OP-4, Design Change Control, Revision 6; and the BVPS OQA Manual, Appendix B, Category I Systems, Structures and Components, Revision 3, provide the requirements for design change and modification control for safety related systems. The Liquid Radwaste System is not considered a safety related system by the BVPS QA Program and is therefore not subject to the Quality Assurance Program controls. Although application of formal engineering and design change controls to this installation were desirable, no violation of NRC requirements was identified.

The extended use of a temporary system is similarly undesirable; the licensee has experienced periodic problems with the installation. On July 14, 1981, Station Modification Request (SMR) 404 was issued to DLC Engineering to install an improved but again, interim system pending availability of a permanent system design. As of January 29, 1981, SMR 404 remained under licensee review.

- (3) TOP 81-31, River Water System Operation While Dredging Near Intake. The TOP provided instructions for cross-connecting the main River Water (RW) System with the Auxiliary River Water (ARW) System during dredging operations at the main intake structure to provide backup cooling capability if dredging silt fouled the main system. The inspector reviewed FSAR Section 9.16; FSAR Question Response 2.30; BVPS Operating Manual, Section 1.30, River Water System, and QA Manual,

Appendix B, Revision 2, confirming that, although the ARW System meets some of the design requirements of an Engineering Safety Feature System (seismic design, single failure analysis, emergency power supplies, etc.) and is capable of supporting a plant shutdown and cooldown on loss of the main RW system, the ARW System is not considered QA Category I (safety related). Additionally, the FSAR does not describe extended operation of the ARW and RW systems in a cross-connect mode during continued reactor operation.

The inspector reviewed OSC Minutes BV-OSC-93-81 (August 7, 1981), finding that the OSC had determined that no unreviewed safety question existed but provided no basis for that determination. Although the minutes noted that one ARW header would be in service during dredging, no evaluation of this alignment was provided. Failure to document the basis for the determination that an unreviewed safety question does not exist is contrary to 10CFR50.59(b) and constitutes an additional example of a violation. (82-01-03).

- (4) Special Operating Order (S00) 81-9, Pressurizer Relief Tank Alarm Setpoints. Pressurizer Power Operated Relief Valve seat leakage had caused abnormally high pressures and temperatures in the Pressurizer Relief Tank. The licensee adjusted the PRT high pressure alarm and high temperature alarm setpoints upward to reduce the frequency of alarm actuation and to reduce the volume of water used to spray (quench) the tank each time the alarms actuated.

The inspector reviewed draft OSC Minutes BV-OSC-77-81 (June 25, 1981) finding that S00 81-9 had been reviewed and found not to involve an unreviewed safety question. The minutes documented review of the setpoints relative to FSAR Section 4.2.2.3 and included consideration of the higher than normal tank temperatures and pressures. The minutes acknowledged that such operation could result in PRT discharge to the containment via the rupture disc on a design basis pressurizer safety/relief valve actuation but noted that condition to be an analyzed event. The DLC Chief Engineer also advised the inspector that, although not documented in the meeting minutes, he had consulted the pressurizer safety valve vendor and determined that the abnormal operating conditions had no adverse effect on safety valve operation. The inspector also noted that, on July 17, 1981, misoperation of the PRT spray system had resulted in PRT rupture disc failure and discharge to the containment (Reference: NRC Inspection Report 50-334/81-18).

The inspector also reviewed the procedures and data used to reset the alarms finding that the PRT temperature and pressure channels are not included in the licensee's safety related calibration program, that the adjustments were made on June 25, 1981 in accordance with generic Calibration Procedures (CP515 and CP035) for the types of instruments involved, and that the SOO provided the interim setpoint information to plant operators.

Although the documented safety evaluation was considered only marginally acceptable (discussions of safety valve operation not included), no violation of NRC requirements was identified.

(Closed) Unresolved Item (81-29-05): Work Instructions not included on Maintenance Work Requests (MWRs) required by Maintenance Manual. The PAS found that minimal or no work instructions had been provided on MWRs and that, in some cases, the scope of work had changed but was not reflected on the MWR:

- MWR 810190, Diesel Generator Lube Oil System. No written instructions were provided to repair an oil leak. A flange was tightened to stop the leak.
- MWR 810381, Channel 1 Loop RCS Flow. No written instructions were provided to replace the flow transducer. The instrument was calibrated in accordance with MSP 6.26, referenced on the MWR.
- MWR 810421, Loop Protection Tavg. No written instructions were provided on the MWR to perform the maintenance in accordance with Corrective Maintenance Procedure (CMP) 1-75-45 which was used to perform the work.
- MWR 810535, Number 2 Emergency Diesel Generator. There were no written instructions on the MWR to replace the turbo-charger in accordance with CMP 1-75-208, which was used to replace the turbo charger.
- MWR 810566, Number 1 Emergency Diesel Generator. There were no written instructions provided to repair the exhaust bonnet for the electrical control panel.
- MWR 811783, Containment Vacuum Pump. No written instructions were provided to troubleshoot or repair bench board lights.
- MWR 810949, Low Head Safety Injection Pump Recirculation Pressure. No written instructions were provided to replace the pressure gauge.

The inspector reviewed:

- BVPS QA Procedure OP-10, Maintenance and Modification Planning, Revision 3;
- BVPS QA Procedure OP-9, Technical Procedure Control for Operations and Maintenance, Revision 3; and,
- BVPS Maintenance Manual (MM), Chapter 1, Conduct of Maintenance, Section A, General Rules for Implementation, Revision 14.

OP-10 provides requirements for work orders (Maintenance Work Requests) and supplemental procedures or instructions for maintenance activities affecting quality. The OP requires that the MWRs and/or supplemental procedures prescribe what is to be accomplished and provide for a record of the quality achievements and verifications (Section 10.3.5). Any changes to the work order or procedures must also be controlled, including review and approval in the same manner as the original (Section 10.4.7).

MM Chapter 1, Section A, provides equivalent requirements. Section 4.a.7 permits instructions to be written in the "Additional Work Instructions" section of the MWR for simple tasks requiring only a few steps, otherwise Section 4.a.9 requires use of a written procedure. Section 7.c requires that work shall be accomplished as described in the instructions or procedures. Section 7.d requires that any changes to instructions or procedures shall follow the same approval process as the original procedures (except for on-the-spot procedure revisions).

The inspector's review of the specific MWR examples identified no actual problems resulting from the absence of work instructions or procedure references. The work specified by these MWRs involved troubleshooting/repairing. In the case of sample repairs, the repair was accomplished during the act of troubleshooting. Detailed work instructions were inappropriate because the task was considered to be within the skills normally possessed by qualified maintenance personnel. In those cases where the troubleshooting identified a more significant repair task, appropriate maintenance/calibration procedures were subsequently referenced on the MWR and used in the repair. Discussions with the DLC Maintenance Supervisor established that informal oral communications are normally used to accommodate the inspector's concerns. However, the inspector's review identified the following additional concerns:

- (1) The Quality Control Department initially reviews MWRs and determines whether QC inspection coverage is required or desirable. A change in MWR scope does not appear subject to additional QC review, particularly if a change in scope is not documented on the MWR or is not subject to other specific maintenance procedures.

- (2) Similarly a change in scope may affect the post-maintenance testing to be performed by the Operations Department. Failure to document such changes do not permit adequate Shift Supervisor review upon closeout of the MWR.
- (3) A change in work scope may also require a change in clearance (tagout) boundaries. The licensee's procedures for MWR control do not address such changes.
- (4) The specific "additional work instructions" or reference to supplemental procedures would normally establish an authorized scope of work and limit the worker's ability to extend the scope of work without change control.
- (5) None of the MWR examples included "additional work instructions" or reference to supplement procedures or instructions (except MWR 810381 which referenced a procedure for calibration of the new transmitter).

The licensee acknowledged the inspector's concerns. The station Maintenance Supervisor advised the inspector that procedure revisions were in preparation at the close of this inspection and would be issued by March 1, 1982. This matter will remain unresolved pending NRC:RI review of the procedures when implemented. (82-01-07).

(Closed) Unresolved Item (81-29-06): Vital Battery cells jumpered without performance of 10CFR50.59 safety evaluation. On October 17, 1981, the number of cells in the No. 1 battery was reduced from 60 (the number specified in the FSAR) to 58 in accordance with MWR 817707 and Corrective Maintenance Procedure (CMP) 1-39DC-Bat 1, 2, 3, 4-2E, Revision 1. The cells had failed to meet the voltage requirement of TS 4.8.2.3.2.b.1. The remaining 58 cells appeared to meet the minimum voltage requirements of TS but a written safety evaluation had not been performed to establish that the remaining battery capacity met FSAR and TS requirements.

During December, 1981 - January, 1982 the licensee was unable to provide documentation of a written safety evaluation predating the above change. The inspector reviewed OSC Minutes BV-OSC-68-79 (October 4, 1979) and -18-80 (January 30, 1980) which documented OSC review of Revision 0 and 1, respectively, of the jumper installation CMP. The inspector found that the OSC had determined no unreviewed safety questions existed but had failed to provide the bases for that determination. No additional information was available.

Although failure to provide a written safety evaluation per 10CFR50.59(b) is a violation of NRC requirements, a Notice of Violation will not be issued. NRC Inspection 50-334/81-28 identified a similar violation for other jumper installations. The licensee's response letter (dated February 8, 1982) to NRC:RI for that violation specifically addresses the corrective and preventive actions regarding battery cell jumpers.

After the PAS finding, the licensee prepared a Safety Evaluation Report, dated December 17, 1982, properly documenting the determination that no unreviewed safety question exists for jumpered battery cells. The safety evaluation addressed FSAR and TS 4.8.2.3 capacity requirements and recommended a limit of 2 cells per battery be jumpered at any time. The safety evaluation was reviewed by the OSC at Meeting BV-OSC-137-81 on December 31, 1981. The minutes of this meeting were in preparation at the end of this inspection.

The OSC also recommended that the Corrective Maintenance Procedures be revised to include the limit of two cells per battery jumpered. The inspectors confirmed that the revised procedures were approved on January 12, 1982 and were pending final typing and distribution at the close of this inspection.

During this and prior inspections, the inspectors had discussed TS 4.8.2.3.2.b.1 with licensee management, including the Chief Engineer and Superintendent of Technical Services. The TS requires that the voltage of each connected cell be greater than 2.02 volts under float charge and that the voltage has not decreased more than 0.05 from the value observed during the original acceptance test. The inspectors noted that IEEE Standard 484-1975, Installation of Large Lead Storage Batteries, considers an individual cell acceptable if its voltage is within 0.4 volts of the average of all cells. The licensee has experienced difficulty in maintaining both original and replacement cells within 0.05 volts of their original acceptance test values. The inspectors advised the licensee that consideration of a TS change consistent with the guidance of the IEEE Standard appeared appropriate.

(Closed) Unresolved Item (81-29-07): Audit program plan not developed to assure coverage of applicable quality assurance program. 10CFR50, Appendix B, Criteria XVIII requires the licensee to establish a comprehensive system of planned and periodic audits to verify compliance with all aspects of the quality assurance program. ANSI N45.2.12, paragraph 3.3, Audit Planning, endorsed by FSAR, Appendix A, Attachment to Table A.2, further requires that the audit system be planned, documented, and conducted to assure coverage of the applicable quality assurance program. The audit system is to be periodically reviewed and revised as necessary to assure that coverage and schedule reflect current activities.

QA Procedure OP-16, Revision 2, Section 16.4, Audit Planning, provides guidance for scheduling audits that are planned, conducted and reported in accordance with written procedures. These procedures are to be revised, approved for use, and updated as necessary. QA Procedure OP-16, does not provide for system plans to assure coverage of all aspects of the quality assurance program. QA Instruction 18.1.1, Revision 6, implements the QA audit schedule requirements. The Senior QA Engineer is responsible for assuring that audit responsibilities and obligations are met. These responsibilities include determining the areas to be audited and the maintenance of audit schedule. The QA Manager approves the audit schedules. The audit schedule is prepared annually and reviewed quarterly by the QA Manager and lists all areas requiring a QA audit. The audit schedule by itself does not provide assurance that all aspects of the applicable QA program have been covered, nor can it identify those areas that still need coverage. The inspector held discussions with licensee QA representatives to determine whether an alternate means existed for assuring that all aspects of the program were covered by the end of the year. None were identified.

Failure to develop an audit program system plan that can assure coverage of all aspects of the QA program is a violation of 10CFR50, Appendix B, Criteria XVIII. (82-01-04).

(Closed) Unresolved Item (81-29-08): 1980 OQA Program Management Audit did not address all activities subject to 10CFR50, Appendix B.

TS 6.5.2.8 requires that an audit of OQA Program implementation be performed under the cognizance of the Offsite Review Committee (ORC) at least once per 24 months. The audit must encompass the performance of all activities required by the OQA program to meet the criteria of 10CFR50, Appendix B. 10CFR50, Appendix B, Criterion II, and BVPS OQA Procedure OP-1, Revision 4, also require a management review (biennially per OP-1) to assess the status and adequacy of the OQA Program.

The PAS found that the 1980 Management Audit, performed by a contractor, was intended to satisfy both the OQA Program and TS requirements. That audit addressed only five of sixteen major OQA procedures used to implement the eighteen criteria of 10CFR50, Appendix B. The PAS also found that, although the audit report was submitted to the licensee in December, 1980, the report was not distributed to the Offsite Review Committee until September 29, 1981.

The inspector reviewed the 1980 audit, the licensee's management audit plan (Memo, C. N. Dunn, dated August 18, 1978), the 1977 and 1978 management audits, and applicable sections of the OQA Procedures (OPs). The inspector found that the licensee's audit plan provided for the audit of the implementation of four or five OQA Procedures during each biennial audit. (Note: The OP-1 audit requirements were changed from annual to biennial in 1979). The inspector confirmed that each audit report documented conformance with the audit plan. Implementation of the audit plan would result in complete coverage of all OQA procedures over a five year period.

Performance of biennial audits for only portions of the OQA procedures does not constitute an adequate management review pursuant to 10CFR50, Appendix B, Criterion II nor an adequate ORC audit pursuant to TS 6.5.2.8.d and is considered a violation. (82-01-05). An additional example of similar violation is discussed in Item 81-29-09 below.

The inspector found that the late distribution of the 1980 Audit Report to the ORC was apparently the result of administrative oversight. Cognizant managers of the audited areas had apparently received distribution of the report upon its receipt from the contractor and at least once again in mid-1981. The report had not, however, been formally distributed to and reviewed by the ORC. The inspector did not review the adequacy or timeliness of corrective actions or ORC audit followup.

(Closed) Unresolved Item (81-29-09): Operation training audit inadequate in scope and depth. The QA Department under the cognizance of the ORC, conducted audit BV-1-81-4 on March 24 - April 4, 1981, to comply with the requirements of TS paragraph 6.5.2.8.b, for the annual audit of the performance, training and qualification of the entire facility staff. The inspector reviewed this audit and discussed its content and scope with the lead auditor. The audit was conducted to cover: BVPS training; training for Construction Department - Nuclear, Schneider, Incorporated, Sargent Electric Company and Dick Corporation personnel under their Program requirements, as related to BVPS Unit 1 modification program; and, to meet the requirements of TS 6.5.2.8.b. The audit consisted mainly of training record reviews for the above groups, requalification training of licensed operators and radiation technician training. The audit did not address the staff areas of: mechanical and electrical maintenance, instrument and control, testing and plant performance, reactor control chemistry, station engineering, or the technical advisory group. Though the licensee was undergoing a reorganization during the period of audit, the organization of the above plant groups remained essentially unchanged.

The scope of the audit was insufficient in that it did not address the qualifications of any staff group, other than licensed operators and radiation technicians, nor did it address the performance of any group to assure that personnel performing a specified job function were trained and qualified to do those jobs.

Failure to audit the performance of any facility staff group, and failure to audit the training and qualifications for some facility staff groups (mentioned above) constitutes another example of violation of TS 6.5.2.8. (82-01-05).

(Closed) Unresolved Item (81-29-10): QA audits did not include observations of performance of operating and maintenance activities for 1980 and 1981. The inspector reviewed the following QA audits of maintenance and operations activities performed in 1980 and 1981:

- BV-1-80-33, Operations
- BV-1-80-15, Maintenance
- BV-1-89-39, Maintenance
- BV-1-81-10, Maintenance
- BV-1-81-28, Operations
- BV-1-81-30, Maintenance

Through this review and discussions with licensee QA personnel, the inspector determined that the QA audits of operations and maintenance activities did not include documented observations of any activities in either audit checklists or results.

ANSI N18.7-1972, Administrative Controls for Nuclear Power Plants, Section 4.4 requires audits to include observations of operations and maintenance activities in addition to reviews of procedures and records and interviews. ANSI N18.7-1972 is endorsed by the BVPS FSAR, Appendix A.2, OQA Program, Section A.2.2, via Endorsement of NRC Regulatory Guide 1.33-1972.

Quality Assurance Procedure OP-16, Audits, Revision 2, does not include requirements for such observations during audits. Failure to establish and implement procedure requirements for audit observations of such activities is a violation of 10CFR50, Appendix B, Criterion XVIII; the BVPS FSAR, Appendix A.2 and ANSI N18.7-1972 as endorsed by Regulatory Guide 1.33. (82-01-04).

(Closed) Unresolved Item (81-29-11): Personnel conducting audit of Plant Operations did not have training or experience in nuclear plant operations. The inspector reviewed the personnel folders of the auditors who performed Quality Assurance (QA) audit BV-1-81-28, Operations, during September 21 - October 7, 1981. Prior to this audit, the team leader had performed 11 other audits in 1981, none of which involved operations. This individual met the audit team leader qualification requirements specified in QA Instruction (QAI) 2.1.3, Training and Qualification of Auditors, Revision 4, issued March 16, 1979. He also participated in a continuing auditor training program as specified in QAI 2.1.2, Training of QA Personnel, Revision 5, issued February 23, 1981. However, this individual has had no previous experience in nuclear plant operations nor other specialized training. The other audit team member had received approximately 15 hours of operations related training between 1976 and 1981; however, he too had no previous experience in plant operations. Neither QAI 2.1.2 nor QAI 2.1.3 require specialized training or experience to establish that the auditors' qualifications are commensurate with the special nature of the activities to be audited.

ANSI N45.2.12-1974 as endorsed by the BVPS FSAR, Attachment to Appendix A-2, requires that QA personnel or technical specialists be selected for an auditing assignment based on experience or training which establish that their qualifications are commensurate with the complexity or special nature of the activities being audited. Although both individuals participating in audit BV-1-81-28 were qualified auditors, neither had plant operation experience nor specialized training in this area. Failure to provide requirements for selection of auditors or use of technical specialists having qualifications commensurate with the complexity or special nature of activities to be audited is a violation of ANSI Standard N45.2.12. (82-01-04).

(Open) Unresolved Item (81-29-12): Written training, retraining, and replacement training program for all unlicensed personnel not provided and fully implemented. (Open) Unresolved Item (81-29-13): Key personnel not provided BVPS plant specific training as required by BVPS FSAR Section 12.2.

The PAS found that established training programs did not appear to meet all requirements of the licensee's OQA program and Technical Specifications and that existing programs specified in the BVPS Training Manual had not been fully implemented. Additionally, key personnel reassigned to BVPS from other DLC facilities had not been provided plant specific training.

The review of these two items was in progress at the end of this inspection. The inspector had reviewed the applicable regulatory requirements and was reviewing a sample of facility staff member training records for compliance with the licensee's existing programs and license requirements. Items 81-29-12 and -13 will remain unresolved pending completion of the inspector's review.

During the review, the inspector found that BVPS Maintenance Department required reading assignments had not been properly performed. Chapter 1 of the BVPS Maintenance Manual (MM) contains administrative procedures for the control of maintenance activities. Chapter 1, Section A.5.b, Revision 14, requires electricians, mechanics, and meter and control repairmen (instrument technicians) to read pertinent sections of Chapter 1. The table below shows inspection results for a sample of 6 individuals whose records were reviewed:

| MM Section | N | Q | H | J | W | Y | Z | O | Legend |
|------------|---|---|---|---|---|---|---|---|---|
| Electr. A | C | * | * | * | C | I | C | X | C = Complete |
| Electr. B | C | * | * | * | C | I | C | X | I = Training incomplete or not documented |
| Mech. A | X | X | C | C | C | I | C | C | X = Not required for job classification |
| Mech. B | X | X | I | I | C | I | C | I | * = Training incomplete but identified by DLC internal memo dated 4/16/81 |
| Tech. A | C | X | C | C | C | I | C | C | |
| Tech. B | I | X | I | I | I | I | I | C | |

Section N - Relay Testing
 Section Q - Motor Repair
 Section H - Cleaning & Maintaining Cleanliness
 Section J - Housekeeping
 Section O - Calibration Program
 Section W - Maintenance Procedure Control
 Section Y - Control & Maintenance of Respiratory Equipment
 Section Z - General Work Practices

Each individual is rated as a "first class" craft worker normally assigned to safety related maintenance activities. Of the 40 required reading assignments sampled, only 20 had been recorded as complete.

10CFR50, Appendix B, Criterion II, requires that the OAQ program provide for indoctrination and training of personnel performing activities affecting quality as necessary to assure that suitable proficiency is achieved and maintained. The BVPS FSAR, Appendix A.2.2.2, states that indoctrination and training measures assure that all responsible individuals are aware of quality policies, procedures and manuals and have an adequate understanding of these requirements. QA Procedure OP-14, Indoctrination and Training, Section 14.4.1, Revision 3, requires that station personnel shall be trained, as appropriate, to achieve special skills required in the performance of equipment protection, process, and test procedures and that retraining will be provided as necessary to maintain adequate proficiency.

The BVPS MM, Chapter 1, Section A.5.b, General Rules for Implementation, Revision 14, requires individuals to receive indoctrination on specific sections of the manual (as represented in the above table) and to document completion of the training. Failure to complete and document this training constitutes a violation. (82-01-06).

(Closed) Unresolved Item (81-29-14): Training records not stored in accordance with QA Program requirements and ANSI N45.2.9. The PAS found that training records were improperly stored at the Nuclear Division Training Center (the Johnson Street School) and that departmental training records maintained by managers and supervisors were not subject to QA record requirements.

The inspector reviewed records at the Johnson Street School and in various station departments with respect to Technical Specification 6.10.2; QA Procedure OP-15, QA Records, Revision 1; and ANSI N45.2.9-1974, Requirements for the Collection, Storage, and Maintenance of Quality Assurance Records for Nuclear Power Plants. Discussions were held through the inspection with Nuclear Division supervisors including the Manager, Nuclear Support Services, and the Nuclear Division Director, Administrative Services.

The inspector determined that the licensee had established an ongoing QA records review and upgrade program, already addressing plant drawings, technical manuals, maintenance work requests, and various procedure records; establishment of satellite record centers; and, division-wide categorization and indexing of QA records. Each activity resulted from prior licensee identification of records program deficiencies or record discrepancies. Corrective actions for each problem were either in progress or in planning.

The inspector found that single copy training records at the Johnson Street School and in BVPS-1 station departments were not stored or maintained in accordance with the above requirements but that the licensee had initiated corrective actions similar to the others above. Other areas requiring similar licensee attention identified by the inspector were: station incident reports, operating procedure and valve lineup records, radwaste and transportation records, and certain maintenance records. By the end of this inspection the licensee had begun addressing each of these items as part of the overall effort. The Nuclear Division Director, Administrative Services advised the inspector that: 1) a fire loading/rating survey had been completed for the Johnson Street School records room; 2) engineering action was in progress to upgrade that facility to meet ANSI N45.2.9 requirements; 3) the use of computerized duplicate training records was being evaluated; and 4) an expected date of completion of actions for the Johnson Street facility would be provided to the inspector by about March 15, 1982. The Nuclear Division Director, Administrative Services further advised that a general review of in-plant and divisional records would be performed to ensure that all single copy records were properly stored; the expected date of completion would also be provided by about March 15, 1982. The acceptability of the licensee's actions in this matter will remain unresolved (82-01-08). Unresolved Item 81-29-14 will be closed.

(Closed) Unresolved Item (81-29-15): Appropriate acceptance criteria not available for activities affecting quality. PAS review of Welding Manual Procedure No. 1.4, Welding Electrode Control, and NSQC 8.1, Storeroom Quality Control, found that certain activities affecting quality were not governed by appropriate acceptance criteria.

- (1) QA Procedure OP-12, Control of Measuring and Test Equipment, Revision 3, requires the calibration of instruments and measuring devices used in activities affecting quality, regardless of the owner or user. Welding Manual Procedure No. 1.4, Welding Electrode Control, Revision 1, requires that ovens used to store covered electrodes be maintained at 250-300°F. During the PAS inspection the inspector observed that thermometers used to determine the temperature of the weld electrode oven in the Maintenance Department had not been calibrated.

The licensee has since calibrated the thermometer and has scheduled it for periodic recalibration in accordance with their administrative controls. The inspector had no further questions on this item.

- (2) General Stores (GS) Procedure 204.0, Storage Functions, Revision 2, requires that temperature and humidity be controlled within specified limits for the Level A storage room. The inspector noted that the temperature and humidity recording instruments had not been calibrated. A sampling review of purchase requisitions by the inspector failed to identify any piece of equipment that required Level A storage. Although the licensee had stored electronic instruments and parts in this storage area, the inspector verified that this equipment did not require this level of storage. The licensee has since initiated a calibration program for the storeroom instrumentation. As Level A storage was apparently not required up to this time and the licensee has instituted a routine calibration program for those instruments, the inspector had no further questions on this matter.
- (3) The temperature and humidity limits discussed in GS 204.0 are not specified by the procedure. Through discussions with Stores personnel, the inspector determined that these limits had not been established at the time of the PAS inspection. The licensee has since issued a memorandum that specifies appropriate limits, subject to change as required to meet special material storage requirements. As there has apparently never been equipment stored in the Level A storage room that required these special temperature and humidity controls, the inspector had no further questions at this time.

(Closed) Unresolved Item (81-29-16): The PAS identified the following items related to storage and inspection of materials:

- (1) Bags of cement were stored within 10-15 feet of reactor plant equipment such as pumps, motors, valves, and spare parts in the warehouse. Several cement bags had been punctured. A plastic tarp used for covering one skid of cement was not in place. The tarp was immediately lowered over the exposed cement bags to contain any dust. The inspector had no further questions on this item.
- (2) Openings in four Limitorque valve operators did not have covers or seals to prevent foreign material from entering the valve operators. The PAS inspector further noted that attached vendor instructions directed that desiccant be added if the operators were not immediately installed. Discussions with storeroom personnel confirmed that instructions from Engineering specifying storage and maintenance requirements were not available and that stores personnel

had not been instructed to look for vendor storage requirements.

During this inspection, the inspector confirmed that the open valve parts had been covered and that requirements for installation inspections and cleaning would assure proper cleanliness levels if and when the valves are used in reactor plant systems. When the licensee disassembled the valve operator to add disiccant, three packs were found inside the operator, apparently added by the vendor before shipping. The licensee's overall program receipt and storage of equipment and material will be inspected in the near future as part of the prescribed inspection program. The inspector had no further questions on this item.

(Open) Unresolved Item (81-29-01): Bases for 10CFR50.59(b) determinations not documented by Onsite Safety Committee (OSC) for procedure changes. The PAS found that the committee did not make written evaluations of procedures or changes to procedures to document the bases for their determination that no unreviewed safety question existed.

The inspector reviewed a sample of 50 procedure changes documented in OSC Meeting Minutes BV-OSC-71-81 (June 10, 1981) through BV-OSC-131-81 (December 17, 1981), including changes to operating procedures, surveillance procedures, calibration procedures, and system descriptions. The inspector also reviewed Section 12.5, Procedures, of the BVPS FSAR and selected other sections discussing test and inspection procedures. The inspector found that none of the fifty procedure changes sampled appeared to constitute a change to the procedure as described by the FSAR. This item remains open pending additional NRC:RI management review.

3. Plant Operations

a. General

The facility was shutdown for all of the inspection. Inspections and plant tours were conducted during day and night shifts with respect to outage activities and maintenance of safe shutdown conditions. Acceptance criteria for those inspections included:

- BVPS FSAR Appendix A, Technical Specifications
- BVPS Operations Manual, 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
- BVPS Operations Manual, Chapter 55A, Periodic Checks - Operating Surveillance Tests
- BVPS Maintenance Manual, Chapter 1, Conduct of Maintenance, Section J, Housekeeping
- BVPS Radcon Manual, various sections
- 10CFR50.54(k), Control Room Manning Requirements
- Inspector Judgement
- BVPS Physical Security Plan

Findings resulting from these inspections are discussed in paragraph 3i below.

b. Areas Inspected

- Primary Auxiliary Building, including High Radiation Areas and Loose Surface Contamination Areas
- Service Building
- Main Steam Valve Room
- Purge Duct Room
- East/West Cable Vaults
- Emergency Diesel Generator Rooms
- Containment Building, including High Radiation Areas
- Penetration Areas
- Safeguards Areas
- Various Switchgear Rooms, Cable Spreading Room
- Protected Area

The inspectors also toured the Control Room regularly to review logs and records and conduct discussions with operators concerning reasons for selected lighted annunciators and knowledge of recent changes to procedures, facility configuration and plant conditions.

c. During daily Control Room tours the inspectors made the following observations:

- (1) Instrument and recorder traces for systems required during shutdown were observed for abnormalities. Systems included:
 - Residual Heat Removal (RHR) System
 - Chemical and Volume Control System (CVCS)
 - Fuel Pool Cooling and Purification System
 - Supplementary Leak Collection and Release (SLCRS) System
 - Liquid (LW) and Gaseous (GW) Radioactive Waste Systems
 - Fire Protection Systems
 - Nuclear Instrument (NI) System
 - Process and Area Radiation Monitors (RMs)
 - Offsite and Onsite Electrical Power Systems
- (2) Proper Control Room and shift manning were confirmed. Control of personnel access was confirmed to be in accordance with the BVPS OM, Section 1.48.
- (3) The inspectors verified operator adherence to approved operating procedures for partial RCS draindown per BVPS OM Section 1.6.4.N, Draining RCS to Centerline of Hot Leg Loops for Maintenance, Revision 3. These inspections activities are further discussed in paragraph 5 of this report.
- (4) The following licensee logs and documents were reviewed daily on a rotating basis during the inspection to obtain information on plant conditions, determine compliance with regulatory requirements and assess the effectiveness of the communications provided by the documents:
 - * -- Nuclear Shift Supervisors Logs
 - * -- Nuclear Control Operator Logs
 - Equipment Clearance Logs
 - Caution Tag Log
 - Special Operating Orders
 - Waste Handling Systems 7 Day Running Logs
 - Chemistry Log Sheets
 - * -- Nuclear Shift Operating Foreman Logs
 - * -- Radcon Foreman Logs
 - Equipment Out of Service (OOS) Logs
 - Temporary Operating Procedures & Log
 - Temporary Logs Sheets (for special surveillance or operations)
 - Nuclear (auxiliary) Operator Logs

* Note: Each of these logs was reviewed for the entire inspection period. All other logs were reviewed at least weekly.

- (5) The inspectors observed Control Room instrumentation, controls, and indicators to verify that ongoing operations and maintenance of shutdown conditions were in conformance with Technical Specification (TS) Limiting Conditions for Operations (LCOs). Portions of the below TS LCOs confirmable from the Control Room were observed on the dates shown:

| <u>TS</u> | <u>Title</u> | <u>Date</u> |
|-----------|--|---|
| 3.1.1.2 | Reactivity Control System, Tavg less than 200°F | January 6, 1982 January 14, 1982 February 2, 1982 |
| 3.1.2.3 | Reactivity Control System, Charging Pump - Shutdown | January 7, 1982 February 2, 1982 February 4, 1982 |
| 3.4.1.3 | Reactor Coolant System - Shutdown | January 8, 1982 January 11, 1982 January 13, 1982 January 19, 1982 February 4, 1982 |
| 3.8.2.2 | Electrical Power System - A.C. Distribution - Shutdown | January 11, 1982 January 14, 1982 January 19, 1982 |
| 3.8.1.2 | Electrical Power System - Shutdown | January 13, 1982 January 28, 1982 January 29, 1982 February 2, 1982 |
| 3.1.2.1 | Reactivity Control System, Boration System | January 14, 1982 January 22, 1982 February 2, 1982 |
| 3.1.2.7 | Reactivity Control System, Borated Water Sources - Shutdown | January 18, 1982 January 22, 1982 February 2, 1982 |
| 3.1.2.5 | Reactivity Control System, Boric Acid Transfer Pump | January 22, 1982 February 2, 1982 |

- (6) The inspectors reviewed completed surveillance tests to verify that: the tests were completed as scheduled; test results were reviewed by responsible supervisors, and that corrective actions were initiated for test identified deficiencies:

- OST 1.43.1 - TS Required Area and Process Monitors Channel Functional Test, Revision 5, performed January 6, 1982, following corrective action on RM-RW-100 per MWR 816045.
- OST 1.43.2 - Area and Process Monitors Channel Functional Check, Revision 16, completed January 6, 1982 to return RM-VS-105 to service.
- OST 1.39.1D - Weekly Battery Check - Battery No. 4, Revision 7, performed January 21, 1982.
- OST 1.20.1, Spent Fuel Pool Level Verification, Revision 0, performed January 21, 1982.
- OST 1.49.2, Shutdown Margin Calculations, Revision 11, performed January 6, 13, and 22, 1982.
- OST 1.20.2, FC-P-1A Fuel Pool Pump Operability Test, Revision 7, initiated January 11, 1982 and put on hold for review after the pump failed to meet the differential pressure acceptance criteria.
- MSP 21.06, P-495 1C Steamline Pressure Protection (Loop 3) Channel III Test, Revision 3, performed December 24, 1981.
- MSP 13.09, L-100A RWST Level Loop Channel III Test, Revision 2, performed December 24, 1981.
- MSP 10.02, RHR Automatic Isolation and Pressure Interlock Test, Channel II, Revision 3, performed January 1, 1982.
- MSP 2.10, Nuclear Instrument Source Range N-32 Calibration, Revision 4, performed December 29, 1981.
- OST 1.7.3, Boric Acid Transfer Pump Operational Test, Revision 21, performed January 22, 1982.
- OST 1.39.1E, Weekly Station Batter Check, Battery No. 5, Revision 8, performed January 22, 1982.

- OST 1.7.8, Boric Acid Storage Tanks and RWST Level and Temperature Verifications, Revision 6, performed January 22, 1982.
- OST 1.32.1, Chemical Waste Sump, pH Monitor Operability Check, Revision 5, and OM Change Notice 82-12, performed January 14 and 22, 1982.
- OST 1.16.2, Supplementary Leak Collection and Release Exhaust Fan and Remote Damper Component Test (Train B), Revision 8, performed January 6, 1982.
- OST 1.48.1, Mode 5 and 6 ESF Train Operability, Revision 5, performed January 6 and 13, 1982 for Train "B."
- OST 1.36.7, Offsite to Onsite Power Distribution System Breaker Alignment Verification, Revision 18, performed January 9, 1982 for Mode 5 conditions.
- OST 1.36.9, AC Power Source Breaker Alignment Verification During Shutdown, Revision 1, performed January 9, 1982.
- OST 1.11.10, Boron Injection Flow Path Power Operated Valve Exercise, Revision 30, performed January 12, 1982.
- OST 1.7.3, Boric Acid Transfer Pump Operational Test, Revision 21, performed January 29, 1982, OMCN 82-03, January 5, 1982.
- OST 1.1.10, Cold Shutdown Valve Exercise, Revision 29, performed January 28, 1982.
- OST 1.7.8, Boric Acid Storage Tanks and RWST Level and Temperature Verification, Revision 17, performed January 28, 1982.
- OST 1.33.3, Fire Protection System Drain Test, Revision 33, performed January 23, 1982.
- OST 1.39.1A, Weekly Battery Check - Battery No. 1, Revision 7, performed February 8, 1982.
- OST 1.39.1B, Weekly Battery Check - Battery No. 2, Revision 7, performed February 8, 1982.

- OST 1.49.2, Shutdown Margin Calculation, Revision 11, performed February 9 and 10, 1982.
- OST 1.16.5, Fuel Building Ventilation System Verification - Fuel Storage, Revision 7, performed February 10, 1982.
- OST 1.36.2 - Diesel Generator No. 2 Monthly Test, Revision 25, performed February 4, 1982.

d. The following activities were inspected during tours of the plant areas listed in paragraph 3.b:

- (1) Safety related tagouts (below) were verified to be properly posted with equipment properly positioned and redundant equipment operable (if required):
 - "A" Emergency Diesel Generator, Equipment Clearance Tag No. 473726 and 466270, placed January 6, 1982.
 - Pressurizer Heaters, Equipment Clearance Tag No. 466277, observed January 18, 1982.
 - "C" Component Cooling Water Pump, Equipment Clearance Tag No. 466140 and 466214, observed January 8, 1982.
 - MOV-RC-557 A&B, Equipment Clearance No. 466315 and 444316, placed February 11, 1982.
- (2) The inspectors independently verified plant conditions and equipment status required for conformance with the following TS LCOs during inspection tours outside the Control Room:
 - TS 3.4.1.3 - Reactor Coolant Systems - Shutdown
 - TS 3.8.1.2 - Electrical Power Systems - Shutdown
 - TS 3.8.2.2 - Electrical Power Systems - AC Distribution
 - TS 3.4.2 - Reactor Coolant Systems - Safety Valves
 - TS 3.7.15 - Fire Barrier Penetrations
 - TS 3.7.14.4 - Fire Hose Stations
- (3) General plant/equipment conditions including operability and verification of standby equipment, pipe hanger/seismic restraint settings and oil levels, and instrumentation and recorders functional.
- (4) The inspectors verified that Maintenance Work Requests (MWRs) had been initiated for equipment in need of maintenance and that proper priorities had been assigned to the repairs. Examples include:

- MWR 816045, completed January 6, 1982 to repair RM-RW-100
 - MWR 820046, completed January 6, 1982 to repair MOV-RH-758
 - MWR 820045, completed January 6, 1982 to repair FCV-CH-114
 - MWR 817917, observed maintenance activities on January 29, 1982 to rebuild PCV-MS-106A
- (5) Toured areas were observed for fire hazards, availability and operability of fire fighting equipment and emergency equipment, and general condition of fire alarms and actuating controls. The inspectors verified that observed ignition sources were being controlled in accordance with BVPS OM Section 1.56.
- (6) The following ongoing activities outside the Control Room were observed to confirm that they were conducted in accordance with applicable administrative controls:
- Rebuild Steam Dump Valve TCV-MS-106A6 per: (i) MWR 817918 for mechanical work; and, (ii) MWR 817917 for actuator work. The inspector verified proper equipment clearance per Clearance No. 479124.
 - Completion of OST 1.39.1C, Weekly Battery Check - Battery 3, Revision 7, performed January 21, 1982.
- (7) Plant housekeeping conditions and cleanliness were observed to confirm that:
- Critical clean areas are controlled.
 - Excess materials and materials are returned to storage areas.
 - Combustible materials and debris are promptly removed from the facility.
- (8) The inspectors observed implementation of the Physical Security Plan, including:
- Proper manning of the security organization.
 - Security personnel were capable of performing their assigned functions.
 - Protected Area barriers were not degraded.
 - Isolations Zones were clear.
 - Persons and packages were properly checked prior to Protected Area entry.

- Vehicles are properly authorized, searched and escorted or controlled within the Protected Area.
 - Persons within the Protected and Vital areas display photo identification badges and are properly escorted if required.
 - Communications checks were conducted and proper communications devices were available.
 - Compensatory measures were employed when required by security equipment failure or impairment and were effective.
 - Security access controls to vital areas are properly implemented.
 - Response force composed of specified armed individuals available and responded in a timely manner on January 19, 1982.
 - Explosives Detector Alarm checked prior to returning to service on January 13, 1982.
 - Vital Area controls for outage activities are also discussed in paragraph 14 of this report.
- (9) Shift turnovers of the following work groups/departments were periodically observed to ensure continuity of information between shifts:
- | <u>Group</u> | <u>Date</u> |
|----------------|--|
| Operations | January 6, 7, 11, 14, 18, 21, and 26, 1982 |
| Health Physics | January 8, 13, 22 and 28, 1982 |
| Security | February 11, 1982 |
| Test Group | January 21, 1982 |
- (10) The following radiological control activities were observed on day and night shifts:
- (a) Portions of the following licensee performed surveys were observed for conformance with BVPS Radcon Manual requirements:
- Survey of Blender Cubicle High Radiation Area in the Primary Auxiliary Building (discussed further in paragraph 3.i(3)).
 - Survey conducted during Type C local leak rate test on penetration 20 inside containment and the Primary Auxiliary Building on January 21, 1982.
 - Survey of Steam Generator Drain Tank Building during decontamination efforts (discussed in paragraph 6.b).
 - Survey of Solid Waste Areas conducted as part of TOP 82-07 and subsequent decontamination (discussed further in paragraph 6.d).

- (b) Radiation protection instruments below were inspected during plant tours to verify operability and adherence to calibration frequency requirements.
- (c) The following Radiation Work Permits and Radiation Access Control Permits were reviewed for completeness. The permit(s) denoted by asterisk were reviewed in the field to verify that the permit requirements were being followed:
 - * -- RWP B009351, Repair Line on LW-TK-7B, January 19, 1982.
 - * -- RWP B009359, Decontaminate Outside Area, January 19, 1982.
 - * -- RWP B009133, Dewatering Demineralizers, January 8, 1982.
 - RACP 81-11-H, Inspection and Surveillance, January 14, 1982.
 - RWP B009122, Clean/Repair/Test Motor Operators, January 1, 1982 for SI-850A.
 - RWP B009299, Install Hydrogen Recombiner System at 735' S/G (Maint), January 14, 1982.
 - * -- RWP B009501, Decon LW-P-1A&B Cubicle, February 4, 1982.
 - * -- RWP B009501, Decon Solid Waste Area, February 8, 1982.
- (d) The inspector audited the licensee's Jumper and Lifted Lead controls on January 15 and 19, 1982 in accordance with BVPS OM Section 1.48.5 to ensure no conflicts with Technical Specifications, that the licensee is actively pursuing correction of conditions requiring the jumpers or lifted leads, and that the installation and removal were proper. The following sample was audited:
 - 2021, Area Ventillation, to allow VS-C-1B1 to run with VS-E-4B out-of-service, placed March 4, 1978.
 - 2122 and 2123, Gaseous Waste System, to disable Alarm A-2-1, placed February 3, 1979.
 - 2766, Miscellaneous Safety Related System, to disable alarm A6-51, placed October 12, 1981.
- (e) The inspector witnessed selected portions of the below radioactive releases to verify conformance with approved procedures, that required release approvals have been obtained, that required sampling was accomplished, and that effluent release instrumentation was operable:
 - RWDA 01736, Steam Generator Drain Tank 7A, discharged to Unit 2 Blowdown, observed February 1, 1982.

(f) The following records of liquid and gaseous radioactive releases were also reviewed to assure that approvals were obtained, sampling was accomplished, and release limits satisfied:

- RWDA (Liquid) 1724, Steam Generator Drain Tank 7B, December 20, 1981.
- RWDA 1724, Steam Generator Drain Tank 7A, January 1, 1982.
- RWDA 1727, Laundry, January 1, 1982.
- RWDA (Gaseous) 0560, Gas Decay Tank 1A, January 3, 1982.
- RWDA 0559, Gas Decay Tank 1C, January 2, 1982.
- RWDA 0553, Containment Purge, December 30, 1981, (Reviewed by OSC meeting 136-81).

(g) The inspector observed solid radioactive waste disposal activities to verify implementation of administrative controls.

- Spent resin transferred to lined waste cask for offsite disposal on February 7 - 10, 1982.

(h) The inspector observed portions of on-going maintenance activities to verify that:

- These activities did not violate TS Limiting Conditions of Operation.
- Required administrative approvals and tagouts were obtained prior to initiating work.
- Approved procedures were being used or the activity was within the "skills of the track."
- QC reviewed the proposed work to define any desired hold points.

Activities observed included:

- Rebuilding Steam Dump Valve TCV-MS-106A6 per
 - (i) MWR 817918 for mechanical work, and
 - (ii) MWR 817917 for work on the valve actuator.
- Instrument Calibration of Rod Area Monitor RM-215A per MSP 43.08, Containment Particulate Calibration, Revision 3, performed February 11, 1982.

e. Findings

(1) Fire Barrier Penetrations Inoperable

Technical Specification 3.7.1.5 requires all penetration fire barriers protecting safety related areas to be functional at all times. The Action Statement of TS 3.7.15 requires that, with penetration fire barrier nonfunctional, a continuous fire watch must be established on at least one side of the affected penetration within one hour. During this inspection, three examples of violation of TS 3.7.1.5 were identified.

- (a) During inspection of temporary cable installations per TOP 82-6 (paragraph 6c, this report) the inspectors found that the temporary 480 volt power supply passed through the wall between the AE and DF Vital Switchgear Rooms via a standard conduit penetration. The fire barrier packing for the penetration had apparently been removed for the cable installation but not replaced. No fire watch was present. The inspectors found the condition at about 10:50 a.m. on January 28, immediately notified the Control Room, and observed repacking of the penetration with acceptable fire stop material at about 11:10 a.m. Inspector discussions with the cognizant Electrical Maintenance Foreman and review of operator logs established that the cable had been run through the penetration at or before 9:00 p.m. on January 27, apparently without proper replacement of the fire stop material or fire watch.
- (b) During a February 5, 1982 tour of the PAB Safeguards Area, the inspectors found an 8" conduit penetration #WCV-735'-111 between the West Cable Vault and the Auxiliary Feedpump Room open and not stuffed with fire retardant material. No fire watch was posted as required by TS 3.7.15. The inspectors immediately notified the Nuclear Shift Supervisor and witnessed repacking of the penetration with fire retardant batting.
- (c) Additionally, the inspectors noted that similar finding was documented in the Nuclear Shift Supervisor's log for 8:25 p.m., February 5. A Nuclear Shift Operating Foreman on plant tour found welding cables passing through a fire barrier penetration between the AE and DF Vital Switchgear Rooms without fire retardant stuffing or a fire watch.

The licensee was unable to establish the date and/or time the penetrations of examples 2) and 3) were unpacked to make them inoperable or whether fire watches had been posted at any time during the inoperability.

Failure to comply with TS 3.7.15 constitutes a violation. (82-01-09).

(2) Security Picture Badge Procedures

During a February 5, 1982 tour of the #1 and #2 Emergency Diesel Generator Rooms, the inspectors observed two construction workers not wearing their security picture badges as required by the BVPS Physical Security Plan. The individuals, inside the #1 EDG Room Vital Area, had left the badges on their coats when the coats were removed. When addressed by the inspectors, both individuals put the badges on as required.

This matter was discussed with the DLC Security Supervisor and Security Assistant on February 5-6. Based on no recent similar observations, the inspectors considered the above apparent violation of security plan requirements to be an isolated case and advised the licensee representatives that any future observations of improperly displayed security badges would be considered as violations. The licensee was ensuring that construction craft workers were made aware of the need to properly wear badges via contractor safety meetings and communications. The inspectors noted that about 1000 construction contractor personnel are onsite to support the current outage and that prior observations showed no widespread abuse of badge requirements.

(3) High Radiation Barrier Unlocked

At 2:45 p.m., January 28, 1982, during a plant tour, the inspectors found the radiation barrier door to the CVCS blender cubicle unlocked and ajar about 8 inches. The door is a fence-type gate properly posted as a High Radiation Area and Contamination Area/RWP required for entry. The inspectors immediately notified the cognizant Radcon Foreman who responded to the scene, insured no personnel were within the cubicle, and relocked the gate.

The inspectors and licensee reviewed survey data, Radiation Access Control Permit logs, Radiation Work Permit Logs, Instrument Issue Logs, and Radiation Area key logs, confirming that only two parties had entered the area since it was last verified locked at about 11:30 a.m., January 28. Neither of the two parties (an operator and a housekeeping crew) recalled finding or leaving the gate unlocked. The inspectors confirmed that both parties were properly authorized entry and both were equipped with required radiation survey meters. Survey data showed that general area radiation levels within the cubicle were less than about 60 mrem/hr. except at and below grating level. At grating level, localized fields were about 100 mrem/hr; below grating level, maximum fields were 600 mrem/hr. or less.

TS 6.12.1.a and BVPS Radcon Manual, Radcon Procedure 9.2, Radiation Area Control, Issue 1, Revision 2, require entry to high radiation areas of more than 100 mrem/hr. but less than 1000 mrem/hr. be controlled via RWP and barricades. Locked barricades are only required if the radiation intensity is greater than 1000 mrem/hr. The licensee locks the lower intensity cubicles to provide additional positive entry control beyond that required by TS. Based on the above and the isolated nature of this finding, no violation of NRC requirements was identified.

4. In Office Review of Licensee Event Reports (LERs)

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

- * -- LER 81-103/03L Over Current Trip of IDF Emergency Bus due to ground from 1C Component Cooling Water Pump Motor.
- LER 81-104/03L Loss of Core Cooling Monitor due to power supply failure.
- LER 81-105/03L Hydrogen Recombiner Pre-heater discharge air temperature failed surveillance test.
- * -- LER 81-106/03L Drift of 7 Main Steam Safety Valve Setpoints.
- LER 82-01/03L Supplementary Leak Collection and Release System Train A failed surveillance test.

No unacceptable conditions were identified.

LER 81-103/03L was submitted by the licensee after the 1C Component Cooling Water Pump Motor Bearings overheated and caught fire. A resulting electrical ground caused an over current trip of the IDF emergency bus. Prior onsite inspector followup of this event is discussed in NRC Inspection Report No. 50-334/81-31.

LER 81-106/03L was submitted by the licensee after 7 of 15 Main Steam Safety Valves experienced setpoint drift. Prior onsite inspector followup of this event is discussed in NRC Inspection Report No. 50-334/81-31.

* Denotes those reports selected for onsite followup as discussed below.

5. Immediate Action Letter Followup - Operation With RCS Partially Drained

-- References:

- (1) Immediate Action Letter (IAL) 81-14, March 9, 1981.
- (2) Duquesne Light Company letter to the Nuclear Regulatory Commission, January 6, 1982.
- (3) Nuclear Regulatory Commission, Region I, letter to Duquesne Light Company, January 8, 1982.

In March, 1981, while the RCS was partially drained to mid-loop level, inaccurate level indication and Residual Heat Removal Pump air binding resulted in a partial loss of core flow. Licensee commitments to ensure adequate Residual Heat Removal (RHR) system capability while in partially drained conditions were documented in IAL 81-14. Proposed changes to those commitments based on a licensee evaluation of the event were forwarded to the NRC in reference (2) for review and concurrence. Clarifications of those commitments are contained in reference (3).

The licensee proposal and clarifications included redundant remote level indications in the Control Room, requirements for instrument checkout and periodic verification, data logging and parameter limits, and actions for abnormal conditions. On January 8 and 11 the inspector reviewed implementation of the licensee commitments after the RCS had been partially drained. Operating Manual Change Notice (OMCN) issued to support those commitments and reviewed by the inspector were:

- OMCN 82-04 to BVPS OM Section 1.6.4 issued, January 7, 1982.
- OMCN 82-09 to BVPS OM Section 1.10.4, issued January 8, 1982.
- OMCN 82-08 to BVPS OM Section 1.10.4, issued January 8, 1982.
- OMCN 82-10 to BVPS OM Section 1.10.4, issued January 8, 1982.
- OMCN 82-05 to BVPS OM Section 1.10.4, issued January 8, 1982.
- OMCN 82-06 to BVPS OM Section 1.10.4, issued January 8, 1982.
- OMCN 82-07 to BVPS OM Section 1.54.3, issued January 8, 1982.

The inspector also observed control board system alignments and indications, held discussions with operations personnel, and reviewed data to confirm licensee compliance with their commitments. These items will receive continued review by the inspector during routine inspection activities.

6. Onsite Event Followup

a. Automatic Actuation of Safety Injection System

A safety injection signal inadvertently actuated at 5:07 p.m., January 4, 1982. Maintenance Surveillance Procedure (MSP) 1.04, Solid State Protection System, Train "A," Revision 16, was being used as a guide to return the Solid State Protection System to

normal after replacing a fuse (replaced MBO-15 fuse with Bussman ABC-15 as specified by EM 41393) per MWR 800775. The safety injection signal resulted from resetting the system out of the sequence specified in MSP 1.04.

During the incident, the reactor was in Cold Shutdown (Mode 5) with two Reactor Coolant Pumps (RCP) and two Residual Heat Removal (RHR) loops in operation. No actual water injection into the Reactor Coolant System occurred due to Mode 5 (Cold Shutdown) system lineups (pumps in pull-to-lock). However, the signal did isolate the charging pump makeup flow path and the RCPs' No. 1 Seal leakoff path (Containment Isolation Phase A). The two operating RCPs were tripped to prevent possible damage, leaving the two Residual Heat Removal loops in operation, meeting Technical Specification requirements (one loop in operation, and one loop operable in Mode 5). After the Safety Injection signal was confirmed to be spurious, normal system alignments were reestablished.

The inspector discussed corrective actions taken by the licensee with the Instrument and Control Supervisor. Actions taken included revising MSP 1.04 for clarity and discussion of the event and the importance of adhering to procedures during a safety meeting with all Meter and Control Repairmen. The inspector had no further questions on this item.

b. Liquid Radwaste Piping Rupture

On January 19, 1982, about 3:30 a.m., water was observed leaking down an exterior wall of the Steam Generator Drain Tank Building. A recirculation line between Steam Generator Drain Tanks (LW-TK-7A & -7B) had ruptured, spilling about 300-500 gallons of water on the roof, walls, and ground around the building. The line was immediately isolated and the spillage stopped. Survey results indicated maximum contamination in the surrounding earth of about 12,000 cpm as measured by an RM14/HP210 frisker. Liquid activity from taken and spilled water samples was about $6E-5$ uCi/cc. Most of the spilled water had frozen on the walls and earth due to extremely cold weather. The snow and ice surrounding the tank was drummed and disposed of as liquid radwaste. Post decontamination surveys showed no contamination above the licensee's administrative limits (450 uCi/100 cm²).

The line apparently ruptured due to freezing. The inspector observed the failed line and portions of repair activities per MWR 820164. The cause of freezing appears to be deficient temporary electric heat tracing and damaged piping insulation, both of which were also repaired.

The inspector became aware of the event about 8:00 a.m., January 19, during a routine log review. 10CFR50.72, Notification of Significant Events, requires prompt telephone notification to NRC of any accidental radioactive release within one hour of occurrence. The inspector reviewed this event relative to 10CFR50.72 and the licensee's reporting procedures of BVPS OM Section 1.48.9.D. At the time of discovery, the area affected by the spill was apparently well defined in the snow around the tank. Discussions with licensee witnesses confirmed that no spillage to storm drains was observed (also later confirmed by sample). The on-duty Shift Supervisor considered the event to be a "spill" rather than a "release" based on the absence of a pathway to the environment. This appears appropriate based on the BVPS FSAR which defines the restricted area (in the context of 10CFR20) as the company owned property at the Beaver Valley and Shippingport sites.

The inspector questioned whether the absence of a release had actually been confirmed within the one hour reporting time of 10CFR50.72. While not actually confirmed by sample, the inspector concluded that the licensee's assessment was reasonable. The inspector, however, advised the Station Superintendent that a notification to NRC per 10CFR50.72 would have been prudent based on the circumstances. The Station Superintendent acknowledged the inspector's concern and, on February 2, 1982, issued Memo NDISS1:482 to Operations Department Supervisors emphasizing the need for both internal (DLC) and external (NRC and other) notifications for potentially reportable or sensitive matters.

The inspectors had no further questions on this matter; no unacceptable conditions were identified.

c. 4160 VAC Cable Failure and Partial Loss of Offsite Power

While in Cold Shutdown, a 4160 VAC feeder cable failed at 2:15 p.m., January 27, 1982, resulting in arcing and smoldering insulation in a switchgear room cable tray, and caused loss of 4160 VAC supply to two of four (the "A" and "B") main electrical busses and the "A" Train (IAE) Emergency Bus. The "A" Train Emergency Diesel Generator (EDG) is out-of-service for modification. The smoldering insulation was immediately extinguished with portable equipment. The "B" Train busses and EDG remained operable throughout the event. The Reactor Coolant System (RCS) was partially drained.

"B" Train safety systems were aligned for "priority train service" and remained operable. The inspector confirmed that Technical Specifications for boration flowpath, onsite and offsite electrical systems, residual heat removal, and reactivity control systems were satisfied, including Action Statements as applicable. Power was lost to the standby Residual Heat Removal (RHR) loop, RHR flow control valves, temporary Reactor Coolant System Level Instruments, and miscellaneous instrumentation and controls. Core flow and level were maintained using local control and monitoring. The cable fire, in the Service Building switchgear room, did not involve radiation or contamination.

Power was partially restored (to 480 VAC busses) via a temporary cable about 9:15 p.m., January 27, restoring most of the instrument and control functions. The "A" 4160 VAC Bus was reenergized by a second temporary cable connection about 4:00 a.m., January 28. Inspector review of the temporary cable connections is further discussed below.

On January 28, the inspectors reviewed the sequence of events, inspected the damaged cable trays, and reviewed the licensee's response to the event. At the time of the incident, the "A" and "B" 4160 VAC busses were being powered via backfeed from the Main Transformer through the 1C Unit Station Service (USS) Transformers. The fault, apparently a phase-to-phase short, occurred in the feeder cables between the 1C USS Transformer and the "A" 4160 VAC Bus. Inspector review of Sequence of Events computer printouts and discussions with on-duty operators established that the electrical fault protection equipment operated as designed. The operators properly responded to the event in accordance with the Abnormal Procedures of the BVPS Operating Manual, Sections 1.36-1.39.

Power was lost to RHR flow control valves and temporary RCS level instruments. Operators were immediately dispatched to containment to manually adjust RHR flow if needed (valves failed as-is) and to monitor the local RCS level standpipe. Both temporary RCS level instruments were powered from the "A/AE" busses via Instrument Bus 3 and were deenergized. The instruments use Channel 3 Steam Generator level transmitters circuitry, temporarily repiped to indicate RCS loop level. The Channel 3 instruments, powered from the same Instrument Bus, were selected because they are the only channels equipped with Control Rod recorders. The inspectors confirmed that both RCS level and flow were properly controlled and monitored through the event.

On the evening of January 27, 1982 the licensee issued and implemented two Temporary Operating Procedures (TOPs) to provide temporary power supplies to the "A" Train electrical busses. TOP 82-5, Temporary Supply of Power to MCC1-E9, provided for temporary cross connection of the 480 VAC emergency busses. TOP 82-6, 4160 VAC Temporary Station Service Supply to AE Emergency Bus, provided a similar cross connection for the 1A 4160 VAC bus. On January 28, the inspectors walked down each of the installations to verify their conformance with the requirements of the TOPs and good installation practice. The inspectors found

that the temporary cables were of the specified size, properly supported, and routed to avoid jeopardizing safety-related cables in adjacent conduit and cable trays.

The inspector noted, however, that the temporary 480 volt power supply passed through the wall between the 1 AE and 1 DF Vital Switchgear Rooms via a standard conduit penetration. The fire barrier packing for the penetration had apparently been removed for the cable installation but not replaced. The matter is further discussed in paragraph 3e(1) of this report.

On January 28, 1982, the inspectors discussed the licensee's safety evaluation for the two TOPs with the DLC Chief Engineer, confirming that common mode failures, cable separation, and circuit protection were properly addressed by the procedures and the Onsite Safety Committee's (OSC) review. On February 4, 1982, the inspectors reviewed the draft safety evaluation included in the draft OSC Meeting Minutes BV-OSC-5-82. The inspectors had no further questions on this matter.

At the close of this inspection, temporary cables continued to supply the "A" 4160 VAC normal and emergency busses. The 480 VAC temporary cross connect remained installed but deenergized. Preparations for repair of the failed 4160 VAC cable were in progress.

On January 27, 28, and 30, the inspectors observed the failed cables and damaged cable trays. Two cables appeared to be the source of the failure (phase to phase and/or phase to ground). The cables failed about midway between wooden supports and did not appear to be in contact with each other at the point of failure. Failure damage included evidence of heavy arcing with burnt cable insulation and melted cable shield and conductors on both cables. Evidence of arcing from the cables to the tray was also observed. The cables are located in a horizontal covered tray about 20 feet above floor level in the Service Building switchgear room. To the extent permitted by the damage, the inspectors observed no evidence of pre-failure damage or tampering. On February 2, 1982, the licensee issued Engineering Memoranda (EM) 44398 and 20928 for repair of the damaged cables and 1C transformer respectively. EM 44398 also provided for analysis of the failed cable by the cable vendor. At the close of this inspection the failure causes for the cable and the potential for similar failures of other cable had not been established, pending vendor analysis. This matter will remain unresolved pending review of the licensee's actions. (82-01-10).

d. Spent Resin Spill

Approximately 1/2 gallon of spent resin was spilled in the Solid Waste Area on February 5, 1982. No personnel internal or external contamination or offsite release occurred.

Temporary Operating Procedure (TOP) 82-07, Resin Removal and Transfer of CH-I-1A, -1B, and -3B, was in progress at the time of the spill. The procedure involved the transfer of spent resin in slurry form from the ion exchangers to a shipping line within a cask atop a flatbed truck for offsite disposal.

Through discussions with licensee personnel, the inspectors determined that the spill occurred after the initial transfer was essentially complete. Involved personnel interviewed by the inspectors stated that when the transfer pump reached shutoff head due to backpressure from the full line, a residual amount of resin remained in the transfer hose coupled to the liner. The hose was disconnected and the residual resin drained into a poly bag. The bag slipped out of the operator's hand, spilling resin onto the outside of the cask, the bed, and tires. The inspector reviewed TOP 82-07 and associated RWP 9516 package to evaluate the licensee's preparations and preventive measures for coping with possible spills. The inspector found the licensee preparations generally acceptable including: a confinement structure around the SWA door and trailer; radiation barriers and postings; sealing of storm sewers; building of floor dikes; placement of spill kits; temporary ventilation and radiation monitors; and radtech coverage. These efforts were successful in containing the actual spill until decontamination was complete.

The inspector noted that TOP 81-07 did not provide guidance for handling abnormal conditions encountered during the transfer such as unexpectedly high radiation levels or line plugging. Additional improvements in the transfer rig such as isolation capability at the cask end of the hose were also identified as desirable. The DLC Radcon Supervisor acknowledged the inspectors' comments and stated that the procedure would be revised to include stop-work provisions for abnormal conditions and transfer rig improvements prior to its next use. These provisions would be included in the licensee's programmatic procedures to ensure that they are considered for any similar evolution. This matter will remain unresolved pending NRC:RI review of the licensee's actions. (82-01-11).

The inspector reviewed pre- and post-spill survey and sample data. Continuous air monitor samples varied from E-9 to E-10 uCi/ml, and showed no increase of airborne activity above initial area

background during the spill. Contact readings on the resin-filled bag showed 15 R/hr. Resin on the truck was reading approximately 3-4 R/hr. at 6 inches, with a general area reading of 40-100 mR/H. Transfer and spill response activities up to cask-top decontamination and cask lid installation resulted in personnel exposures within the As Low As Reasonably Achievable (ALARA) guidelines for RWP 9' 6. Decontamination efforts performed under RWP 9501 (General Decontamination) were also accomplished with minimum personnel dose.

When operations to seal the cask resumed, an additional written ALARA review was not performed. Continuous health physics coverage was, however, provided. The Radcon Foreman who surveyed the lid area of the cask where some of the resin had spilled, was equipped with two high range extremity dosimeters (one for each hand), a low range dosimeter for whole body exposure control, and a TLD badge. After assessing the situation, the foreman decided to personally complete the RWP 9516 work by manually cleaning the lid sealing area of resin. The individual's low range pocket dosimeter was periodically read during the work to control whole body exposure and indicated a total exposure of 425 mrem. The individual's thermoluminescent dosimeter (TLD), processed after the job showed a total 1130 mrem whole body exposure for the calendar quarter, 900 mrem attributable to this activity. A calibration check of the pocket dosimeter showed the instrument to be defective. The total exposure for this individual is within the limits prescribed by 10CFR20, but did exceed the licensee's administrative guidelines of 1000 mrem/quarter.

The high range dosimeters showed a total extremity dose of 4320 mrem gamma for the right hand and 3480 mrem gamma for the left hand. These values were also within the 10CFR20 limits of 18 3/4 rem per quarter.

The inspector discussed this event with Radcon Supervisor and expressed his concern that work had been allowed to continue after radiological conditions had substantially changed without performing an additional ALARA review. Though the Radiological Control Manual Chapter 3, Radcon Procedure 8.1, Radiological Work Permit, Revision 1, states that Radcon should initiate an ALARA review of a dose of greater than 200 mR for an individual or 1000 mR for a work party is expected, none is required. The inspector further noted that Radcon Procedure 8.1 contains provisions for terminating an RWP if warranted by changes in radiological status, as determined by Radcon personnel. The licensee acknowledged the inspector's comments, stating that future jobs would be carefully monitored to prevent recurrence.

The inspector observed portions of the decontamination of the Solid Waste Area and cask truck, verifying that radiological controls were properly implemented.

7. Refueling Preparations - New Fuel Receipt

The inspector reviewed procedure NSQC 10.2, "Fuel Assembly and Shipping Container Receipt Inspection," Revision 1, July 8, 1980, to verify that a technically adequate, approved procedure was used for the receipt, inspection and storage of new fuel. No inadequacies were identified.

The inspector reviewed the Fuel Assembly Receiving and Inspection Reports (NSQC 10.2, Attachment 6.1) for the 52 fuel assemblies received in shipments DLCF-1 through DLCF-5, to verify that the receipt, inspection and storage of the new fuel was accomplished in accordance with procedure NSQC 10.2. No unacceptable conditions were identified by the receipt inspectors. The inspector had no further questions in this area.

8. IE Bulletin Followup

Licensee responses to IE Bulletins were inspected for timely submittal, adequate corrective action, and dissemination to onsite management as discussed below.

IE Bulletin 80-05: Vacuum Condition Resulting in Damage to Chemical and Volume Control System (CVCS) Holdup Tanks. The inspector reviewed this bulletin and the licensee's response (DLC letter of June 16, 1980) which adequately addressed the concerns to the bulletin for the Pressurizer Relief Tank, Primary Drains Transfer Tanks 1 and 2, Coolant Recovery Tanks 4A and 4B, and the Volume Control Tank. The inspector noted, however, that there were several other tanks which had not been evaluated to determine if they could be subjected to potentially damaging vacuum conditions. The licensee agreed to extend the evaluation to the tanks in question. The licensee's action in this regard will be reviewed in a subsequent inspection.

IE Bulletin 80-18: Maintenance of Minimum Flow Through Centrifugal Charging Pumps Following Secondary Side High Energy Line Rupture. The inspector reviewed the licensee's response to this bulletin (DLC letter of September 24, 1980) and Emergency Operating Procedure E-0, verifying that the bulletin had been received and evaluated, the required modification made to prevent automatic closure of the coolant charging pump (CCP) miniflow isolation valves on safety injection actuation, and that emergency procedures had been modified to provide operator guidance on opening and closing the CCP miniflow isolation valves. The inspector had no further questions in this area.

IE Bulletin 80-23: Failure of Valves Manufactured by VALCOR Engineering Corporation. The inspector reviewed the licensee's response to this bulletin (DLC letter of December 15, 1980) which stated that no Valcon solenoid valves were in use at Beaver Valley, Unit 1. The inspector reviewed the licensee's records documenting their review, consisting of:

a memo listing all safety-related solenoid valves and the manufacturers, a memo of a phone contact with a Stone and Webster representative, (Stone and Webster had been listed in the bulletin as receiving some of the valves from Valcor), a memo of a phone contact with the W. J. Wooley, Co. (airlock supplier), and a memo referencing a check of spare parts. This documentation supports the licensee's conclusion that none of these valves are used at the site. The inspector had no further questions in this area.

9. Review of TMI Action Plan Requirements

The inspector reviewed licensee implementation of TMI Action Plan Items identified in NUREG 0737, Clarification of TMI Action Plan Requirements, published November 1980, with respect to the licensee letters identified below, the guidance of NUREG 0737, and other applicable documents as referenced by NUREG 0737.

Item II.E.4.1, Dedicated Hydrogen Penetrations. The licensee's response to NUREG 0737 guidance (DLC letter of January 26, 1980), describes the installation of the Hydrogen Recombiners at the site. A review of this response, the licensee's FSAR Sections 6.5 and 14.3.4.4, and the BVPS Operating Manual, Section 1.46, confirmed that the licensee's installation meets the requirements of 10CFR50.44, 10CFR50 General Design Criteria 54 and 56, and the NRR position as clarified in NUREG 0737, Item II.E.4.1. Inspector walkdown of the penetration piping confirmed the installation to be as described by the licensee's submittals. The inspector had no further questions in this area.

Item II.E.4.2.5a & b - Containment Isolation Dependability (Actuation Setpoint). The licensee's submittal to NRC dated December 31, 1980 provided the bases for no reduction or modification to the containment pressure setpoint for initiation of containment isolation. The submittal discusses the facility's subatmospheric containment design and the considerations for maintaining the existing setpoint. The inspector reviewed BVPS Operating Manual Section 1.16 and 1.47, finding the information contained in the letter to be consistent with existing system descriptions and operating procedures. This item was reviewed by NRC:NRR and found acceptable (NRC letter, Varga to Carey, dated December 11, 1981).

Item II.E.4.2.7: Containment Purge and Vent Valves Close on High Radiation. This requirement has been determined not to be applicable to Beaver Valley, Unit 1 because of the subatmospheric containment design and was deleted by a letter from the NRC to the licensee dated April 29, 1981. Subatmospheric containment designs do not permit opening purge and exhaust valves except in Cold Shutdown or Refueling conditions. Containment purge and exhaust valves are equipped with high radiation isolation signals for these conditions. Containment vacuum pump lines are separately equipped with isolation signals.

10. Emergency Preparedness Exercise - Personnel Accountability Drill.

On February 12, 1982 the inspectors witnessed portions of the licensee's accountability drill, performed to meet the requirements of the BVPS Emergency Preparedness Plan, Section 6.7.5 and NUREG 0654, Section J. The drill was conducted separately from the full scale NRC/FEMA drill of February 17, 1982 to minimize the impact of the current outage on both exercises. About 1000 additional non-DLC employees are currently onsite for the refueling/modification outage and were not included in the accountability drill.

Inspector drill observations were made from the Primary Assembly Area (Men's Locker Room), the Control Room, the Central Alarm Station, and the Nuclear Division administration building, with respect to:

- EPP/Implementing Procedure (IP) 7.2, Administration of EPP Drills and Exercises, Issue 6, Revision 3;
- EPP/IP 3.1.3, Administration Building Evacuation, Issue 6, Revision 4; and
- EPP/IP 3.2, Personnel Accountability, Issue 6, Revision 4.

The drill was to include limited participation by BVPS Unit 2 construction personnel (emergency/accountability coordinators). Participation was less than expected due to a misunderstanding of drill announcements and poor PA system performance. Unit 2 activities were observed by the BVPS Unit 2 resident inspector.

The inspectors attended the licensee's post drill critique, confirming that licensee observer findings were consistent with the inspectors'. The licensee met the accountability goal of 30 minutes specified by NUREG 0654. The inspectors' findings will be included in NRC:RI Inspection Report 50-334/82-04 for the full scale emergency response exercise.

11. Containment Hydrogen Recombiner Design Deficiencies

On December 15, 1981, Rockwell International, manufacturer of the BVPS-1 recombiners, notified NRC:HQ and the licensee of deficiencies in recombinder heater lead wire insulation. The vendor's evaluation concluded that normal testing combined with actual post-LOCA operation would result in failures after ten years in normal service. The BVPS-1 recombiners were delivered in 1974. The vendor will provide the licensee instructions for correction of the deficiencies.

The inspector confirmed that the licensee had received the vendor's notification and had initiated Station Modification Request (SMR) 543, dated February 3, 1982, to accomplish the vendor's recommendations. The SMR notes that action must be completed prior to 1984. The

inspector also confirmed that the modification requirements had been entered into the BVPS Commitment Action Control System, responsibility assigned for completion, and a required completion date of December 30, 1983 established.

12. Safety Injection Actuation Design

Because of a recent design error found at the Maine Yankee Nuclear Power Station which would have prevented actuation of the Safety Injection System for certain single active components failures, the inspector reviewed the design of the Westinghouse safeguards actuation circuitry for BVPS-1 with the Westinghouse Site Representative. This review verified that a similar design error does not exist in this circuitry. The inspector had no further questions in this area.

13. Review of NDE Techniques for Plant Modification Piping

On February 2-3, 1982, a region based inspector reviewed licensee and licensee contractor actions taken in response to Schneider Power Corporation Nonconformance Report (NCR) 288, regarding use of DLC Radiographic Procedure RT2 for radiography of USAS/ANSI B31.10 (1967) pipe welds. Procedure RT2 has been used on examination of field pipe welds used for safety related modifications in progress at BVPS-1.

NCR 288, dated December 23, 1981, indicated that the determination of sensitivity in B31.1 (which references ASME SC1) is different than that required in RT2. The penetrometer requirements are more severe in B31.1. The licensee conducted a series of radiographic tests utilizing the same techniques used for the affected pipe welds on pipes of similar wall thickness with the B31.1 and RT2 (SC111) penetrometers. The inspector reviewed the radiographs and Radiographic Interpretation Reports dated January 27, 1982 for 6" x 0.432", 10" x 0.365", 3" x 0.360", 6" x 0.134", and 6" x 0.240" tests. The radiographic techniques used are capable of meeting the sensitivity levels required by both B31.1 and RT2. The quality of the weld joints is therefore acceptable to B31.1. A review of the assignment of allowable stresses in ASME SC111 and B31.1 indicates that a higher allowable stress for SA106C is permitted in SC111 Table J-1.1 (19.4 KSI @ 650°F) than is permitted for B31.1 (17.5 KSI @ 650°F) indicating further conservatism for B31.1 fabrication when compared with SC111. (The higher allowable stress is permitted with the lower radiographic sensitivity).

The inspector reviewed DLC Memo DLCQA-3459 dated January 29, 1982 on the evaluation of the sample radiographs finding the licensee's evaluation and actions acceptable.

15. Review of Periodic Reports

The inspector reviewed the BVPS Monthly Operating Reports for October-December, 1981 to verify that information required to be reported by NRC requirements had been included. No inadequacies were identified.

16. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable, items of noncompliance or deviations. Two unresolved items were identified and are discussed in paragraphs 6.c and 6.d of this report.

17. 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 also provided to the licensee at the conclusion of the report period.