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

Region I

Report No. 50-334/81-15

Docket No. 50-334

License No. DPR-66 Priority -- Category C

Licensee: Duquesne Light Company

435 Sixth Avenue

Pittsburgh, Pennsylvania

Facility Name: Beaver Valley Power Station, Unit 1

Inspection at: Shippingport, Pennsylvania

Inspection conducted: June 1 - July 5, 1981

Inspectors: D. A. Beckman, Senior Resident Inspector — August 3, 1981 (date signed)

J. D. Hegner, Resident Inspector — August 3, 1981 (date signed)

_____ — _____ (date signed)

Approved by: E. G. Greenman, Chief, Reactor Projects Section No. 2A, DRPI — 8/26/81 (date signed)

Inspection Summary:

Inspections on June 1 - July 5, 1981 (Inspection Report No. 50-334/81-15).
Areas Inspected: Routine inspections by the resident inspectors (214 hours) of: Licensee action on previously identified inspection findings; plant operations; radiological controls; physical security; inoffice review of licensee event reports; onsite licensee event followup; IE Bulletin followup; and, licensee actions regarding reactor coolant system pressure isolation valve surveillance requirements.
Results: Noncompliances: None in 7 areas. Four in one area (Failure to maintain fire penetration barriers, paragraph 3.d; Failure to maintain operating procedures, paragraph 4; Failure to implement procedures, paragraph 3.d; Failure to maintain surveillance procedures, paragraph 3.d).

DCS IDENTIFICATION NOS. IE INSPECTION NO. 50-334/81-15

NO.	REPORT PARAGRAPH
50-334 - 810606	8
50-334 - 810522	4,5
50-334 - 810503	4
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DETAILS

1. Persons Contacted

R. Balcerek, Nuclear Engineering and Refueling Supervisor
J. Carey, Vice President, Nuclear Division
K. Grada, Superintendent, Licensing and Compliance
R. Hansen, Maintenance Supervisor
J. Kosmal, Radcon Supervisor
W. Lacey, Chief Engineer
L. Schad, Operations Supervisor
J. Sieber, Manager, Nuclear Safety and Licensing
J. Starr, Station Engineer
H. Williams, Station Superintendent

The inspectors also contacted other licensee and licensee contractor employees.

2. Licensee Action on Previously Identified Inspection Findings

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) Deficiency (80-20-09): Failure to maintain records of IEB reviews to substantiate submittals made to NRC for IEB 79-27. The inspector reviewed the licensee corrective actions as specified in DLC letter dated December 29, 1980 in conjunction with the review of IE Bulletin 79-27 discussed in paragraph 6 of this report. The inspector confirmed that the corrective actions as stated in the licensee's letter were acceptably implemented. The inspector additionally reviewed DLC Memoranda Nos. BVPS/LC:JDS:383 and 557 dated September 11, 1980 and December 22, 1980 respectively. These memoranda provided written instructions to personnel responsible for assemblage and maintenance of records substantiating licensee submittals to NRC. The instructions as issued provided adequate guidance for the types and content of such documentation. The inspector identified no unacceptable conditions.

(Closed) Unresolved Item (81-12-09): NRC to review DLC evaluation of preventive actions associated with feedwater regulating valve stem cracking. On June 8, 1981 the DLC Manager, Safety and Licensing, informed the inspector that the various vendor recommendations for preventive actions discussed in IE Inspection Report No. 50-334/81-12 had been evaluated and additional licensee actions planned. The vendor recommendations have been implemented with the exception of the recommendation to

instrument the valve stem(s). The licensee's evaluation of this recommendation determined that volumetric nondestructive examination to be performed at the next refueling outage (Cycle II-III) would determine if the corrective actions discussed in the above inspection report were effective. The results of the NDE will be evaluated to determine if additional modification of the valves or installation of valve stem instrumentation appears necessary. The inspector confirmed that this action has been entered into the licensee's internal commitment control system and that the Manager, Nuclear Operations, and the Supervisor, Quality Control, had been advised of the above to initiate action. The inspector had no further questions on this matter. The licensee's continuing actions will be reviewed during future routine inspections.

(Open) Unresolved Item (81-10-03): Review acceptability of DLC overtime controls per NUREG 0737, Item I.A.1.3. On June 15, 1981 the licensee provided additional clarifications of previous commitments and additional commitments for implementation of administrative control for overtime work. This submittal, made to NRC:RI, stipulated that overtime control would be extended to First Class Meter and Control Repairment (Instrument Technicians) but not to other station personnel such as electricians, mechanics, radiation technicians, licensed operators, and test personnel, although these individuals may perform safety related functions. The licensee letter provided the basis for the licensee's position for each of the above omitted personnel. At the close of this inspection, the licensee's submittal remained under review by NRC:RI. This matter will remain unresolved pending completion of that review and inspection of the licensee's commitment implementation pursuant to the DLC letter of June 15, 1981.

3. Review of Plant Operations

a. General

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

Additional plant tour activities relative to proper alignment/status of equipment important to safety are discussed in paragraphs 3.c(8) and 8 of this report.

Acceptance criteria for the above areas include the following:

-- BVPS FSAR Appendix A, Technical Specifications (TS)

-- BVPS Operating Manual (OM), Chapter 48, Conduct of Operations

-- OM 1.48.5 Section D, Jumpers and Lifted Leads

-- OM 1.48.6, Clearance Procedures

-- OM 1.48.8, Records

-- OM 1.48.9, Rules of Practice

-- OM Chapter 55A, Periodic Checks - Operating Surveillance Tests

-- BVPS Maintenance Manual (MM), Chapter 1, Conduct of Maintenance

-- BVPS Radcon Manual (RCM)

-- 10 CFR 50.54(k), Control Room Manning Requirements

-- BVPS Station Administrative Procedures (SAP)

-- BVPS Physical Security Plan (PSP)

-- Inspector Judgement

b. Areas Inspected

During the course of the inspection the inspectors made observations and conducted multiple tours of plant areas, including:

-- Control Room

-- Primary Auxiliary Building, except High Radiation Areas and Contamination Areas

-- Turbine Building

-- Service Building

-- Main Intake Structure

-- Main Steam Valve Room

-- Purge Duct Room

-- East/West Cable Vaults

-- Emergency Diesel Generator Rooms

-- Containment Airlock Area

-- Penetration Areas

-- Safeguards Areas

-- Various Switchgear Rooms/Cable Spreading Room

-- Protected Area

c. Observations

(1) Conformance with Technical Specifications

Through observation of Control Room monitoring instrumentation and annunciators, log review, and direct observation of selected equipment, the inspectors verified that instrumentation and systems required to support operations were in conformance with the Technical Specification (TS) Limiting Condition for Operations (LCO). Verification of conformance to the following Technical Specification LCOs was conducted frequently:

-- TS 3.1.2.2, Boric Acid Flowpaths

-- TS 3.1.2.6, Boric Acid Transfer Pumps

-- TS 3.1.2.8, Borated Water Sources

-- TS 3.1.3.1, Movable Control Assemblies Group Height

-- TS 3.1.3.2, Position Indicator Channels

-- TS 3.1.3.5, Control Rod Insertion Limits

-- TS 3.2.1, Axial Flux Difference

-- TS 3.3.3.1, Radiation Monitoring

-- TS 3.4.11, Pressurizer Relief Valves

-- TS 3.5.1, Accumulators

-- TS 3.5.2, ECCS Subsystems

-- TS 3.5.5, Refueling Water Storage Tank

-- TS 3.6.1.4, Containment Pressure

-- TS 3.6.1.5, Containment Temperature

-- TS 3.6.2.1, Containment Quench Spray System

-- TS 3.7.1.2, Auxiliary Feedwater System

-- TS 3.7.1.3, Primary Plant Demineralized Water

-- TS 3.7.3.1, Component Cooling Water System

-- TS 3.7.4.1, Reactor Plant River Water Systems

-- TS 3.8.1.1, AC Sources

-- TS 3.8.2.1, AC Distribution - Operating

In addition, the inspectors conducted periodic visual channel checks of Reactor Protection System and Engineered Safety Features instrumentation to confirm the availability of safety related equipment. The inspectors verified that selected instruments were calibrated, functional, and that demonstrated parameters were within Technical Specification limits. The inspectors independently verified valve and breaker positions for selected components in the following systems:

-- Chemical and Volume Control System

-- Low Head Safety Injection System

-- Containment Depressurization System

-- Auxiliary Feedwater System

-- River Water System

-- 4160V/480V/120V AC Electrical Systems

-- 125V DC Electrical System

-- Reactor Protection System

See paragraphs 3.c(9) and 8 of this report for additional verification activities.

(2) Radiation Controls

Radiation controls, including posting of radiation areas, the conditions of step-off pads, disposal of protective clothing, completion of radiation work permits, compliance with Radiation Work Permits and Radiation Access Control Permits, personnel monitoring devices being worn, cleanliness of work areas, radiation control job coverage, area monitor operability (portable and permanent), area monitor calibration, and personnel frisking procedures were observed on a sampling basis. The inspector also conducted independent radiation surveys of various posted areas to verify that radiation levels were in accordance with the posting.

(a) The following Radiation Access Control Permits (RACPs) were reviewed for completeness:

-- RACP 81-1-R, dated May 27, 1981, for PAB, Safeguards, Fuel and Decon Building, Outside Areas, Drum Line Storage for inspection and surveillance.

-- RACP 81-2-R, dated May 27, 1981, for Fuel Pool Leak Monitoring Room, Primary Water Pump Room and Outside Areas for inspection and surveillance.

-- RACP 81-3-R, dated May 27, 1981, for Security Surveillance of PAB, Safeguards, Fuel and Decon Buildings, Outside Areas, and all elevations.

-- RACP 81-4-R, dated May 27, 1981, for RBC - all elevations outside Crane Wall.

-- RACP 81-5-R, dated May 27, 1981, for PAB, Safeguards, Fuel and Decon Buildings, Outside Areas and all elevations for inspection and surveillance

(b) The inspector reviewed the following Radioactive Waste Discharge Authorization (RWDA) for completeness and verified that ongoing discharges were in conformance with the RWDAs:

-- RWDA - Gas, No. 509, for batch discharge from Gas Decay Tank 1B, dated June 23, 1981.

-- RWDA - Liquid, No. 1606, for discharge of Test Tank LW-TK-5B, dated June 10, 1981.

-- RWDA - Gas, No. 499, for batch discharge from Gas Decay Tank 1C, dated June 3, 1981.

-- RWDA - Liquid, No. 1598, for liquid waste discharge from Test Tank LW-TK-5A, dated June 5, 1981.

-- RWDA - Liquid, No. 1629, for liquid waste discharge from Tank BR-TK-7B, dated June 24, 1981.

-- RWDA - Liquid, No. 1636, for liquid waste discharge from Test Tank LW-TK-5A, dated July 2, 1981.

-- RWDA - Gas, No. 511, for batch discharge from Gas Decay Tank 1A, dated July 1, 1981.

-- RWDA - Liquid, No. 1637, for liquid waste discharge from Test Tank LW-TK-5B, dated July 2, 1981.

(c) The inspector confirmed that for Out-of-Service radiation monitors corrective actions were being implemented in a timely manner, appropriate compensatory sampling was being conducted as necessary, and that personnel performing radioactive waste discharges were cognizant of radiation monitor status.

(d) On June 2 and 9, 1981 the inspector reviewed the Radiation Monitor Setpoint Log maintained in the Shift Supervisor's office for completeness and to verify that certain setpoint changes had received prior OSC approval in accordance with BVPS administrative procedures. No discrepancies were noted by the inspector.

(e) On June 29, 1981 the inspector reviewed measures employed by the licensee during the periodic containment entries at power (as discussed in paragraph 3.c.4 of this report) to verify that adequate radiological controls were being implemented and that personnel exposures were being maintained As Low As Reasonably Achievable (ALARA). Radiation Work Permit RWP 7815, Adding Oil to the Reactor Coolant Pump, dated June 23, 1981 was reviewed.

The following documents associated with the above RWP were also reviewed:

-- RWP/RACP High Radiation Area Access Authorization.

-- Permit Acceptance/Dosimetry Data Record for RWP 7815.

-- Special Whole Body Monitoring Data.

-- Check Off List.

-- Respiratory Protection Requirements.

-- Anti-C Clothing Requirements.

-- Survey Data for "C Cubicle" dated June 23, 1981.

-- Status Report - Air Sampling Data.

-- Whole Body Exposure Tracking Information.

-- Pre-Work Discussion Record.

-- RWP Request Form.

No unacceptable conditions were noted by the inspector. The inspector discussed ALARA considerations with the cognizant Radcon Foreman in order to verify that all reasonable actions were being taken to minimize personnel exposure and confirmed that stay-times in the cubicle were being closely monitored. Possible alternative measures for filling the oil reservoir from a remote location were discussed. The inspector had no further questions.

(3) Plant Housekeeping

Plant housekeeping conditions including general cleanliness conditions, control of material to prevent fire hazards, maintenance of fire barriers, fire barrier penetrations, and verification of posted fire watches in these areas were observed. The inspector verified that selected fire extinguishers were accessible and inspected on schedule, that fire alarm stations were unobstructed, that Cardox systems were operable and that adequate controls over ignition sources and fire hazards were being maintained.

Fluid leaks. No fluid leaks were observed which had not been identified by station personnel and for which corrective action had not been initiated, as necessary.

Piping vibration. No excessive piping vibrations were observed and no adverse conditions were noted.

Selected pipe hangers and seismic restraints were observed and no adverse conditons noted.

(4) Control Room Observations

Control Room manning was observed periodically during the inspection on daily visits during the normal work week, on backshifts, and on weekends, and was confirmed to meet or exceed the requirements of Technical Specifications and the BVPS Operating Manual. In addition, the inspectors periodically observed shift turnovers to verify that continuity of operations was maintained and that personnel assuming responsibility for plant operation were fully cognizant of plant systems status. The inspectors periodically questioned shift personnel regarding their awareness of plant conditions, procedure changes, facility configuration, and knowledge of emergency procedures.

The inspectors toured the Control Room on a daily basis in order to:

-- Verify access to the Control Room was controlled in accordance with licensee procedures;

-- Review Shift Supervisor, Shift Foreman, Nuclear Control Operator, and Nuclear Operator logs and records to obtain information concerning operating activities and trends;

-- Conduct discussions with operators concerning reasons for selected lighted annunciators and verify that the reasons for them were understood and corrective action, if required, was being taken;

-- Verify the operability of required Reactor Protection System and Engineered Safety Features systems;

-- Verify boric acid concentrations, volume, temperature, and flowpaths were in conformance with Technical Specifications;

-- Verify by examining panel indications that the required emergency power sources were available; and

-- Verify by examining panel indications, log review, and interviewing operators that required containment configuration was established.

During power operation between June 6-28, 1981 "C" Reactor Coolant Pump Bearing Oil Reservoir Level Low annunciator (A3-82) alarm was activated on an intermittent basis (every several days). Containment entries by operators and Radiation Control Technicians were made on several occasions while at power to investigate the cause of the alarm, and refill the reservoir if necessary. (Inspector review of the radiological aspects of the containment entries and licensee actions to minimize exposure are discussed in paragraph 3.c(2) of this report.

The licensee initiated compilation of oil leak rate data for trending and quantification. Operator observations in the pump cubicle noted no indication of oil external to the pump. Based on discussions with the DLC Operating Supervisor, it was believed that the oil leaking from the reservoir was being vaporized by the heat of the coolant pump. Although the leakage did not appear to jeopardize safe plant operation, the licensee's actions to correct the leakage and minimize personnel exposure during any necessary containment entries will be routinely reviewed during future inspections.

Except as noted above and in paragraph 3.d below, inspector concerns or questions resulting from these daily reviews were acceptably resolved by licensee personnel.

(5) Surveillance Tests

(a) The inspectors reviewed completed surveillance tests to verify that: surveillance tests were being completed as scheduled; test results were being reviewed according to approved procedures; and, appropriate corrective actions were initiated as necessary. The following records of completed Operational Surveillance Tests (OST) were reviewed:

-- OST 1.44A.6, Chlorine Detection System and Control Room Breathing Air Header Bottles Operability Checks, Revision 6, completed June 24, 1981.

-- OST 1.33.1, Fire Protection System Monthly Inspection Test, Revision 29, completed June 23, 1981.

-- OST 1.3.1, Incore Moveable Detector System Normalization, Revision 6, completed June 22, 1981.

-- OST 1.11.10, Boron Injection Flowpath Power Operated Valve Exercise, Revision 28, completed June 23, 1981.

-- OST 1.7.1, Boric Acid Transfer Pump (ICH-P-2A) Operational Test, Revision 12, completed June 23, 1981.

-- OST 1.24.4, Steam Turbine Driven Auxiliary Feed Pump Test(IFW-P-2),Revision 20, completed June 23, 1981.

-- OST 1.16.1, Supplementary Leak Collection and Release Exhaust Fan and Remote Damper Component Test (Train A), Revision 3, completed June 11, 1981.

-- OST 1.24.2, Motor Driven Auxiliary Feed Pump Test (IFW-P-3A), Revision 20, completed June 12, 1981.

-- OST 1.11.13, Boron Injection Surge Tank Level Verification, Revision 25, completed June 29, 1981.

-- OST 1.6.2, Reactor Coolant System Water Inventory Balance, Revision 8, completed June 29, 1981.

-- OST 1.6.6, PORV Valve Position Check and Isolation Valve Test, Revision 10, completed June 29, 1981.

-- OST 1.7.1, Boric Acid Transfer Pump (ICH-P-2A) Operational Test, Revision 12, completed June 29, 1981.

-- OST 1.11.3, Boron Injection Flow Path Valve Position Exercise, Revision 20, completed June 29, 1981.

-- OST 1.33.7, Weekly Motor Driven Fire Pump Operation Test, Revision 29, completed June 29, 1981.

-- OST 1.13.4, 1B Recirculation Pump Dry Test, Revision 24, completed June 29, 1981.

-- OST 1.13.6, 2B Recirculation Pump (IRS-P-2B) Dry Test, Revision 24, completed June 10, 1981.

-- OST 1.36.8, AC Power Source Weekly Breaker Alignment Verification, Revision 21, completed June 6, 1981.

-- OST 1.36.7, Offsite to Onsite Power Distribution System Breaker Alignment Verification, Revision 18, completed June 6, 1981.

-- OST 1.2.1, Nuclear Power Range Channel Functional Test, Revision 19, completed June 8, 1981.

(b) The inspector observed performance of some or all of the following surveillance tests in order to verify that test instrumentation was calibrated; redundant systems or components were available for service, if required; approved procedures were used; and work was performed by qualified personnel:

-- OST 1.7.2, Boric Acid Transfer Pump (ICH-P-2B) Operational Test, Revision 12, performed June 25, 1981.

-- OST 1.7.8, Boric Acid Storage Tanks and RWST Level and Temperature Verification, Revision 17, performed June 25, 1981.

-- OST 1.36.2, Diesel Generator No. 2 Monthly Test, Revision 20, performed June 2, 1981.

-- OST 1.11.1, Safeguards Protection System Train A Test, Revision 25, performed June 5, 1981.

-- MSP 73.11, Radiation Process Monitor RM-RW-101 Component Cooling Heat Exchanger River Water Calibration, Revision 1, performed June 26, 1981.

(6) Temporary Operating Procedures (TOP) and Special Operating Orders (SOO)

The inspectors reviewed Temporary Operating Procedures and Special Operating Orders to determine whether: the procedures had been properly reviewed, approved and issued; that plant operations or activities directed by the procedures and orders were in accordance with the requirements of the facility TS and QA program; and that procedures were properly implemented and their performance documented.

-- SOO 81-8, Nuclear Instrument Systems/Liquid Waste Systems/ Logs, issued June 22, 1981.

-- SOO 81-7, Battery OST, issued June 16, 1981.

-- SOO 81-6, Notifications-Security, issued June 15, 1981.

-- SOO 81-4, Reactor Operator Logging, issued June 3, 1981.

-- TOP 81-15, Makeup to SI Accumulators Using Temporary Pump, issued May 26, 1981, effective until incorporated into BVPS OM.

-- TOP 81-16, Circulating Water Chlorinator Startup and Shutdown, issued May 29, 1981, effective until incorporated into BVPS OM.

-- TOP 81-17, Two Man Rule in Primary Auxiliary Building, Diesel Generator Building, Switchgear Building, Screenhouse and Chemical Addition Building, dated June 8, 1981.

-- TOP 81-18, Using HCF Heat Exchanger for Cooling Valve Stem Leakoff to Primary Drains Tank (DG-TK-1), issued June 10, 1981, effective until VSLO leak rate corrected (not to exceed Cycle II-III refueling).

-- TOP 81-19, Automatic Operation of the Circulating Water Chlorination, issued June 11, 1981. Effective until incorporation into BVPS OM.

-- TOP 81-20, Draining LHSI Pump 1A casing to Safeguards Sump, issued June 12, 1981, effective for one time use only.

-- TOP 81-22, Operation with Both Degasifers Out of Service, issued June 17, 1981, (reference: paragraph 9 of this report).

-- TOP 81-23, Pumping Water from Solid Waste Area to North Sump, issued June 19, 1981, effective until transfer is complete, (reference: paragraph 10 of this report).

-- TOP 81-24, Two Man Rule in Primary Auxiliary Building, Diesel Generator Building, Switchgear Building, Screenhouse, and Chemical Addition Building, issued June 22, 1981, effective until June 30, 1981, supercedes TOPs 81-17 and 81-21 (same title).

(7) Equipment Control Procedures

Equipment control procedures used by the licensee to restrict plant activities were examined to verify that tags were properly filled out, posted, and removed as required by approved procedures. The inspectors reviewed logs and records for completeness.

(a) On June 23, 1981 the inspector reviewed the Out of Service (OOS) log for completeness and, on a sampling basis, confirmed that for posted OOS stickers, corresponding entries had been entered in the log. The inspector noted no discrepancies between the posted stickers and log entries but did observe several poorly annotated log entries. These discrepancies were promptly brought to the attention of the Acting Operations Supervisor for corrective action. On June 29, 1981 the inspector confirmed through rereview of the OOS log that the identified discrepancies had been corrected. The inspector had no further questions.

(b) On a daily basis between June 6 - July 5, 1981 the inspectors verified through independent observation/verification of valve position and the presence of locking devices that the licensee's administrative controls for identified ESF valves were acceptable.

Additional observations of equipment position/status relative to a valve mispositioning event are discussed below and in paragraph 8 of this report.

(8) As a result of the valve mispositioning event discussed in paragraph 8 of this report, the inspectors conducted special verifications of the status and alignment of equipment important to safety. These tours and observations were conducted on a weekday, selected nightshift, and selected weekend shift basis June 6 through 30, 1981 to verify proper positioning and general condition of valves, switchgear, and instrumentation, including:

-- Manual, padlocked Engineered Safety Feature (ESF) valves and breakers;

-- Selected ESF instrumentation properly valved in;

-- Auxiliary Feedwater System valves, breakers, and instrumentation properly aligned and locked (if required);

-- Selected containment isolation valves properly positioned, operating air aligned, correct remote position indication, and in generally good condition;

-- Visual inspection of selected electrical containment penetrations for general integrity and gas pressurization.

-- General condition of electrical load centers, cable tunnels, cable spreading areas, and instrument racks.

-- Main control board and Control Room back panel instrumentation and equipment status lights for normal indication;

-- General condition of equipment in the plant areas listed below;

-- Manual and remotely operated valves (not subject to locking) properly aligned;

-- Compliance with the provisions of Immediate Action Letter No. 80-25 (reference: paragraph 8 of this report);and,

-- Review of documentation of licensee security and plant operations tour activities.

The areas below were toured by the inspectors on a rotating basis to ensure complete coverage of all sensitive plant areas over a 2-3 day period. Except as noted in paragraph 3.d below, no unacceptable conditions were identified.

-- Control Room

-- Cable Spreading Mezzanine

-- West Cable Vault

-- East Cable Vault

-- Non-Vital Switchgear Room

-- Emergency Switchgear Room

-- Vital Battery Rooms

-- Remote Shutdown Panel/Reactor Protection System/ESF Cabinets

-- Reactor Trip Breaker Room

-- Primary Auxiliary Building (767, 752, 737, and 722 ft. elevations)

-- Solid Waste Building

-- Main Steam Valve Room

-- MCC Room

-- Main 10 Ton Cardox Room

-- Steam Generator Drains Tank Room

-- Containment Airlock Area

-- Primary Grade Water Pump Room

-- Purge Duct Room

-- Safeguards Area (Penetrations Area/Quench Spray Pumps/ Outside Recirculation Spray Pumps/Auxiliary Feedwater Pumps/Hydrogen Recombiners/Analyzers)

-- Fuel Building

-- Emergency Diesel Generator Rooms

-- Intake Structure

-- Demineralized Water Storage Tank

-- Chemical Additional Building

(9) Plant Security/Physical Protection

Implementation of the Physical Security Plan was observed in the areas listed in paragraph 3.b above with regard to the following:

-- Protected Area barriers were not degraded;

-- Isolation zones were clear;

-- Persons and packages were checked prior to allowing entry into the Protected Area;

-- Vehicles were properly searched and vehicle access to the Protected Area was in accordance with approved procedures;

-- Security access controls to Vital Areas were being maintained and that persons in Vital Areas were properly authorized;

-- Security posts were adequately manned, equipped, and security personnel were alert and knowledgeable regarding position requirements, and that written procedures were available; and

-- Adequate lighting maintained.

d. Findings

(1) During Protected Area tour on June 1-3, 1981 the inspectors observed dampers, air intakes and similar openings in Vital Area structures which appeared to have less than adequate physical security barriers. These barriers were equipped with light screen covers which did not appear to provide sufficient deterence to forcible entry. This matter was informally referred to NRC:RI management for review. Based on that review, on June 24, 1981 the inspector advised the Station Office Manager that additional strengthening of these barriers appeared necessary. On June 25, 1981 the inspector toured the identified areas with the Station Security Assistant, Onsite Engineering Group and architect-engineer personnel. Based on the above and additional discussions between the inspector and licensee security supervision, the Station Security Assistant advised the inspector that the specifically identified barriers would be strengthened by about July 30, 1981. Additionally, the licensee intends to survey other plant areas for similar installations to insure that all such barriers or applications are similarly strengthened. The inspector acknowledged the licensee's commitment and stated that this matter would remain unresolved pending completion of the committed licensee actions and review by the NRC:RI. (81-15-01).

(2) During routine observation of surveillance activities (reference: paragraph 3.c(5)(b) of this report) the inspector observed licensee maintenance personnel performing a calibration of the Component Cooling Heat Exchanger River Water Radiation Monitor (RM-RW-101) following monitor repairs. The DLC Meter and Control Repairmen (MCRs) were using Maintenance Surveillance Procedure (MSP) No. 43.11, Radiation Process Monitor RM-RW-101, Component Cooling Heat Exchanger River Water Calibration, Revision 1, and had progressed to Step 7 (input of test signals) of the instructions. The inspector observed that the "Approved for Use" validation stamp on the cover page of the MSP had expired. The approval stamp stated: "Approved for Use from 5/18/81 to 5/23/81." This discrepancy was immediately brought to the attention of the work party. The calibration was promptly terminated and the channel restored to normal. The inspector discussed the matter with the cognizant maintenance foreman and Maintenance Supervisor who stated that the procedure had originally been scheduled for performance in May, 1981 but had been delayed due to higher priority maintenance requirements. The Maintenance Supervisor further stated that a review would be conducted prior to implementing MSP 43.11, Revision 1, to assure that changes, if any, to the procedure were incorporated in the approved revision.

Failure to assure that an approved copy of MSP 43.11 was available for use resulting in the partial implementation of an unapproved copy is contrary to 10 CFR Part 50 Appendix B, Criterion VI, Document Control and BVPS Station Administrative Procedures, Chapter 8, Maintenance, and constitutes an item of noncompliance. (81-15-02).

(3) During plant tours on June 6 and 7, 1981 the inspector observed the fire barrier door on the 722 foot elevation between the Primary Auxiliary Building and Safeguards Area to be open on at least three occasions. The installed door closing mechanism had been damaged and differential ventilation air pressure between the two areas pushed the door in the open direction. Although door latch mechanism appeared to function properly it appeared that personnel using the door did not attentively ensure the door to shut after normal passage. This condition was identified to shift supervision by the inspectors and door closer repairs completed on June 8-9, 1981. During another plant tour on June 25, 1981 the inspectors observed the posted fire door leading from the 752 foot elevation of the Primary Auxiliary Building to the elevator stairwell to be open. In this case, the door appeared to be held open by full extension

of the door closer and with the door closer fuseable link disconnected. TS 3.7.15 requires all penetration fire barriers protecting safety related areas to be functional. When one or more such fire barriers are nonfunctional the TS requires establishment of a continuous fire watch on at least one side of the affected penetration within one hour. The examples identified above had existed for indeterminate lengths of time and had not been reported to station supervision prior to the inspectors' identification. During IE Inspection No. 50-334/81-10 the inspectors had identified an apparently isolated case of an open unattended fire door. That condition was identified to the Station Superintendent for additional management attention. The licensee had previously been found in violation of TS 3.7.1.5 during IE Inspection No. 50-334/80-06. Failure to maintain fire barrier penetration (fire door) integrity per TS 3.7.1.5 on June 6-7 and 25, 1981 constitutes a repetitive item of noncompliance. (81-15-03).

(4) On June 25, 1981, 12:00 a.m.-8:00 a.m. shift, operators attempted performance of OST 1.47.1, Containment Airlock Test, Issue 1, Revision 22. Test preparations require that the outer airlock door be opened as one of the initial steps of the surveillance test procedure. When the operators attempted to open the door using normal hydraulic controls, the rotating breech ring appeared to jam prior to disengaging the door breech lock, leaving the door partially unsealed but incapable of either full opening or full shutting. TS 3.6.1.3 requires the containment airlock to be operable during power operation. With the airlock inoperable it must be restored to operable status within 24 hours or the station must be placed in Hot Standby condition within the next 6 hours and in Cold Shutdown condition within the following 30 hours. The licensee declared the airlock inoperable as required and initiated maintenance. The inspectors became aware of this matter via routine log review at about 7:00 a.m. on June 25, 1981.

About 9:45 a.m., June 25, 1981 maintenance personnel fully rotated the breech ring to the open position with a chain fall and portable rigging. Upon inspection of the door mechanism and accessories the maintenance crew found the air supply to the door O-ring test port pressurized. With the door shut the air pressurization of the O-ring seals would tend to force the door hard against the breech lock and result in the observed jamming. The air supply was temporarily isolated using a test valve (not normally used for system isolation; normally in the open position). With the air pressure removed from the seal cavity the door and breech assembly operated smoothly. The

inspectors observed the airlock door operation immediately following the isolation of test air confirming the above. The door was successfully retested in accordance with OST 1.47.1 on the afternoon of June 25, 1981, satisfying the conditions of TS 3.6.1.3 for continued power operation.

During the period June 25-July 2, 1981, the inspectors and the licensee reviewed the circumstances by which test air pressure could have been imposed on the seals. The inspectors determined that the personnel airlock had been satisfactorily tested last on June 22, 1981. Since that test, two additional containment entries had been made through the door on June 23, 1981. Following the discovery of air pressure on the seals, plant operators rechecked valve lineups during performance of OST 1.47.1 on the afternoon of June 25, 1981. Based on discussions with those operators and station management the inspectors determined that all valves were found properly positioned except the test valve inside the airlock (discussed above) that was shut by maintenance personnel. Based on the foregoing, it appears that one or more air isolation valves were shut but not tightly seated during the last performance of the OST (June 22, 1981) permitting abnormally high leakage through the valves to pressurize the seal cavity. No indication of actual valve mispositioning or tampering was observed.

The Station Chief Engineer informed the inspectors that the results of the licensee's investigation would be documented in the Station Incident Report and Licensee Event Report. As of July 2, 1981 no further difficulties had been encountered in the operation of the airlock door. This matter will remain unresolved pending NRC:RI review of the licensee's incident evaluation and corrective or preventive actions (if any). (81-15-04).

During observation of maintenance activities at the airlock door on the afternoon of June 25, 1981, the inspectors noted that airlock Operating Procedures posted on the airlock door for referral during use were obsolete. BVPS OM Sections 1.47.4.a, Issue 1, Revision 2, and 1.47.4.b, Issue 1, Revision 3, were conspicuously posted on the outer airlock door adjacent to the door control panel. The current revision of OM Section 1.47.4 as contained in the Shift Supervisor's controlled copy manual was Issue 2, Revision 1, effective September 1, 1980. That revision of the OM had been temporarily superceded by Temporary Operating Procedure (TOP) 81-14, Temporary Operating Procedure for Personnel Airlock, issued May 15, 1981. The TOP had been issued to provide modified operating practices for the

door controls pending installation of modifications to correct previously identified operating deficiencies. Failure to maintain up-to-date Operating Procedures for the containment personnel airlock door at the point of use is contrary to TS 6.8.1.8 and US NRC Regulatory Guide 1.33, Quality Assurance (Operations) and constitutes an item of noncompliance. (81-15-05).

This matter was immediately identified to the Shift Supervisor. The obsolete procedures were immediately removed from the airlock door.

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:

*	81-047/03L	High Head Safety Injection Pumps Supply Valve Found Shut
	81-048/03L	RHR Pump Suction Valve Inoperable
	81-050/03L	Control Room Chlorine Detectors Inoperable
	81-051/03L	Containment Airlock Failed Type "C" Test
	81-052/03L	Control Room Chlorine Detectors Inoperable
*	81-053/03L	Containment Mechanical Vacuum Pump Inadvertently Isolated

Additional inspector review of LER 81-042/03L, Apparent Failure of Pressurizer PORV Block Valve, and LER 81-048/03L, Inoperable RHR Pump Section Valve, noted that the licensee had assembled task forces to investigate the associated problems and identify potential additional corrective measures. (Onsite Licensee Event followup regarding LER 81-042/03L was conducted and documented in IE Inspection Report 50-334/81-12). At the exit meeting for this inspection the inspectors requested the licensee to issue supplemental LERs providing the results of the task force findings for the problems identified above. The Chief Engineer committed to issuing the reports and stated that the expected target date for completion of the task force efforts was August 30, 1981. Confirmation of the additional submittals and review of the task force's findings/subsequent DLC actions will be examined during future inspections. (81-15-06).

* - Denotes those reports selected for onsite followup.

5. Onsite Licensee Event Followup

For those LERs selected for onsite followup (denoted by asterisks in paragraph 4), the inspector verified that the reporting requirements of the Technical Specifications and BVPS OM Section 1.48.9.D, Miscellaneous Reports, had been met, that appropriate corrective action had been taken or planned, that the event was reviewed by the licensee as required by Technical Specifications and the BVPS-1 Station Administrative Procedures Chapter 4, Plant Operations Group - Incident Reporting, and that continued operation of the facility was conducted in accordance with Technical Specifications and did not constitute an unreviewed safety question as defined in 10 CFR 50.59(a)(2). The following findings relate to the LERs reviewed onsite:

LER 81-042/03L - High Head Safety Injection Pumps Supply Valve Found Shut, was followed by the inspectors during the event as discussed in paragraph 8 of this report and in IE Investigation Report 50-334/81-16.

LER 81-053/03L - Containment Mechanical Vacuum Pump Inadvertently Isolated. On May 22, 1981 a containment mechanical vacuum pump flowpath was used to obtain a containment air sample. The discharge flowpath was inadvertently isolated by the Radiation Control Technician while investigating a possible problem in the attached portable sampling rig.

Inspector review of the applicable procedure and discussion with the cognizant shift supervisor determined that the procedure contained certain steps which required valve manipulations by the technician in more than one location. The time delay inherent in traveling between the locations and some ambiguity in certain procedure steps resulted in the technician deadheading the pump while adhering to the procedure. Inspector review of Radcon Procedure 7.7, Containment Atmosphere Sampling Using Containment Vacuum Pumps, Revision 1, confirmed that on June 23, 1981 the licensee had modified the procedure (as stated in the LER) to ensure that the vacuum pump was not deadheaded during implementation of the procedure. The inspector also confirmed through discussions with the Radcon Foreman that Radiation Control Technicians had received training in the revised procedure. The inspector had no further questions.

6. IE Bulletin Followup

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

IEB 80-09: Hydramotor Actuator Deficiencies. The IEB identified problems with Hydramotor Valve Actuators supplied by a particular vendor and identified actions to be taken by the licensee should such actuators be used in safety related applications. The DLC response to this IEB (DLC letter, dated June 4, 1980) stipulated that no Hydramotor Actuators are installed at the Beaver Valley Power Station. On June 4-5, 1981 the inspector reviewed DLC Memorandum No. BVPS:JES:19, Review of IE Bulletin 80-09, dated May 20, 1980. This memorandum documented the reviews conducted by the licensee to establish that no Hydramotor Actuators are utilized in BVPS-1 safety related systems. The memorandum documented the method of review, references used, the bases for the determination and appeared to adequately substantiate the licensee's conclusion. On June 5, 1981 the inspector reviewed the Station Engineering files which included the detailed records of the above review. During routine inspection tours documented in paragraph 3.b of this report, the inspectors periodically observed valve actuators, confirming that none of the actuators observed were of the Hydramotor type addressed by the bulletin. No unacceptable conditions were identified.

IEB 81-03: Flow Blockage of Cooling Water to Safety System Components by CORBICULA SP. (Asiatic Clam) and MYTILUS SP. (Mussel). This IEB involved the presence of Asiatic clams in cooling water supply systems which had or could result in significant flow blockage of cooling water to safety related equipment. The inspector reviewed licensee's submittal (DLC letter, dated May 26, 1981) and following substantiating documentation:

-- Surveillance and Test Engineering Results Reports, BVPS 1.1 - 2.30.1 and 1.1 - 2.30.2, Head Capacity Curve for WR-P-1A and -1B Following Pump Modifications, dated January 19, 1981 and August 29, 1980 respectively;

-- Maintenance Work Requests Nos. 810847, 810848, 810781, Inspection and Cleaning of the 1A, 1B, and 1C Reactor Plant Component Cooling Water Heat Exchangers;

-- OST 1.30.2, Reactor Plant River Water Pump 1A Test, Revision 28;

-- OST 1.30.3, Reactor Plant River Water Pump 1B Test, Revision 28;

-- OST 1.30.10, Quarterly Silt Check - Main Intake Structure, Revision 29;

-- OST 1.33.6, Fire Protection System Annual Test, Revision 29;

-- OST 1.33.3, Fire Protection System Drain Test, Revision 25;

-- OST 1.33.4, Fire Protection System Hydrant Test, Revision 25.

The licensee appears to have adequate methods in place for preventing and detecting flow blockage or degradation due to clams, mussels or shell debris based on the recent history of clam and mussel presence in the vicinity of the station. This history is established by the prior inspection records discussed in the licensee's submittal and reviewed above. The inspector identified no unacceptable conditions and had no further questions on this matter.

IEB 79-27: Loss of Non-Class 1E Instrumentation and Control Power System Bus During Operation. The licensee actions in response to IEB 79-27 were previously reviewed during IE Inspection No. 50-334/80-20. During that review, the inspector found that the licensee had not conducted a review of DC Instrument and Control Power Systems. On October 21, 1980 the licensee submitted a supplemental response reporting that the required reviews of DC systems had been completed, that no plant modifications were required, and that appropriate procedures for loss of DC buses had been promulgated. On June 3, 1981 the inspector confirmed the licensee's actions as stated in the DLC letter of October 21, 1980 to be complete and reviewed the following associated documentation:

-- Supplemental DLC response to IEB 79-27, dated October 21, 1980;

-- DLC Memorandum, T. E. Kuhar to F. J. Lipchick, Methods and References Used in Developing Abnormal Procedures for Loss of a DC Bus, dated October 16, 1980;

-- Onsite Safety Committee Meeting Minutes No. BV-OSC-135-80, meeting on October 15, 1980, review of BVPS OM Section 1.39.4, Issue 1, Revision 6, Abnormal Procedures for Extended Loss of 125V DC Switchboards Nos. 1, 2, 3 and 4;

-- OSC Meeting Minutes No. BV-OSC-147-80, meeting on October 29, 1980, review of DLC Supplemental Response to IEB 79-27;

-- BVPS OM Sections 1.39.4.k, l, m, and n, Abnormal Procedure, Extended Loss of 125V DC Switchboards, Issue 2.

The inspector confirmed that step-by-step instructions for response to loss of DC Switchboard and its effects including cooldown of the Reactor Coolant System were included in the procedures. The procedures individually addressed operation of a CVCS, RCS, MS, SI, FW, and BR systems, the EDGs, and other miscellaneous equipment under loss of power conditions.

The inspectors had no further questions regarding the licensee's actions; no unacceptable conditions were identified.

7. Review of Licensee Actions Taken in Reponse to NRC Order for Modification of License Concerning Primary Coolant System Pressure Isolation Valves

NRC review of postulated accidents has determined that intrasystem leakage can result in loss of coolant accidents of significant magnitude. As a result of these reviews and studies, an NRC Order Modifying License was issued to DLC on April 20, 1981 requiring periodic leak testing of certain check valves in the Low Head Safety Injection (LHSI) System. Additional TS Limiting Conditions for Operation (LCO) for operability of these valves were issued with the Order. On June 29-30 and July 6, 1981, the inspectors reviewed licensee actions taken in response to the order, verifying compliance with the conditions of the order and T

The following documents were used as guidance by the inspector in determining the acceptability of licensee actions in this matter:

-- NRC Safety Evaluation Report for BVPS Unit 1, Primary Coolant System Pressure Isolation Valves (WASH 1400, Event V), dated April 20, 1981;

-- NRC Technical Evaluation Report, Primary Coolant System Pressure Isolation Valves, for DLC Beaver Valley Unit 1, dated October 24, 1980;

-- S&W Drawing No. 11700-RM-167, Safety Injection System, Sheets 1 and 2.

In response to prior irformal discussions with NRC:NRR regarding the need for periodic seat leakage testing of the LHSI check valves, the licensee had previously developed a surveillance test prior to imposition of the Order and TS requirements. The inspector reviewed OST 1.11.16, Verifying That SI Check Valves to Cold Leg Loops Seat Properly, Revision 25, conducted April 12, 1981, to determine whether the test procedure satisfied the TS LCO surveillance requirements.

Technical review by the inspector determined that the test was adequate for determining whether leakage through the subject check valves existed. The inspector noted that the procedure provided for leakage detection by means of monitoring pressure changes to identify the existence of leakage. The completed test identified no leakage. The inspector, however, had the following concerns regarding portions of the test procedure:

-- The TS surveillance requirement requires each check valve to be tested. Of the six check valves tested by the existing OST, only three are tested individually. A common leakage test is performed for check valves 1SI-10, 11, and 12. The inspector expressed his concern to the Nuclear Operations Supervisor that,

in the event a common leakage test identifies a leakage rate in excess of the TS allowable value, the procedure should be capable of identifying the specific valve(s) and quantifying the individual leak rate(s).

-- Several discrepancies between the OST procedural requirements and data from April 12, 1981 test performance were noted. Specifically the procedure required leakage testing of check valves 1-SI 23, 24, and 25 at test pressures of about 500 psig. The test pressures logged for the three valves ranged from 1200 to 1800 psig. In addition, the inspector expressed concern that these differences had not been noted by DLC personnel during review of the completed OST. The Nuclear Operating Supervisor stated that additional time would be required to investigate the discrepancies, determine their cause and take corrective action, if necessary.

-- Revision 25 of the OST did not appear to provide adequate means for quantifying the leakrate past any check valve (including those tested individually) that had been identified as leaking. The procedure did not include adequate controls for accurate measurement of actual leakage vs residual water in downstream piping.

-- For check valves installed in series, the procedure had no provision for measuring simultaneous leakage of both valves.

The inspector concluded that the test was acceptable for determining whether any check valve leakage occurred and noted that none had been identified, the acceptability of the licensee's procedure in support of the TS LCO during future surveillance tests is unresolved pending additional investigation by the Nuclear Operating Supervisor regarding the inspector's concerns identified above prior to next implementation of the OST. (81-15-07).

The inspector also noted during his review that the OST failed to include an adjustment for leak rates obtained at lower than functional (design) pressure as assumed in Section 2.2.2 of the referenced Technical Evaluation Report. This matter was discussed with the Senior Compliance Engineer on June 30. This matter will remain unresolved pending evaluation by DLC for applicability of the correction factor to the DLC surveillance procedure. (81-15-08).

7. Manual Suction Valve for High Head Safety Injection (HHSI) Pumps Found Mispositioned

A manual valve (1SI-26), in the High Head Safety Injection Pumps' common suction line was found shut during a routine operator tour at about 1:00 a.m. on June 6, 1981. The valve was immediately reopened. This valve, which is checked by operators each shift, had been reported

open at about 4:30 p.m., June 5. With the valve shut, emergency core cooling water from the Refueling Water Storage Tank would not have been available to the three HHSI pumps for high pressure injection of water into the core under emergency conditions. The chain and padlock which normally secure this valve in the open position were not found.

Additionally, about 9 a.m., June 5, 1981, similar locks and chains were found removed from three Auxiliary Feedwater Pumps' manual suction isolation valves but the valves were all in their normally open position. These locks and chains also were not found. The licensee notified the NRC Operations Center of the above events at about 1:40 a.m., June 6, 1981, via the Emergency Notification System. Upon discovery of SI-26 being shut, the licensee immediately isolated the plant vital areas and implemented additional security precautions.

The Senior Resident Inspector was also notified by the licensee and responded to the site about 6 a.m. The Federal Bureau of Investigation (Pittsburgh, PA office) was notified by the licensee about 1:30 p.m., June 6. NRC and licensee followup and investigative activities are documented in IE Investigation Report No. 50-334/81-16. The resident inspectors provided liaison,consultation and support for NRC and FBI investigation activities.

On Sunday, June 7, 1981, the Senior Resident Inspector confirmed the continuing licensee implementation of vital area isolation and access control measures, augmented security and plant operator tours, and plant operating status. The inspector toured the plant vital areas with the DLC Nuclear Shift Supervisor, independently verifying proper positioning and general condition of valves, switchgear, and instrumentation important to safety, including:

-- Manual, padlocked Engineered Safety Feature (ESF) valves and breakers;

-- Selected ESF instrumentation properly valved in;

-- Auxiliary Feedwater System valves, breakers, and instrumentation properly aligned and locked (if required);

-- Selected containment isolation valves properly positioned, operating air properly aligned, correct remote position indication, and in generally good condition;

-- Visual inspection of selected electrical containment penetrations for general integrity and gas pressurization;

-- General condition of electrical load centers, cable tunnels, cable spreading areas, and instrument racks.

-- Main control board and back panel instrumentation and equipment status lights for normal indication;

-- General condition of equipment in the Primary Auxiliary Building, Safeguards Area, Switchgear Rooms, and associated areas;

-- Lockout of vital area doors, established by the licensee as an interim access control;

-- Confirmation of compliance with two-man access rule for vital areas; and,

-- Review of documentation of licensee security and plant operations activities.

No unacceptable conditions were identified. The inspectors regularly toured plant areas performing similar verifications through the next two weeks as documented in paragraph 3 of this report.

On June 9, 1981, NRC:RI issued Immediate Action Letter (IAL) No. 81-25, documenting licensee commitments to maintain augmented vital area access control, security tour, plant operations tour, and ESF equipment check activities (as discussed in IE Investigation Report No. 50-334/81-16) until further notification from NRC:RI. The inspectors verified, on a daily basis, licensee compliance with the provisions of the IAL by direct observation of licensee activities during routine and special inspector tours documented in paragraph 3 of this report.

At the end of this inspection, the licensee, NRC and FBI investigations continued and the provisions of IAL 81-25 remained in effect.

8. Unusual Occurrence - Inadvertant Radioactive Release to Plant Spaces and Gaseous Waste System

The facility is equipped with two Boron Recovery (BR) System degasifiers which, during normal operation, strip dissolved gases from Reactor Coolant prior to storage. Degasifier influent coolant is provided from either the Chemical and Volume Control System (CVCS) letdown flowpath and/or Primary Drains System tanks via drain pumps. Stripped gases are diverted to the Gaseous Waste (GW) System for discharge or deferred discharge following decay.

On June 16 and 17, 1981, respectively, the recirculation pumps for each of the degasifiers failed, rendering both units inoperable. Without degasification, coolant forwarded for tank storage would evolve radioactive gas directly to storage (Coolant Recovery) tank atmosphere where the gases would be swept into the GW discharge header for direct discharge without decay. To accommodate the degasifier failures while minimizing GW radioactive discharges, the licensee had established Temporary Operating Procedure

(TOP) 81-22, Operating With Both Boron Recovery Degasifiers Out of Service, dated June 17, 1981. The TOP established a flowpath from the Primary Drains Tank to the Coolant Recovery Tanks via the idle 1B degasifier and required minimization of CVCS coolant diversion to the Coolant Recovery Tanks. This resulted in the 1B degasifier being full of water at system static pressure (several pounds) rather than operating partially full as in the degasification mode. The degasifier is equipped with a vapor space relief valve set at 50 psig that relieves to the GW discharge header via the sweep gas subsystem.

Discussion of Incident

TOP 81-22 was issued and its temporary flowpaths established by about 4:00 p.m., June 17, following failure of the second degasifier. All affected equipment was performing as expected. At 5:28 p.m. the 1B GW fan unexpectedly tripped. Attempts to start both the 1A and 1B fans were unsuccessful. About the same time, maintenance personnel repairing the 1B degasifier reported water spraying from above the unit. Control Room operators immediately secured water flow from CVCS and the Primary Drains Tank to the degasifier, initiated a precautionary evacuation of the Primary Auxiliary Building (PAB) and dispatched personnel for inspection of the GW fans. The fans and associated equipment were found full of water, apparently from inadvertant lifting of the degasifier vapor space relief valve. The relief valve had lifted when CVCS letdown flow, previously aligned to the Volume Control Tank (VCT) had spuriously diverted to the degasifier, pressurizing the unit to/above the relief valve setpoint. With GW fans idle, gases normally swept from tanks and trenches apparently began to evolve into plant spaces. At 5:39 p.m. the Shift Supervisor declared an Unusual Event per the BVPS Emergency Preparedness Plant (EPP).

About 6:00 p.m. a High alarm was actuated on the GW Particulate and Gas Radiation Monitor channels (RM-GW-108A & B respectively) followed shortly by a High-High alarm on RM-GW-108A. Concurrently, a High alarm was actuated on RM-VS-101A, Ventilation Vent Particulate Radiation Monitor. Radcon sampling of the PAB and discharge flowpaths was begun immediately. Following initial response to the above, state, local and federal agency notifications of the event were begun at about 6:40 p.m. The Unusual Event condition was cancelled at 9:10 p.m. following collection and evaluation of radiological data and reduction in building and discharge airborne radioactivity levels.

Additional licensee investigation found that about 400 gallons of coolant had been relieved to the GW piping, flooding the GW fans and filters. Leakage from the fan and filter enclosures had resulted in spillage onto the adjacent floor resulting in loose surface contamination up to 50,000 nCi/100 cm^2. The flooded equipment was drained, including the GW piping loop seal at the base of the cooling tower, by about 10:00 p.m. RM-GW-108A & B were inspected and found to be free of water, but water was found in

the sample lines and sampled piping. Affected systems were restored to the TOP alignment and reestablished during the 12-8 a.m. shift on June 18. One degasifier was repaired and in operation about 2:00 p.m., June 18, permitting TOP 81-22 to be secured.

Inspector Followup

The apparent cause of this event was spurious diversion of CVCS letdown flow to the degasifier. Letdown flow will normally divert to the degasifiers on high level in the VCT but the system was aligned to minimize this diversion and VCT level was apparently normal at the time of occurrence. Operators informed the inspectors that a prior, similar diversion had occurred at an unknown time in the past but had had neglible effect on system operation with degasifiers in normal operation. Initial licensee troubleshooting of the VCT level control and diversion cirucits identified no reason for the spurious control action. On June 18, 1981 the licensee temporarily established a nitrogen blanket in the idle degasifier's vapor space to provide a surge volume and minimize the effect of possible diversions while still in the TOP alignment. Additional troubleshooting of the circuits has been deferred pending a plant shutdown during which proper plant conditions can be established.

The water spray observed above the 1B degasifier resulted from a leaking relief valve discharge piping gasket joint. The leak was repaired prior to restoring the unit to service. Personnel working in the cubicle were authorized by Radiological Work/Access Permit (RWP/RACP) Nos. 7783/4515 and 4516. The inspectors reviewed the RWP/RACP, associated dosimetry records, breathing zone and general area air sample data, and survey data. The individuals wore appropriate anticontamination clothing and full face masks equipped with particulate filters. These records show that no radioiodine was detected before or after the leak and that exposure due to imersion in noble gases (Xe, Kr) was negligible.

The inspectors reviewed results of 35 airborne radioactivity samples taken in the PAB and from GW and ventilation system exhausts between 6:00 p.m., June 17 and 2:15 a.m., June 18, 1981. No radioiodine was detected. Maximum radioactive particulates observed were about E-11 to E-9 uCi/cc. Radiogases (Xe, Kr) in concentrations of E-6 to E-5 uCi/cc were measured in GW piping and in isolated plant spaces. Worst case licensee estimates of released radioactivity were reviewed and found conservative. The licensee estimated that a total of 500 uCi of particulates could have been released (about 0.2% of Maximum Permissible Concentrations permitted by 10 CFR 20). About 1.94 Ci of radiogases could have been released (no radioiodine), equating to about 96% of station administrative limits. The peak gaseous release concentration of 1.75 E-9 uCi/cc occurred during a three minute interval via the stack (about 8.75% of Maximum Permissible Concentration per 10 CFR 20).

The inspectors also reviewed personnel exposure records and dose estimates for individuals within the affected building spaces. No exposures in excess of regulatory or licensee administrative limits were identified. Fourteen or fifteen individuals within the building at the time of evacuation showed nasal swipe activity between 35 - 165 counts per minute (measured on an RM-14 frisker) above background. Whole body counts of these individuals showed no internal deposition of radioactive material. The positive nasal swipes appeared due to inhalation of short half-life noble gas daughter products which quickly decayed to below detectable levels.

The inspectors reviewed the development and implementation of TOP 81-22 including review of Onsite Safety Committee (OSC) Meeting Minutes No. BV-OSC-81-73 of June 17, 1981, and interviewed the DLC Chief Engineer, acting Operating Supervisor, Radcon Supervisor, and Control Room operators. The inspectors concluded that the OSC had appropriately considered the possible consequences of operation with the abnormal degasifier alignment, including: estimates of increased gaseous radioactivity releases, suitability of atmospheric conditions for the releases, estimates and methods of control of hydrogen gas evolution from undegassed coolant, and alternative measures including plant shutdown. The OSC had concluded that an orderly plant shutdown could result in greater gaseous radioactivity releases due to the need for substantial RCS boration without degasification. Based on anticipation of degasifier repairs being completed within about 24-48 hours, the OSC concluded that operation in accordance with TOP 81-22 was preferable to other alternatives.

The inspectors reviewed the preparation for and implementation of the TOP by the Control Room operators. Although the TOP provided only basic system alignment instructions, the inspectors found that the acting Operator Supervisor had participated extensively in the OSC review of the matter and personally briefed onduty operators and supervised the establishment of the TOP conditions, including briefing of the 4 p.m. - 12 a.m. relief shift upon their arrival. Based on the considerations and preparations above, the inspectors found the licensee's actions to adequately address operation with inoperable degasifiers.

No unacceptable conditions were identified.

9. Inadvertent Overfill of Coolant Recovery Tank

On June 18, 1981 an estimated 8-10 thousand gallons of radioactive water was found by an operator in the Solid Waste (SW) area cubicles during a routine building tour. Based on review of logs and records, discussions with operators, chemical and radioisotopic analysis, leak checks, and simulation of possible leakage paths, the licensee concluded that the water had been deposited in the cubicles as a result of overfilling of a Coolant Recovery Tank (CRT) adjacent to the SW cubicles between June 11-14, 1981. The water was pumped to normal radioactive waste handling system on June 19, 1981. On June 23, 1981 the inspectors were made aware of the event during review of temporary operating procedures and discussions with plant personnel. Between June 23-26, 1981 the inspectors discussed the event with cognizant station management and staff, reviewed

logs, licensee correspondence and sampling data, and visually inspected the area.

Event Details

In early June, the licensee had been in the process of filling one (BR-TK-4A) of two Coolant Recovery Tanks (CRT) at an above normal rate. This evolution was necessary to support normal plant operations as a result of a failed Boron Recovery System Evaporator Bottoms pump that is necessary for normal processing of CVCS letdown. Simultaneously, the licensee was attempting to avoid use of the redundant CRT (BR-TK-4B) to allow it to be drained and cleaned for weld inspection. Based on review of tank capacity curves, known CRT fill rate, and anticipated completion of maintenance on the failed pump, the licensee estimated that enough space remained in BR-TK-4A to provide sufficient storage capacity until the failed pump was repaired. This capacity included apparent space in the 4A Coolant Recovery Tank above the upper level transmitter and involved continued filling of the tank after level indication went offscale high. An overfill crossconnect pipe to the redundant 4B tank was expected to provide sufficient protection in the event of an overfill of the 4A tank. Based on the above, operators were directed to disregard the High level alarm for BR-TK-4A and continue to fill the tank after the level indication had gone offscale high. The indication went offscale high on June 11, 1981 and remained offscale until June 14, 1981 when the failed pump was returned to service and the stored water processed.

Subsequent review of plant system diagrams by licensee personnel after discovery of the water in the SW cubicles found that the overfill crossconnect line between the Coolant Recovery Tanks also communicates with a portion of the gaseous waste sweep gas subsystem. In turn, the sweep gas piping from the CRTs communicates with the sump in the adjacent solid waste cubicles. The licensee postulates that when the tank was overfilled between June 11-14, 1981, a portion of the overfill that passed through the crossconnect line was suctioned or diverted into the sweep gas header and deposited in the lower elevation SW cubicle sumps. Licensee examination of the overfill piping was inconclusive in determining exact cause. Chemical and radioactivity/isotopic analyses tended to support this conclusion and ruled out the other likely water sources, i.e., ventilation system cooling water or rain water. Licensee attempts to simulate a ventilation system cooling water leak demonstrated that the leak flowpath would not have resulted in deposition of water in the SW cubicles. Visual inspection of the SW area during and after heavy rain activity identified no rain water inleakage in the SW building.

Due to a resin spill that occurred during a mixed bed resin transfer several months prior, the licensee had maintained several inches of water on the SW cubicle area floor (which included filling the SW cubicle sumps) to minimize any airborne radioactivity problems. As a result, the sump High level alarms were not available for annunciation in the event of additional inleakage into the SW sumps. In addition, the level transmitter for the 4B tank had been removed on April 30, 1981 resulting in no

indication to operators of the fill rate/level inside the redundant 4B tank.

Inspector Followup

During the period June 23-26, 1981 the inspectors visually examined the SW cubicle area and reviewed documents associated with the event. The following documents were reviewed:

-- OM Chapter 8.4.M, Correcting Major Component Alarm Condition - Boron Coolant Recovery Tank 4A Level High-Low, Issue 2, Revision 1, which directs operators to secure filling the 4A tank and line up to 4B tank for filling in the event of a high level in the 4A tank;

-- BVPS Chemistry Log Sheet MA-1, Miscellaneous Analyses, dated June 19, 1981 which provides the chemical analysis for the water found in the SW cubicles on June 18, 1981. The inspector also reviewed boron concentration sampling data for the water found in the SW cubicles and in the 4A Coolant Recovery Tank;

-- Waste Handling Systems 7 Day Running Inventory Log, L3-11, which documents liquid and gaseous radwaste tank levels on a daily basis;

-- Liquid Activity Check Record dated June 19, 1981, which documents radioactivity analysis performed on a 20 ml sample taken from the SW cubicles on June 19, 1981. Activity was found to be 1.03E-3 uCi/ml. The inspectors also reviewed isotopic analysis for the water found in the SW cubicles dated June 19 and 24, 1981 and for water in the 4A CRT sampled June 25, 1981. Additional review of the radiological aspects of the event was conducted by a region based health physics specialist inspector via telephone conversation with the DLC Radcon Supervisor during the same period.

-- DLC Internal Memorandum BVPS:KDG:29, dated June 26, 1981, K. D. Grada, to W. S. Lacey, subject: Solid Waste Area - Water Accumulation, which documented the licensee's evaluation of the event and corrective actions/recommendations, including:

  - Issuing an operating order to operators to check alarmed conditions on radwaste sumps on a shift basis;

  - Reinstallation of the 4B CRT level transmitter on an expedited basis;

  - Recommendations for increasing the inventory of spare parts and upgrading the quality of sump level alarm switches.

Based on the inspectors review of the above and discussions held with the Acting Operations Supervisor on June 26, 1981, the inspectors had the following findings:

-- The licensee failure to implement the alarm response procedure, identified above, modify the procedure in accordance with BVPS administrative controls, or conduct the overfill evolution of the 4A Coolant Recovery Tank in accordance with any procedure subject to a 10 CFR 50.59 review is contrary to TS 6.8.1, Procedures, and BVPS Special Operating Order 80-08, Procedure Compliance, and constitutes an item of noncompliance. (81-15-09).

-- At the close of the inspection period, the inspectors had not completed their review of DLC actions relative to operability of sump alarms and pumps prior to and during the incident, and prior DLC corrective actions for contamination levels requiring water cover on the floor. This issue will remain unresolved pending completion of NRC review. (81-15-10).

10. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable, items of noncompliance or deviations. 3 unresolved items were identified and are discussed in paragraphs 3, 7 and 10 of this report.

11. 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.