

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-255/94006(DRP)

Docket No. 50-255

License Nos. DPR-20

Licensee: Consumers Power Company  
212 West Michigan Avenue  
Jackson, MI 49201

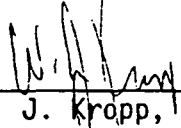
Facility Name: Palisades Nuclear Generating Facility

Inspection At: Palisades Site, Covert, Michigan

Inspection Conducted: March 15 through May 9, 1994

Inspectors: M. E. Parker  
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Approved By:

  
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Reactor Projects Section 2A

  
Date

Inspection Summary

Inspection from March 15, 1994, through May 9, 1994,  
Report No. 50255/94006(DRP)

Areas Inspected: Routine, unannounced safety inspection by the resident inspectors of actions on previous inspection findings, operational safety verification, engineered safety feature systems, onsite event follow-up, current material condition, housekeeping and plant cleanliness, radiological controls, regional requests, safety assessment and quality verification, maintenance, surveillance, fuel handling, and review of licensee reports.

Results: Within the 13 areas inspected, no violations, or deviations were identified.

The following is a summary of the licensee's performance during this inspection period:

## Plant Operations

The plant continued with the plant outage that began on February 17, 1994.

An NRC Diagnostic Evaluation Team (DET) completed their onsite inspections of the licensee on April 22, 1994. The evaluation report is scheduled to be released in June, 1994.

The licensee reported several events, as a result of DET reviews and the licensee's own internal reviews, that require resolution prior to plant startup.

The quality and lack of existing plant labelling was considered a weakness.

The plant improved in overall material condition towards the end of the current extended forced outage. However, one area that needs additional attention was the P-8A and P-8B auxiliary feedwater pump room.

## Safety Assessment/Quality Verification

The licensee's initial independent Management Safety Review Committee (MSRC) was held on March 17 and 18, 1994. During the meeting the MSRC established its mission statement and created five subcommittees to provide more interaction with plant staff and opportunities for in-depth reviews.

## Maintenance and Surveillance

The licensee's activities to repair the containment sump discharge check valves CK-ES3166 and CK-ES3181 were satisfactory. The licensee provided appropriate oversight of the contractor who performed the repairs.

The inspector identified a concern during a pressure test of the engineered safeguards suction piping. Technical Specification 4.5.3.b requires a maximum allowable leakage of 0.2 gpm from the recirculation heat removal systems' components. The Safety Injection and Refueling Water Storage Tank outlet valves were measured to leak greater than 0.2 gpm. The licensee interprets the 0.2 gpm limit as only applying to the engineered safeguards rooms - not the entire recirculation heat removal system. Resolution of this issue was pending at the close of this inspection period.

The inspector toured the containment sump with licensee personnel and found the sump screens were intact and clean; the sump drain mesh was clean; and level switches were intact.

## Engineering and Technical Support

A small leak was discovered in February 1994 from the "B" train containment sump check valve CK-ES3166. The licensee shut the plant down and initiated action to identify the failure mechanism, the extent of the indications, and a repair method. The licensee used metallurgical analyses and nondestructive examination techniques to identify the failure mechanism and the extent of the indications. The licensee identified the failure mechanism to be

intergranular attack (IGA) in the location of a repair weld made during the time of original plant construction. The licensee implemented a weld overlay on both check valves per ASME Code Case N504-1. The licensee's repair efforts were reviewed by both NRC Region III and NRR cognizant engineers. The repair was found to be satisfactory.

#### Fuel Handling

The inspector monitored the licensee's inspection of fuel assemblies in the spent fuel pool for the purpose of evaluating assemblies for permanent storage in dry cask containers.

## DETAILS

### 1. Persons Contacted

#### Consumers Power Company

- R. A. Fenech, Vice President, Nuclear Operations
- \* T. J. Palmisano, Plant General Manager
- \* R. D. Orosz, Nuclear Engineering & Construction Manager
- R. M. Rice, Director, NPAD
- D. D. Hice, Nuclear Training Manager
- \*#S. Y. Wawro, Acting Operations Manager
- \*#D. W. Rogers, Safety & Licensing Director
- \* R. B. Kasper, Maintenance Manager
- R. C. Miller, System Engineering Manager
- \* K. M. Haas, Radiological Services Manager
- \* C. R. Ritt, Administrative Manager
- \* J. C. Griggs, Human Resource Director
- \* H. A. Heavin, Controller
- \* M. A. Savage, Corporate Communications
- #D. G. Malone, Shift Operations Superintendent
- D. J. Malone, Acting Radiological Services Manager
- #G. Goralski, Nuclear Fuels Supervisor
- #B. Gerling, Reactor & Safety Analysis Manager
- \*#J. H. Kuemin, Licensing Administrator

#### Nuclear Regulatory Commission (NRC)

- \*#M. E. Parker, Senior Resident Inspector
- D. G. Passehl, Resident Inspector
- #K. Salehi, Reactor Inspector
- J. F. Schapker, Reactor Inspector
- \* C. N. Orsini, Reactor Engineer

\*Denotes those attending the exit interview conducted on May 9, 1994.

#Denotes those attending the exit interview conducted on May 10, 1994.

The inspectors also had discussions with other licensee employees, including members of the technical and engineering staffs, reactor and auxiliary operators, shift engineers and electrical, mechanical and instrument maintenance personnel, and contract security personnel.

### 2. Action on Previous Inspection Findings (92701)

- a. (Closed) Unresolved Item 255/92022-02(DRP): The licensee failed to update a vendor drawing to reflect the as-built conditions for a SOLA transformer in inverter ED-07.

A reactor trip on August 24, 1992, was caused in part by improper internal wiring connecting the transformers within inverter ED-07. Inverter ED-07 rectifies 125 VDC from the station batteries to 120

VAC that supplies preferred AC bus Y-20. The licensee revised vendor drawing VEN-E11-Sheet 1(1) to properly show the connection of the SOLA transformers. The drawing also references the appropriate vendor manual for detailed connections, internal wiring, and jumpers. This item is closed.

- b. (Closed) Unresolved Items 255/92004-03(DRS) and 255/92004-04(DRS): Indeterminate Regulatory Guide 1.97 Isolation for steam generator pressure and hydrogen monitor instrumentation.

After further review, the Office of Nuclear Reactor Regulation (NRR) determined that the licensee had acceptable isolation devices in place for the steam generator pressure and hydrogen monitor instrumentation. These items are closed.

No violations, deviations, unresolved, or inspection followup items were identified in this area.

3. Plant Operations (71707, 71710, 93702)

a. Operational Safety Verification (71707)

The inspectors verified that the facility was being operated in conformance with the license and regulatory requirements, and that the licensee's management control system was effective in ensuring safe operation of the plant.

On a sampling basis the inspectors verified proper control room staffing and coordination of plant activities; verified operator adherence with procedures and technical specifications; monitored control room indications for abnormalities; verified that electrical power was available; and observed the frequency of plant and control room visits by station management. The inspectors reviewed applicable logs and conducted discussions with control room operators throughout the inspection period. The inspectors observed a number of control room shift turnovers. The turnovers were conducted in a professional manner and included log reviews, panel walkdowns, discussions of maintenance and surveillance activities in progress or planned, and associated LCO time restraints, as applicable.

The plant continued with a forced outage that began on February 17, 1994, to repair a through wall leak found on the recirculation containment sump outlet check valve, CK-ES-3166. The associated repairs were complete by the end of March 1994.

An NRC Diagnostic Evaluation Team (DET) completed their onsite inspections of the licensee on April 22, 1994. The DET report is scheduled to be issued in June 1994. Several issues were identified by the DET and the licensee that required resolution prior to plant startup. Some of those issues are described in paragraph 3.c below.

Region III inspectors and the onsite resident inspectors were assigned to follow up the various issues, which will be addressed in a subsequent Region III NRC inspection report.

b. Engineered Safety Feature (ESF) Systems (71710)

During the inspection period, the inspectors selected accessible portions of several ESF systems to verify status. Consideration was given to the plant mode, applicable Technical Specifications, Limiting Conditions for Operation requirements, and other applicable requirements.

Various observations, where applicable, were made of hangers and supports; housekeeping; whether freeze protection, if required, was installed and operational; valve position and conditions; potential ignition sources; major component labeling, lubrication, cooling, etc.; whether instrumentation was properly installed and functioning and significant process parameter values were consistent with expected values; whether instrumentation was calibrated; whether necessary support systems were operational; and whether locally and remotely indicated breaker and valve positions agreed.

During the inspection, the accessible portions of the following ESF systems were walked down:

- Low Pressure Safety Injection, Train A and B
- High Pressure Safety Injection, Train A and B
- Auxiliary Feedwater, Train A
- Emergency Diesel Generator, Train A and B

No concerns were identified by the inspectors.

c. Onsite Event Follow-up (93702)

During the inspection period, the licensee experienced several events, some of which required prompt notification of the NRC pursuant to 10 CFR 50.72. The inspectors pursued the events onsite with licensee and/or other NRC officials. In each case, the inspectors verified that any required notification was correct and timely. The inspectors also verified that the licensee initiated prompt and appropriate actions. The specific events were as follows:

**March 10, 1994:** During reviews of the emergency diesel generator system, the licensee found that the diesel generator fuel oil storage tank T-10 did not meet General Design Criteria (GDC) 2 for tornado missiles. During systematic evaluation program reviews for the diesel generators in the early 1980's, the diesel

generator fuel oil transfer system was not considered safety related. However, since that time the licensee has concluded that the fuel oil transfer system should be safety related. In addition, the licensee has increased the loading of the diesel generators, which has caused an increase in the fuel oil consumption rate. The inspectors continue to follow this issue to ensure resolution prior to startup.

**March 11, 1994:** During spent fuel assembly inspections for the dry fuel storage project, licensed operators were attempting to remove fuel assembly FA GDK-004 from cell location I-3 for ultrasonic inspection when the fuel assembly became stuck approximately 2 feet out of the storage cell and approximately 2 inches into the hoist box. There was no radiological release and no degradation of spent fuel integrity. The bundle was successfully lowered later that evening. (See paragraph 8 for a further discussion of this event.)

**March 21, 1994:** The licensee found that the Safety Injection and Refueling Water Storage Tank (SIRWT) outlet valves CV-3057 and CV-3031 do not completely isolate the SIRWT from the downstream portion of the system. The current Loss of Coolant Accident (LOCA) containment submergence analysis does not account for SIRWT inventory remaining after a Recirculation Actuation Signal (RAS). This additional inventory could adversely affect equipment qualifications if added to the containment by either:

- (1) Leaking out of the SIRWT due to the inability to maintain SIRWT outlet valves CV-3057 and CV-3031 to remain leak tight; or
- (2) Operators using the remaining inventory, per the emergency operating procedures, to flush the charging lines and boric acid lines, thus adding to the containment water inventory.

The licensee retracted this event notification on April 20, 1994. The licensee found after further review that a few valve operators in both the high pressure and low pressure safety injection systems would become submerged. However, prior to being submerged, the valves would have gone to their required position (open). After being submerged, the failure of the valves in the open position would not impact the ability of the plant to mitigate the accident.

The licensee's followup actions include evaluating the seat leakage on SIRWT outlet valves CV-3057 and CV-3031 and modifying as needed the existing containment flood analysis and existing design basis.

**March 25, 1994:** During a plant walkdown of main steam piping outside containment with the plant in cold shutdown, the licensee found two missing fastener nuts on a main steam line whip restraint for one of the two main steam lines. The licensee

issued work requests and replaced the missing nuts. Subsequently, on April 20, 1994, the licensee retracted this event since further engineering evaluation found that the two missing nuts would not impair the operability of the main steam line or system.

**March 29, 1994:** The licensee discovered inadequate electrical isolation between safety related and non-safety related primary coolant system temperature monitoring instruments affecting the thermal margin monitor (TMM) and low temperature over-pressure (LTOP) circuits. The licensee is planning to install a modification prior to plant startup to correct the discrepancy. This issue was followed by regional inspectors to ensure proper resolution prior to plant startup. This issue will receive additional closeout review after the licensee event report is issued.

**March 29, 1994:** The licensee discovered inadequate electrical isolation between the power range safety channel signals and the safety related thermal margin monitor and the non-safety related primary datalogger and the critical functions monitor circuits. The licensee is planning to install a modification prior to startup to correct the discrepancy. This issue was followed by regional inspectors to ensure proper resolution prior to plant startup. This issue will receive additional closeout review after the licensee event report is issued.

**April 22, 1994:** The licensee discovered inadequate electrical isolation between Class 1E panels "EY-10", "EY-20", "EY-30", and "EY-40"; and several non-class 1E loads such as valves and fans. During a seismic event, all four of these panels could fail due to failure of the non-class 1E load and result in a significant reduction of bus voltage and degraded equipment operation.

The licensee is planning to install fuses to provide the necessary isolation. This issue was followed by regional inspectors to ensure proper resolution prior to startup. This issue will receive additional closeout review after the licensee event report is issued.

**April 27, 1994:** The NRC Diagnostic Evaluation Team (DET) identified that the licensee had not included uncertainty in their analyses for emergency diesel generator (EDG) loadings under certain accident conditions. The licensee followup found a potential condition which could result in overloading the emergency diesel generator during certain accident conditions, namely a loss of coolant accident with a concurrent loss of offsite power and failure of one of the two emergency diesel generators (EDGs). The in-service emergency diesel generator (EDG) might exceed its load rating if manual actions are performed



in accordance with emergency operating procedures and the engineered safety system pumps are all operating at runout conditions.

The continuous load rating for the EDG is 2500 kW, its 2 hour rating is between 2500 kW and 2750 kW, and its 30 minute rating is between 2750 kW and 3125 kW. Based on current modeling, the licensee's analysis found that the total electrical load on the operating EDG may exceed 2750 kW for 30 minutes when a second battery charger is placed in service following functional recovery procedure EOP-9 guidance.

The licensee stated that it would be unlikely that the 30 minute run time above 2750 kW would be exceeded. The current modeling assumes loading of a battery charger shortly after start of the postulated accident. In practice, however, the battery charger would not be added to the EDG until about 60 minutes after start of the postulated accident, well after the initiation of the recirculation actuation signal (RAS), which trips the low pressure safety injection pumps. Removing the low pressure safety injection pumps would eliminate the possibility of EDG overload.

The licensee is continuing to revise their existing analyses. This issue will receive additional closeout review after the licensee event report is issued.

**April 29, 1994:** The licensee identified that signs in containment were not properly secured and could block the sump screens during a design basis accident. During a containment walkdown the licensee identified that an excessive amount of labeling and signs were not properly secured. Some instances were found of the signs being secured with double sided tape or other inappropriate methods, vice being properly secured with steel bolting. This material could come loose during a design basis accident and potentially restrict flow from the containment sump to the containment spray pumps and the high pressure safety injection pumps. The containment spray pumps and high pressure spray pumps are considered inoperable until this problem is corrected. All equipment required in the current plant mode (cold shutdown) is operable. This issue was followed by regional inspectors to ensure proper resolution prior to startup. This issue will receive additional closeout review after the licensee event report is issued.

**April 29, 1994:** The licensee identified a condition where some instrument tubing may not meet seismic design criteria. During a walkdown of the primary coolant pump seal pressure instrument tubing, the licensee discovered that some of the tubing is not mounted in accordance with plant seismic design criteria. Because of this, the licensee was uncertain that the line would survive a seismic event. If the line did fail, a condition equivalent to a small break loss of coolant accident would exist. The cause of

the nonconforming instrument tubing was being investigated. An analysis was also being performed to verify whether or not the tubing could meet the seismic design criteria in the present configuration. This issue was followed by regional inspectors to ensure proper resolution prior to startup. This issue will receive additional closeout review after the licensee event report is issued.

d. Current Material Condition (71707)

The inspectors performed general plant as well as selected system and component walkdowns to assess the general and specific material condition of the plant, to verify that work requests had been initiated for identified equipment problems, and to evaluate housekeeping. Walkdowns included an assessment of the buildings, components, and systems for proper identification and tagging, accessibility, fire and security door integrity, scaffolding, radiological controls, and any unusual conditions. Unusual conditions included but were not limited to water, oil, or other liquids on the floor or equipment; indications of leakage through ceiling, walls or floors; loose insulation; corrosion; excessive noise; unusual temperatures; and abnormal ventilation and lighting.

Improvement was noted in some areas throughout the plant. However, the quality of existing labelling was considered a weakness. Labelling was nonexistent or difficult to read on many plant components. Some areas of the plant had component and system names handwritten on the walls. One wall in containment had "C Channel" handwritten on it. Also, as noted in paragraph 3.c above, the licensee identified that signs in containment were not properly secured and could block the sump screens during a design basis accident.

e. Housekeeping and Plant Cleanliness (71707)

The inspectors monitored the status of housekeeping and plant cleanliness for fire protection and protection of safety-related equipment from intrusion of foreign matter.

The plant improved in overall material condition towards the end of the current extended forced outage. The licensee satisfactorily cleaned and removed the clutter from the safeguards rooms where the check valve repairs were performed. Other areas in the plant, notably in the turbine building, and the spent fuel pool floor, were freshly painted. One area that needs additional attention was the auxiliary feedwater pump room, housing auxiliary feedwater pumps P-8A and P-8B. Groundwater seepage through the walls has resulted in standing water on the floor.

f. Radiological Controls (71707)

The inspectors verified that personnel were following health physics procedures for dosimetry, protective clothing, frisking, posting, etc. and randomly examined radiation protection instrumentation for use, operability, and calibration.

No violations, deviations, unresolved, or inspection followup items were identified in this area.

4. Regional Request (92701)

- a. The inspectors followed up a Region III request to identify any "unreported potentially risk significant events" that occurred within the past six months at Palisades. An unreported potentially risk significant event is an event or condition that may be safety significant but was not required to be reported in a prompt notification (10 CFR 50.72) or in a licensee event report (10 CFR 50.73).

The inspector forwarded to Region III one unreported potentially risk significant event documented in NRC inspection report no. 50-255/93032(DRP), involving the loss of three of the six offsite power supplies to the site at the same time.

The event occurred on December 17, 1993. While attempting to restore the Cook - Palisades #1 345 kV circuit, Indiana & Michigan personnel at the D.C. Cook plant closed the Cook - Palisades "N1" automatic circuit breaker (ACB), with the three phase line grounds at Palisades still attached. The line grounds were in place to allow performance of a preplanned outage for general maintenance on transformers and associated motor operated airbreak switches at Benton Harbor.

The Cook - Palisades #1 offsite power supply deenergized after the ground was sensed. However, as a result of maloperation of a breaker relay in the Palisades switchyard, both the Cook - Palisades #2 and the Argenta - Palisades #2 sources supplying offsite power to Palisades were also lost. Thus, three of the six offsite power supplies to the site were rendered unavailable at the same time. Following repair of the failed breaker relay, power was restored to the three offsite power sources later that same day.

- b. The inspectors followed up a Region III request to assess the licensee's response to Information Notice (IN) 89-77, Supplement 1, issued December 3, 1993, entitled "Debris In Containment Emergency Sumps And Incorrect Screen Configurations."

The NRC issued this IN to alert licensees to problems that could occur with post-accident debris blocking emergency core cooling systems. The supplement was issued to alert licensees to

additional problems that may not have been previously considered. The IN specifically discusses breaches in the integrity of the reactor building sump at Arkansas Nuclear 1. The breaches consisted of semicircular holes at the base of the sump curb, penetrations in the mesh screen, defects in the screen mesh, and reactor building drain headers that lacked protective screen material.

The licensee evaluated this issue and initiated an addition to Startup Checklist 1.3, "250# Heatup Checklist Containment Building," Attachment 1, to assure that sump screens are intact and clean. Other steps of that checklist include making sure the sump is free of debris, the sump drain mesh is clean, and level switches are intact. The inspectors verified the licensee's response to this IN was adequate. In addition, the inspectors performed a tour of the containment sump and verified the items in the above checklist were met.

No violations, deviations, unresolved, or inspection followup items were identified in this area.

5. Safety Assessment/Quality Verification (40500 and 92700)

a. Licensee Event Report (LER) Follow-up (92700)

Through direct observations, discussions with licensee personnel, and review of records, the following event reports were reviewed to determine that reportability requirements were fulfilled, that immediate corrective action was accomplished, and that corrective action to prevent recurrence had been or would be accomplished in accordance with Technical Specifications (TS):

- (1) (Closed) LER 255/92010: Safety injection and refueling water tank (SIRWT) exceeded the administrative limit for maximum permissible concentration.

A sample taken on February 9, 1992, indicated that the licensee had exceeded an administrative limit for maximum permissible concentration (MPC) of radionuclides in the SIRWT. The limit was 1000 times the MPC for the radionuclides listed in 10 CFR 20, Appendix B, Table II, Column 2. Actual activity was calculated to be 2,937 times the MPC.

The licensee's review of the event identified that Xenon 133 contributed 87% of the total radioactivity measured. Xenon 133 is a noble/entrained gas, but the MPC that was used in the calculation was for Xenon 133 in air, not water. When the calculation was re-performed using the MPC for Xenon 133 in water, the activity was only 390 times the MPC. Therefore, the licensee's administrative limit was not actually exceeded. The correct MPC value was incorporated into the calculation methodology. This item is closed.

- (2) (Closed) LER 255/92022 Spurious radiation monitor results in left channel containment isolation.

On March 15, 1992, spurious alarms from radiation monitor RIA-2316 caused two actuations of the left channel of containment isolation within a one hour period. The monitor was taken out of service, and radiation surveys in containment near the detector indicated that no actual changes in the radiation field occurred. Following this event, RIA-2316 was recalibrated and the associated radiation detector (RE-2316) was replaced with a spare detector. Surveillance test RI-86E "Refueling Isolation Monitors Calibration," which verifies the alarm setpoints, was performed and the radiation monitor was declared operable on March 17, 1992. This surveillance procedure is required to be performed every 18 months.

Testing of the detector removed from the containment could not identify a root cause problem. However, RIA-2316 was subsequently replaced on July 5, 1993 as part of the licensee's instrument upgrade program. This item is closed.

- b. In addition to the LERs, the inspector reviewed the licensee's deviation reports (DRs) generated during the inspection period. This was done in an effort to monitor the conditions related to plant or personnel performance, potential trends, etc. DRs were also reviewed to ensure that they were generated appropriately and dispositioned in a manner consistent with the applicable procedures.
- c. The NRR Project Manager attended the licensee's initial independent Management Safety Review Committee (MSRC) held on March 17 and 18, 1994. During the meeting the MSRC established its mission statement, and created five subcommittees to provide more interaction with plant staff and opportunity for in-depth review. In addition, the group toured the plant and interviewed personnel. The next MSRC meeting will be held on May 12 and 13, 1994.

No violations, deviations, unresolved, or inspection followup items were identified in this area.

6. Maintenance/Surveillance (62703 & 61726)

a. Maintenance Activities (62703)

Routinely, station maintenance activities were observed and/or reviewed to ascertain that they were conducted in accordance with approved procedures, regulatory guides and industry codes or standards, and in conformance with technical specifications.

The following items were also considered during this review: limiting conditions for operation were met while components or

systems were removed from service; approvals were obtained prior to initiating the work; functional testing and/or calibrations were performed prior to returning components or systems to service; quality control records were maintained; and activities were accomplished by qualified personnel.

Portions of the following maintenance activities were observed and reviewed:

- Work Request 249325, "Repair D-2 Control Room HVAC Damper"
- Work Order 24410596, "Adjust Packing On Safety Injection and Refueling Water Storage Tank Outlet Valve CV-3057"
- Work Orders 24410748 and 24419749, "Repair containment sump discharge check valves CK-ES3166 and CK-ES3181"

The licensee provided appropriate oversight over the contractor who actually made the repairs. (See paragraph 7 for a full description of this repair)

b. Surveillance Activities (61726)

During the inspection period, the inspectors observed technical specification required surveillance testing and verified that testing was performed in accordance with adequate procedures, that test instrumentation was calibrated, that results conformed with technical specifications and procedure requirements and were reviewed, and that any deficiencies identified during the testing were properly resolved.

The inspectors also witnessed or reviewed portions of the following surveillances:

- RT-71L, "Technical Specification 4.5.3. Pressure Test of ESS Pump Suction Piping," Rev.1

This procedure was performed, in part, to fulfill the pressure test requirements of Nuclear Code Case N-504-1 following the weld overlay of containment sump outlet check valves CK-ES3166 and CK-ES3181. The licensee pressurized the piping containing the check valves to approximately 100 psia and performed a detailed visual examination to check for leakage. Zero leakage was observed from the check valves, indicating a satisfactory repair.

The purpose of the procedure was also to check internal leakby of the safety injection and refueling water tank (SIRWT) outlet valves from the suction of each of the two trains of engineered safeguards system (ESS) pumps to the SIRWT. The licensee calculated a combined leakage of approximately 1.5 gallons per minute into the SIRWT.

Although this was acceptable according to the procedure, which stated an acceptance limit of less than 20 gallons per minute, the inspector questioned whether the acceptance limit was appropriate when the technical specifications appeared to state a different allowable leakrate.

Technical Specification 4.5.3.b provides a maximum allowable leakage from the recirculation heat removal systems' components of less than 0.2 gpm. The licensee interprets the 0.2 gpm limit as only applying to external leakage in the engineered safeguards rooms - not the entire recirculation heat removal system, which includes the SIRWT outlet valves which have a measured leakage rate of approximately 1.5 gpm. The resident inspectors are continuing to follow this issue to ensure appropriate resolution prior to startup.

- Startup checklist 1.3, "250# Heatup Checklist Containment Building," Attachment 1

The inspector used the above checklist during a tour of the containment sump with licensee personnel to evaluate the condition of the sump prior to the end of the current forced outage. The inspector verified that the sump screens were intact and clean, free of debris, the sump drain mesh was clean, and level switches were intact.

The pre-job briefing for the sump inspection was attended by all involved personnel. The shift engineer covered the details of the planned activities, discussed the precautions, potential problems, and contingencies. Expected radiological conditions and radiological protection coverage were discussed in detail. The entire evolution went well with no problems.

- T-343, "Emergency Diesel Generator Day Tank Consumption And Refill Test," Rev.0

No violations, deviations, unresolved, or inspection followup items were identified in this area.

## 7. Engineering and Technical Support (37700)

### Inspection of Containment Sump Outlet Check Valve Repair

#### a. Background

The licensee identified a through wall leak on the body of the containment sump check valve, CK-ES3166, via a visual and liquid penetrant examination. Subsequent ultrasonic examination (UT) identified nine indications. Because of the limitations of UT on cast stainless steel and the location of the indications, in the

valve transition area, depth and through wall position were not determined. The licensee also UT inspected the opposite train valve, CK-ES3181, and identified five indications similar to those found on CK-ES3166.

A surface replication was taken from CK-ES3166 from the area of the leak. The sample revealed discontinuous intergranular corrosion areas. The microstructure, in the leak area, consisted of a sensitized continuous grain boundary precipitate network. Historical research found that no post weld heat treatment was performed or required for weld repairs performed on these valves during fabrication and construction. Root cause was determined to be intergranular attack (IGA) caused by multiple heat input and repair welds at the leak site (sensitized casting material).

b. Repair Methodology

The licensee requested the NRC's approval to repair the containment sump valves using the ASME Code case N-504-1, "Alternative Rules For Repair of Class 1, 2, and 3 Austenitic Stainless Steel Piping, Section XI, Division 1". This method of repair employs the use of a weld overlay. Use of this repair methodology had been approved for use on austenitic stainless steel primary system piping with good results.

c. Inspection

The NRC inspector reviewed documents applicable to the repair process and examination of the weld overlay. Included in this review were:

- CK-ES3166 Leak Root Cause Analysis E-PAL-94-008 Rev, 1.
- Work Order 24410749, Traveler For Weld Metal Overlay Of ES3166.
- Project Plan: CK-ES3166 Through Wall Leak Evaluation and Repair, Rev. 3.
- Welding Procedure Specification: WPS-8 (MACHINE) Rev. 3.  
Welding Procedure Specification: (MANUAL) Rev. 0.
- Procedure Qualification Record: PQR-44 Rev. 0.  
Procedure Qualification Record: PQR-62 Rev. 1.
- Flaw Evaluation for Check Valve in Containment Sump Suction: Calculation No. CMED-58597 Rev.0 (Sargent & Lundy Engineers)
- ASME Section XI Repair Program: 0054-00101-001-100 Rev. 0.



- Check Valve Leak Root Cause, Engineering Analysis and Repair/Replacement Options, CMED-058599 Rev. 0 (Sargent & Lundy).
- Procedure for Application and Examination of Weld Overlay Repairs to Austenitic Stainless Steel Piping Systems: 0054-00101-001-101 Rev. 0.
- Ultrasonic Examination data of the weld overlay repairs.

d. Observation of Work Activities

The NRC inspector observed the welding of the root layer for the ES-3166 check valve. The inspector verified that the essential welding variables were controlled in accordance with procedure and special traveler instructions, with particular attention to heat input control. Visual examination of the root layer weld deposit indicated good welding technique with no indication of welding defects. The completed weld overlay was ground smooth for ultrasonic examination.

Final liquid penetrant examination identified several indications adjacent to the weld in the casting valve body. These indications were removed by grinding to acceptable dimensions in accordance with the ASME Section XI requirements. Ultrasonic examination identified laminar oriented indications in the weld overlays. These indications had no depth and were acceptable per the ASME Section XI Code requirements.

The licensee's repair of the two containment sump check valves appeared to be based on conservative measures, as only the one valve had been diagnosed with a through-wall defect. Ultrasonic examination and repair of the opposite train valve was a conservative action to assure that no through-wall crack could develop.

No violations, deviations, unresolved, or inspection followup items were identified in this area.

8. Fuel Handling (42700, 86700)

a. Inspection and Fuel Status Summary (42700, 86700)

The licensee performed visual inspection (VT) and ultrasonic testing (UT) of irradiated fuel assemblies. The UT and VT were performed on 266 and 284 fuel assemblies respectively. The UT identified six assemblies containing one failed rod and one assembly with two failed rods. The VT identified three (including one failing the UT test) unacceptable assemblies. Considering the results of UT, VT and other previously identified concerns, the

licensee classified 17 fuel assemblies as unacceptable for dry cask storage. The plans were to exclude the 17 assemblies from dry fuel storage.

Based on the VT and the combined results of UT and fuel sipping (performed from 1983-88), 282 assemblies were considered acceptable for dry cask storage. Since each dry cask can hold 24 assemblies, 264 fuel assemblies would fill the 11 dry fuel storage casks scheduled for loading in 1994.

b. Inspection Activities and Concerns (42700, 86700)

The inspectors reviewed visual inspection, testing and handling of fuel assemblies in the spent fuel pool and identified observations in three areas.

(1) Software Control For The Spent Fuel Handling Machine (SFHM)

The inspector had a concern for two related issues. The first concern was for not classifying the controlling software program for the SFHM as safety related. The other concern addressed several software change logs in which the initiator reviewed or approved his own initiated changes. Since the software program was not classified as safety related, it was not subject to the licensee's software QA program, Administrative Procedure 9.14.

(2) Review Qualification And Training Of Fuel Handling And Contractor Staff

Formal orientation sessions were stated to have been provided for engineers and fuel handlers dedicated to fuel handling. However, there were no attendance records for these orientation sessions.

(3) Lack of Procedures for Manning Requirement for Refueling Floor with a Stuck Fuel Assembly

On March 11, 1994 during withdrawal of an irradiated fuel assembly for ultrasonic testing (UT), the fuel assembly became stuck about two feet from the bottom of the spent fuel rack. According to an established policy of stopping work in an abnormal fuel handling situation, the fuel handling crew, the contractors and the engineers stopped work and attended a conference in the Technical Support Center (TSC) to determine the next step.

Prior to leaving the stuck fuel and the refueling floor, personnel removed power from the fuel handling machine, and set the load cell at about 1300 pounds (approximately the weight of the assembly). However, the machine was not

caution tagged. If the fuel had dislodged, it would have remained very close to its stuck position.

The inspector's concern was that there were no procedures governing the continuous manning of the fuel handling machine when a fuel becomes stuck, or for monitoring both the fuel pool water level and the position of the fuel assembly. The licensee noted the inspector's concern and implemented procedural changes requiring manning the refueling floor when there is a stuck assembly situation until further assessment determines that continuous manning is no longer warranted.

No violations, deviations, unresolved, or inspection followup items were identified in this area.

9. Report Review

During the inspection period, the inspectors reviewed the licensee's monthly operating report for February, March, and April 1994. The inspectors confirmed that the information provided met the reporting requirements of TS 6.9.1.C and Regulatory Guide 1.16, "Reporting of Operating information."

No violations, deviations, unresolved, or inspection followup items were identified in this area.

10. Meetings and Other Activities (30703)

Exit Interview (30703)

The inspectors met with the licensee representatives denoted in paragraph 1 during the inspection period and at the conclusion of the inspection on May 9 and 10, 1994. The inspectors summarized the scope and results of the inspection and discussed the likely content of this inspection report. The licensee acknowledged the information and did not indicate that any of the information disclosed during the inspection could be considered proprietary in nature.