



UNITED STATES
ATOMIC ENERGY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS
REGION II - SUITE 818
230 PEACHTREE STREET, NORTHWEST
ATLANTA, GEORGIA 30303

TELEPHONE: (404) 528-4503

RO Inspection Report No. 50-270/74-1

Licensee: Duke Power Company
Power Building
422 South Church Street
Charlotte, North Carolina 28201

Facility Name: Oconee Unit 2
Docket No.: 50-270
License No.: DPR-47
Category: B1

Location: Seneca, South Carolina

Type of License: B&W, PWR, 2568 Mw(L)

Type of Inspection: Routine, Unannounced

Dates of Inspection: January 22-26, 1974

Dates of Previous Inspection: November 27-30, 1973, and December 2-7, 1973

Principal Inspector: F. Jape, Reactor Inspector, Facilities Test and Startup Branch

Accompanying Inspectors: K. W. Whitt, T. N. Epps, R. C. Lewis, G. Jenkins,
A. F. Gibson

Other Accompanying Personnel: None

Principal Inspector: Francis Jape 2-11-74
F. Jape, Reactor Inspector, Facilities Test and Startup Branch Date

Reviewed by: R. C. Lewis for 2/26/74
C. E. Murphy, Chief, Facilities Test and Startup Branch Date

7911270608

SUMMARY OF FINDINGSI. Enforcement Action

1. The following violations are considered to be Category II severity:

a. Failure to Perform Tritium Monitoring

10 CFR 20.201 requires, in part, that an evaluation be made of radiation hazards to assure compliance with the regulations.

Contrary to the above, an evaluation or survey for airborne tritium was not made to determine that the requirement of 10 CFR 20.103(a) was not exceeded following the leak of reactor coolant to the reactor building on January 22, 1974. (Details IV, paragraph 3)

b. Improper Alarm Setpoint

Technical Specification 6.4.1 requires that the station be operated and maintained in accordance with approved procedures.

Contrary to the above, on January 26, 1974, the alarm setpoint for Gaseous Monitor 2-RIA-46 was observed to be higher than the value specified in OP/2/A/1102/14, "RB Purge System," dated June 12, 1973. (Details IV, paragraph 4)

2. The following violation is considered to be Category III severity:

a. Reactor Operations Logbook

Technical Specification 6.5.2 and Oconee Standing Order No. 9 requires that a Reactor Operations Logbook be maintained of events affecting reactor operation.

Contrary to the above, during the period of January 22-25, 1974, the logbook did not contain entries concerning a weld failure of a RCP seal water supply pipe and leakage of radioactive water in the auxiliary building, actuation of the QT rupture disc and resultant damage to other components, receipt and investigation of a reactor building fire alarm and the leakage of ~ 65,000 gallons of radioactive water in the containment. (Details III, paragraph 2.d.)

II. Licensee Action on Previously Identified Enforcement MattersA. Violations

1. Disabling of Valves (2BS-1 and 2BS-2) (RO Inspection Report No. 50-270/73-17, Item I.A.1.b.(2))

Duke Power Company's response, dated January 17, 1974, was

verified by the inspector. There are no questions or comments on this item. (Details II, paragraph 5)

2. Failure to Perform Procedure Steps (RO Inspection Report No. 50-270/73-17, Item I.A.1.b.(3))

Duke Power Company's response, dated January 17, 1974, was verified by the inspector. There are no further questions on this item. (Details II, paragraph 5)

3. Reactor Coolant System Heatup Limitations (RO Inspection Report No. 50-270/73-17, Item I.A.1.d.)

Duke Power Company's response, dated January 17, 1974, was verified by the inspector. There are no further questions on this item. (Details II, paragraph 6)

B. Safety Items

None

III. New Unresolved Items

74-1/1 Station Review Committee

A timely review of an abnormal occurrence involving a weld failure of a reactor coolant pump (RCP) seal water supply pipe and leakage of radioactive water in the auxiliary building, RCP seal failure, actuation of the quench tank (QT) rupture disc that resulted in shearing of a pressurizer level instrument line and damage to the instrument line isolation valve and leakage of ~ 65,000 gallons of radioactive water into the reactor building (containment) was not performed by the SRC. (Details III, paragraph 2.e.)

74-1/2 Communication of Activities Affecting Reactor Operations

Measures have not been implemented to keep on-shift operations personnel informed of activities affecting the facility. (Details III, paragraph 3)

74-1/3 Records of Radioanalysis Results

The licensee does not record actual value of minimum detectable activity (MDA) where analysis results are less than that value. Also, statistical uncertainties are not specified in licensee records of radioanalysis results. (Details IV, paragraph 5)

IV. Status of Previously Reported Unresolved Items73-8/2 Valve Wall Thickness of Valve 2-RV-67

RO:II has reviewed the licensee's reports concerning the power operated relief valve and comments have been submitted to DPC. Supplemental information from DPC, dated January 22, 1974, has been received by RO:II and is currently under review by RO:II inspectors.

73-8/1 Body Wall Thickness of Valves 2-51-244 and 2-51-245

No change in status. Corrective measures have been completed by DPC. An RO:II inspector will review these measures on a subsequent inspection.

V. Unusual Occurrences1. UE-270/73-1, "Engineered Safeguards Valve 2LP-22 and Low Pressure Injection Pump 2B"

Corrective measures described in DPC's report, dated December 11, 1973, were verified by the inspector and there are no further questions on this item. (Details II, paragraph 4)

2. Operation With A Loose Part Indication

The loose parts monitoring system gave an indication of a possible loose object on January 4, 1974. DPC has submitted a report, dated January 10, 1974, describing the indication, investigation, actions taken and a monitoring program to permit continued operation with the presence of the loose object in the lower reactor vessel head. The inspector reviewed the implementation of the monitoring program. There were no questions on the procedures provided for the loose parts surveillance and the procedure for re-escalation to 75% power. (Details I, paragraph 2)

3. 230 KV Switchyard Isolation

On January 4, 1974, a spurious signal actuated the breaker failure relays resulting in isolation of the 230 KV switchyard. The 13.8 KV underground feeder was energized by Keowee Unit 1 by correct operation of the emergency start signal to both Keowee units. Keowee Unit 1 separated from the system and continued to provide emergency power to the vital buses as designed. Permanent corrective measures to prevent recurrence have not been completed. Interim measures have been taken and the system is considered operational.

4. Reactor Coolant Leak Incident

During a plant startup on January 22, 1974, at a power level of about 20%, seals of reactor coolant pump 2B2 resulted in about 65,000 gallons of reactor coolant leaking into and being retained in the reactor building. (Details III and IV)

VI. Other Significant Findings

Organization Changes

See RO Inspection Report 50-269/74-1 for information on organization changes.

VII. Management Interview

The management interview for this inspection was held in two parts. The first part was on January 25, 1974, with J. E. Smith, R. M. Koehler, L. E. Schmid, O. S. Bradham and J. W. Cox in attendance. Items discussed included resolution of previously identified violations and the surveillance program being implemented to permit plant operation with a loose object. (Details I and II)

Part two was held on January 26, 1974, with J. E. Smith, R. M. Koehler, C. L. Thames, L. E. Schmid and J. W. Cox in attendance. This part of the meeting concerned the reactor coolant leak in the reactor building and related activities.

The radiation specialist inspector stated that in his review of the health physics activities associated with the reactor coolant leak, two apparent violations were identified. (Details IV, paragraphs 3 and 4) Also, during the meeting, records of radioanalysis results were discussed. At the time, this item was not identified as an unresolved item, but on January 28, 1974, the licensee was notified that this item would be carried as an unresolved item. (Details IV, paragraph 5)

The inspector's finding regarding the lack of timely review of the leak incident by the station review committee was discussed. (Details III, paragraph 2.e.)

The inspectors stated that during discussions held with operations personnel it appeared that they were not always aware of activities that affected reactor operations. (Details III, paragraph 3.)

DETAILS I

Prepared by:

Frank JapeF. Jape, Reactor Inspector
Facilities Test and Startup Branch2-7-74

Date

Dates of Inspection: January 22-26, 1974

Reviewed by:

R.C. Lewis forC. E. Murphy, Chief, Facilities
Test and Startup Branch2/26/74

Date

1. Individuals ContactedDuke Power Company (DPC)

J. E. Smith - Plant Superintendent
 J. W. Hampton - Assistant Plant Superintendent
 L. E. Schmid - Operating Engineer
 G. Ridgeway - Assistant Shift Supervisor
 R. M. Koehler - Staff Engineer
 D. Rains - Assistant Plant Engineer

2. Operation With Loose Part Indication

On January 4, 1974, an indication of a possible loose object was received on the loose parts monitor. An evaluation of the indication, by DPC, showed that the loose object is contained in the lower vessel head and that the object tends to become fixed in location with two or more reactor coolant pump in operation.

Continued operation with the loose object is considered acceptable^{1/} provided a monitoring program, as described in DPC report to Licensing dated January 10, 1974, is followed. To implement the monitoring program, DPC has provided TP/2/A/800/34, "Loose Parts Monitoring Surveillance," and TP/2/A/800/23A, "Controlling Procedure for Re-Escalation to 75% Full Power."

Both of these procedures were approved by the Plant Superintendent on January 17, 1974, and were reviewed by the Station Review Committee.

The inspector examined these two procedures and found them to include the items stated in the January 10, 1974, report from DPC to Licensing. Implementation of TP/2/A/800/34 was initiated on January 17, 1974, and TP/2/A/800/23A on January 19, 1974.

^{1/} Letter to DPC from Directorate of Licensing, dated January 15, 1974.

3. Status of Preoperational Testing

The status of test procedures conducted prior to initial operation of the reactor was reviewed. The following tests have not received final approval:

- a. TP 150/10, "RB Cleaning"
- b. TP 600/12B, "Pressurizer Operation and Spray Flow Test (ZPPT)"
- c. TP 600/13, "RCS Instrument Hot Operation Function Test."

The licensee's representative indicated that these three test procedures are currently being reviewed and final approval should be granted within two weeks. There are no outstanding deficiencies on these tests to resolve.

DETAILS II

Prepared by: K. W. Whitt
K. W. Whitt, Reactor Inspector
Facilities Test and Startup Branch

2/5/74
Date

Dates of Inspection: January 15-18, 1974

Reviewed by: C. E. Murphy for
C. E. Murphy, Chief, Facilities
Test and Startup Branch

2/26/74
Date

1. Individuals Contacted

Duke Power Company (DPC)

J. E. Smith - Plant Superintendent
J. W. Hampton - Assistant Plant Superintendent
R. M. Koehler - Staff Engineer
J. W. Cox - Assistant Plant Engineer
R. J. Brackett - Junior Engineer
L. E. Schmid - Operating Engineer
J. M. Davis - Maintenance Engineer

2. Steam Production Quality Assurance Staff

Audit Report No. 0-7, "Hot Functional Testing of Unit 2," conducted August 23-24, 1973, was reviewed. This was the only audit report reviewed that affected only Unit 2. The inspector had no questions concerning this report. (For details of other audit reports reviewed that affected both Units 1 and 2 and of the inspectors conclusions regarding the performance of the steam production quality assurance staff, see Details II, paragraph 2 of RO Report No. 50-269/74-1.)

3. Station Quality Assurance Group

The inspector reviewed the audit report for the audit of Unit 2 shift supervisor's log which was conducted on January 8, 1974. This was the only audit report reviewed which related only to Unit 2. The inspector had no questions regarding this item. (Several other audit reports that were relevant to Unit 1 or to both Units 1 and 2 were reviewed. The results of these reviews and the inspector's finding concerning the overall performance of the station quality assurance group may be seen in Details II, paragraph 3 of RO Report No. 50-269/74-1.)

4. UE-270/73-1, Engineered Safeguards Valve 2LP-22 and Low Pressure Injection Pump 2B

The inspector reviewed the unusual event report and the corrective action taken. The station review committee reviewed the event and

recommended a course of action for determining the cause of the failure of LP-2B to operate. The recommended action was carried out and it was concluded that the failure was due to electrical breakers for LP-2B being racked in improperly. The station operating engineer stated that he had discussed the incident with the station operating personnel and had stressed the importance of properly racking breakers in and out. The procedure for adjusting and packing valves (MP/O/A/1400/25) has been changed to require the following actions for all motor operated engineered safeguards valves:

- a. Verify that valve can be cycled before adjusting or repacking the valve. The shift supervisor on duty is required to sign this procedure step.
- b. Verify that valve is completely operable following maintenance by cycling the valve three times. The valve is to be cycled against pressure where possible.

The inspector has no further questions regarding this item.

5. Failure to Follow Procedures - Failure to Perform Procedure Steps and Disabling of Valves (2BS-1 and 2BS-2)

The licensee response to these examples of violations and corrective actions that have been taken were reviewed during this inspection. The station operating engineer stated that he had discussed these events with the station operating personnel and had stressed the importance of adherence to procedures in all cases even if they think other actions may cover certain steps. PT/O/A/204/7, "Reactor Building Spray System Test Procedure," has been or will be changed as follows:

- a. A prerequisite is being added to assure that the components of the reactor building spray loop not being tested is operable (no breakers racked out and no valves or pumps tagged out) before the test is started on the other loop.
- b. A procedure step has been added to require the test coordinator to verify that the valve breakers for the tested loop have been racked in following testing or that he notify the shift supervisor that they are still open for reasons other than for the testing.

The inspector has no further questions concerning this item.

6. Reactor Coolant System Heatup Limitations

On January 18, 1973, the station review committee considered the question of operating out of technical specification limitations

while the temperature was raised to get back within the technical specifications. The proper temperature-pressure relationship to get the unit back within technical specification limits could have been obtained by lowering the pressure or by raising the temperature. The latter course of action was taken. The station review committee concurred with the action that was taken. The action also satisfies the requirements of Administrative Procedure No. 3, "Actions To Be Taken In The Case Of Exceeding Of Limits." This item is considered closed.

7. Borated Water Storage Tank (BWST) Overflow System (Reference letter dated July 19, 1973, from R. C. DeYoung to Duke Power Company and letter dated September 6, 1973, from A. C. Thies to R. C. DeYoung on this subject)

In the September 6, 1973, letter referenced above, Duke Power Company stated that the BWST overflow system would be modified to route any overflow through the pipe trench drain to the low activity waste tanks. This modification was completed for Unit 2 on January 18, 1974. No further inspection effort is planned for this item.

DETAILS III

Prepared By: R. C. Lewis 2/26/74
 R. C. Lewis, Senior Inspector Date
 Test & Startup Branch

Frank Jape 2-12-74
 F. Jape, Reactor Inspector Date
 Test & Startup Branch

T. N. Epps 2-13-74
 T. N. Epps, Reactor Inspector Date
 Facilities Operations Branch

Dates of Inspection: January 25-26, 1974

Reviewed By: C. E. Murphy 2/26/74
 C. E. Murphy, Chief Date
 Facilities Test and Startup
 Branch

1. Persons Contacted

The following individuals were contacted during the inspection:

Duke Power Company (DPC)

J. E. Smith - Superintendent
 J. W. Hampton - Assistant Plant Superintendent
 L. E. Schmid - Operating Engineer
 R. M. Koehler - Staff Engineer
 S. A. Holland - Assistant Operating Engineer
 G. Ridgeway - Assistant Shift Supervisor
 W. Morgan - Control Operator
 R. Casler - Control Operator
 B. Smith - Control Operator

2. Reactor Coolant Pump (RCP) Seal Failurea. General

At a reactor power level of ~20%, during a reactor startup following an extended shutdown (reactor down since January 7), a failure of the RCP shaft seals on RCP 2B2 was experienced. The reactor was manually scrammed and a controlled cooldown was initiated and completed. During manual venting of the core

flood tanks to maintain the nitrogen pressure below the reactor coolant system pressure, an operator opened a vent valve too fast, causing overpressurization of the quench tank (QT). The overpressurization resulted in actuation of the tank rupture disc. The failed rupture disc and/or a panel of damaged insulation struck and damaged a PZR level root valve and sheared the connecting 3/8" level instrumentation tubing. Subsequent to the inspection, RO:II was informed that the failed rupture disc was held in place as designed, and had not acted as a missile.

The RC leakage through the RCP shaft seals and the PZR instrument line, resulted in ~65,000 gallons of RC flowing into the reactor building containment during system cooldown to 110° F (10 hour period).

b. Review of Plant Records

A review of the plant logs, January 20-25, 1974, instrument charts, computer printout and discussions with management and operating personnel concerning the incident was conducted. No violations of safety limits or limiting conditions for operation were detected. (Details III, paragraph 2.f)

The information contained in the Reactor Operation Log (console log), the Shift Supervisor's Log Book and on the computer print out, were inadequate to permit a complete reconstruction of the chronological sequence (to include time) of events that occurred prior to and during the incident.

c. Incident (Plant records and Personnel Recollections)

- (1) Reactor operation was resumed at 1746 on 1/21/74. RCS heatup to operating pressure and temperature (2150 psig and Tav 579° F) was achieved and turbine overspeed trip tests were conducted.
- (2) At about 0800 on January 22, a leak estimated to be ~2 gpm was discovered in the auxiliary building, emanating from a weld of a reducing pipe nipple of the 2A1 RCP seal water supply pipe. Due to the non-stabilized conditions of the plant, i.e., transients introduced by turbine overpeed testing and increasing power level, the RCS water inventory method to determine leak rate was ineffective. However, no increase in the off-gas activity was indicated by the plant stack monitor. (Details IV, paragraph 2)

- (3) The isolation valves on the seal water supply to the RCP's were closed to effect weld repair at 160 Mwe (20% reactor power). The Bingham pumps have shaft mounted seal water pumps that can pump reactor coolant system water to the seals when normal seal water is not available, thus allowing normal reactor coolant pump operation without the normal source of seal injection water. The exact time of seal water isolation valve closure could not be determined.
- (4) The logs indicate, without reference to time, that the 2B2 RCP seal leak off temperature increased to $\sim 320^{\circ}$ F, the pump was secured and reduction of generator load was commenced. The generator was tripped at 1742 due to an apparent seal failure on 2B2. A containment building fire alarm signal was received in the control room and personnel entered the containment to investigate. The logs indicate that steam was observed to be coming up from around RCP 2B2 and the reactor was scrammed from 15% power at 1746 hrs. A controlled cooldown of the RCS was immediately initiated.
- (5) While venting the nitrogen blanket from the core flood tanks to the QT, the operator opened a manual vent valve too fast, resulting in overpressurization of the QT and blowing out the QT rupture disc. The insulation panels from the lower section of the PZR (PZR is located above the QT rupture disc) were severely damaged. The PZR lower level impulse nozzle and root valve were bent and the connecting 3/8" level instrumentation tubing was sheared. The leak through the sheared tubing could not be isolated, due to the damaged valve.
- (6) During the cooldown of the RCS to 110° F, extending over a period of about 10 hours, an estimated 53,000 gallons of water from the Borated Water Storage Tank (BWST) and an estimated 10,000 gallons from the Bleed Holdup Tank (BHT) was injected into the RCS via two high pressure injection pumps. This 63,000 gallons of water plus an additional 2,000 gallons from the PZR and QT leaked to the reactor building. Management elected to let the water collect on the containment floor, where it would be recovered, processed and reused.

During the inspection, RCP 2B2 was in the process of being disassembled, to permit an inspection of the impeller. Subsequent to the inspection, RO:II was informed that the Capscrew spirol pin (3/16" diameter X 3/4" long), and Socket head cap screw (1-12 UNF X 3 1/4" long) were missing from the impeller hub. Management stated that they planned to inspect the other three RCP impellers prior to a reactor start.

d. ViolationsReactor Operations Logbook

The procedure specifying the maintenance of the unit 2 Reactor Operation Log was identified by licensed personnel as the Oconee Unit 1 Standing Order No. 9 (Rev. 1) dated January 22, 1973. SO 9, entitled "Reactor Operation Log" requires that logbook entries to include a brief explanation be made for the operation of any equipment in an abnormal condition; i.e., inoperable instrumentation; equipment isolated, abnormal valve alignments for plant conditions; all important Stacalarms, malfunction of equipment, relief valve actuation, and significant spills of radioactive liquids.

Contrary to Technical Specification 6.5.2, the Reactor Operations Logbook with entries of significant events affecting reactor operation was not maintained during the period of January 22-25, 1974. Specifically, the following significant events were not entered in the Reactor Operations Logbook:

- (1) A 2 gpm leak of radioactive water in the auxiliary building from a failed weld in the seal water supply piping,
- (2) The receipt of a fire alarm originating from the Oconee 2 reactor building,
- (3) Personnel entries into the reactor building to investigate the fire alarm and subsequent leaks,
- (4) Overpressurization of the QT and rupture disc failure,
- (5) The removal of ~53,000 gallons of water from the BWST and injection of the water into the RCS,
- (6) That a PZR instrument line was sheared and the root isolation valve was damaged and inoperable,
- (7) That ~65,000 gallons of radioactive water was leaked and collected in the reactor building,
- (8) That the RCS cold leg drain valves were opened and the loops drained to permit removal of the pump impeller.

e. New Unresolved Item

Technical Specification 6.2.2 requires the Superintendent to promptly notify the Assistant Vice President, Steam Production, of abnormal occurrences and shall cause the SRC to perform a review of the occurrence. However, the Oconee Technical Specifications do not specifically require the SRC to investigate and/or promptly review abnormal occurrences. Managements position is that the SRC performs an after the fact review and does not participate in investigative and/or planning activities. Consequently, as of 5:00 p.m. on January 26, 1974, the SRC had not convened to perform a review of the occurrence involving a weld failure on the seal supply piping, leakage of radioactive water into the auxiliary building, RCP seal failure, QT rupture disc actuation due to overpressurization, shearing of a PZR instrumentation level tubing and damage of the associated isolation valve, and leakage of ~65,000 gallons of radioactive water into the containment.

At the exit interview, management stated that a review of the occurrence by the SRC would be conducted when a draft of the incident report was available for the committee's review. The inspectors informed management that the intent of the Technical Specifications was that the SRC's review be timely, and that a review conducted some 7-10 days subsequent to the occurrences does not appear to be a timely review.

In subsequent telephone discussions with corporate management personnel, management committed to giving further consideration to performance of timely reviews and would be prepared to state their position in their response to our letter.

f. Adherence to Technical Specifications

Records were examined by the inspector to determine adherence to Technical Specification limits during the reactor coolant leak incident that occurred on January 22, 1974. The records revealed the following:

(1) Pressurizer Level

Prior to the reactor coolant leak incident, pressurizer level was at 200 inches which is considered normal operating level. At 5:46 p.m., when the reactor was tripped, the water level dropped to 50 inches, and within several minutes after the scram, level was at 175 inches.

(2) Cooldown Limit

Technical specification 3.1.2 specifies a maximum cooldown rate of 100 F/hr. An examination of the strip chart of the cold leg temperature during the reactor coolant leak incident revealed that a maximum cooldown rate of 80 F/hr was experienced.

(3) Pressure/Temperature Envelope

Figure 3.1.2-2 in Technical Specification 3.1.2 presents the allowable pressure-temperature combination for cooldown. Examination of the strip chart cold leg temperature and the reactor coolant wide range pressure recording, for the time period during the reactor coolant leak incident, revealed that the Technical Specification was not violated.

(4) Shutdown Margin

The minimum shutdown margin, defined in Technical Specifications, requires at least 1% $\Delta k/k$. Duke Power Company's OP/1103/15B, "Reactivity Balance Calculation," provides the method for determining shutdown margin. The inspector examined the record for the January 22, 1974, shutdown which revealed that the shutdown margin was 2.8% $\Delta k/k$.

(5) Reactor Coolant Leak Rate

Technical Specification 3.1.6, "Leakage," presents the allowable limits and conditions for plant operation with regard to coolant leakage. Actions taken by station personnel during the reactor coolant leakage incident on January 22, 1974, were reviewed by the inspector to determine if the Technical Specification was complied with.

A review of logbooks, health physics records, and conversations with plant personnel indicate that the requirements of Technical Specification 3.1.6 were followed. Initial discovery of a leak was at 7:20 a.m. on January 22, 1974. This leak was in the seal supply line in the auxiliary building. Reactor operation was stopped at 5:46 p.m. January 22, 1974, and the plant was at cold shutdown conditions by 7:00 a.m. on January 23, 1974.

g. Reactor Coolant System Leak Detection

A review of reactor coolant system leak detection systems was conducted in conjunction with the primary pump seal failure on January 22, 1974.

During reactor operation a change in the letdown storage tank level is an indication of reactor coolant system leakage, since make-up water is pumped from this tank back into the reactor coolant system through a high pressure injection pump. Approximately 8 hours before the reactor was tripped on January 22, 1974, reactor coolant leakage

indicated by this method increased from 2.5 gpm to 4.1 gpm. This increase was due to a leak in one seal water injection line outside the primary containment.

Another method of determining primary system leakage is from the level indicator in the reactor building normal sump. It was indicated that this method did not show a primary system leak until the fire alarm actuated and it then went off scale. There was already a significant amount of water in the sump from condensation and the sump capacity is low.

Systems sensitive to radioactivity that indicate reactor coolant system leakage into the containment and their response to primary pump seal leakage on January 22, 1974, are listed below.

- (1) The containment iodine monitor showed no increase prior the fire alarm, but increased from 30 cpm to 200 cpm when the fire alarm occurred.
- (2) The containment air particulate monitor showed no increase until the fire alarm occurred. This indication reached a maximum in approximately 2 hours.
- (3) The containment gas monitor showed no increase before or after the fire alarm.
- (4) Two vent stack indicators increased only after the fire alarm occurred.

3. Reactor Operations

In discussions held with operations personnel by the inspectors, it was revealed that the shift personnel were not always made aware of activities that affected reactor operations. Specifically: (1) The reactor operators are not briefed by management of AEC inspection findings; (2) do not see a copy of the RO inspection report and RO letters to their management concerning violations or managements response to inspection findings; and (3) do not always see reports of the facility abnormal occurrences and consequently, are not always familiar with abnormal occurrences that occurred on other shifts. Also, there is no evidence to indicate that the shift operators and supervisors are reviewing the previous shifts reactor logs to familiarize themselves with plant activities and status.

In the exit interview, management committed to reviewing the area of improving communications with the reactor operators.

DETAILS IV

Prepared by

G. R. Jenkins
 G. R. Jenkins, Radiation Specialist
 Radiological and Environmental
 Protection Branch

2/4/74
 Date

A. F. Gibson
 A. F. Gibson, Radiation Specialist
 Radiological and Environmental
 Protection Branch

2/4/74
 Date

Dates of Inspection: January 25-26, 1974

Reviewed by:

J. T. Sutherland
 J. T. Sutherland, Chief, Radiological
 and Environmental Protection Branch

2/4/74
 Date

1. Individuals Contacted

J. E. Smith - Plant Superintendent
 C. L. Thames - Health Physics Supervisor
 G. Ridgeway - Assistant Shift Supervisor

2. Reactor Coolant Leak in Auxiliary Building

A reactor coolant leak in Room 327 pipe chase resulted in contamination of this room and the adjacent hallway. The reactor coolant water was discovered in the hallway at about 7:25 a.m., January 22, 1974. Analysis of a sample of the hallway water showed a radioactivity concentration of 8.22×10^{-4} microcuries per milliliter. An inspector reviewed survey records, the Health Physics Log, and the Radiation Work Permit pertaining to this leak. Although the situation was complicated during cleanup by a leaking vacuum cleaner, which caused spread of contamination in the hallway, the review of records and discussions with licensee representatives indicated that the health physics actions were prompt and adequate.

3. Reactor Coolant Leak in Reactor Building

a. On the afternoon of January 22, 1974, a major leak of reactor coolant occurred at reactor coolant pump 2-B-2, resulting in a release of approximately 65,000 gallons into the reactor containment building. Part of the coolant was released as steam, and all of the coolant ultimately collected in the bottom of the containment building to a depth of approximately one foot. Analysis of a sample of the collected water showed a radioactivity concentration of about 10^{-3} microcuries per milliliter.

- b. During this inspection, survey records, the Health Physics Log, Radiation Work Permits, and effluent radiation monitor recorder charts were reviewed as they pertained to this incident. This record review and discussions with licensee representatives showed that there were no releases of radioactivity to the environment above applicable limits, measured particulate and iodine airborne radioactivity within the reactor building did not exceed applicable maximum permissible concentrations, and there was no significant exposure of personnel to external radiation.
- c. A licensee representative stated that the reactor building air was not sampled for tritium subsequent to this incident until January 26, 1974. An inspector stated that such an extensive release of reactor coolant, much of it in the form of steam, might have resulted in a significant concentration of airborne tritium in the reactor building; without sampling for airborne tritium, the licensee could not show that personnel entering the reactor building were not exposed to high levels of tritium concentration. Results of the sample obtained on January 26, 1974, showed a tritium concentration not in excess of the minimum detectable of 5×10^{-8} microcuries per milliliter.
- d. Survey records showed extensive areas of surface contamination within the reactor building. The highest value noted was 20,250 disintegrations per minute per 100 square centimeters, on the fourth floor. The records showed that, prior to this incident, surface contamination levels in the reactor building were generally less than 200 dpm/100 cm².

4. Unit Vent Monitor Alarm Setting

The Operating Procedure, Reactor Building Purge System (OP/2/A/1102/14) specifies an alarm setting of 25 counts per minute (cpm) on the 2-RLA-46 Gaseous Monitor. During this inspection, the alarm was observed to be set at 50 cpm. During the management interview, an inspector pointed out that this was a violation of Technical Specifications, Specification 6.4.1.

5. Records of Radioanalysis Results

After reviewing licensee records, an inspector noted that the letters "MDA" were often the only results recorded on radioanalysis records when no radioactivity was detected, and that statistical uncertainties were not specified in records of radioanalysis results. An inspector discussed with licensee representatives the importance of recording the actual value of the minimum detection limit, and of determining and specifying statistical uncertainties. Licensee management repre-

representatives agreed to record actual values for "MDA" in the future, and to consider including statistical uncertainties in future analyses.

6. Contamination Control

The following weaknesses in the licensee's contamination control practices were identified to licensee management:

- a. A sign on the door to Room 327 of the Auxiliary Building specified surface contamination levels within the room; the levels had not been updated on the sign since early January, even though a spill had occurred on January 22, 1974.
- b. General housekeeping in the Hot Machine Shop appeared to be poor. In addition, there was no personnel monitor at the door through which the inspectors were escorted when exiting from the Hot Machine Shop.
- c. Personnel exiting from the Reactor Building wearing potentially contaminated protective clothing, enroute to the hot change room, traverse the same hallway in the Auxiliary Building that is used by general personnel traffic in the area.

A management representative indicated agreement, and stated that improvements in the contamination control program would be considered.