ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket Nos.:	50-528 50-529 50-530
License Nos.:	NPF-41 NPF-51 NPF-74
Report No.:	50-528/99-19 50-529/99-19 50-530/99-19
Licensee:	Arizona Public Service Company
Facility:	Palo Verde Nuclear Generating Station, Units 1, 2, and 3
Location:	5951 S. Wintersburg Road Tonopah, Arizona
Dates:	September 5 through October 16, 1999
Inspectors:	J. H. Moorman, III, Senior Resident Inspector D. R. Carter, Resident Inspector D. E. Corporandy, Resident Inspector N. L. Salgado, Resident Inspector
Approved By:	P. Harrell, Chief, Project Branch D

ATTACHMENT: Supplemental Information

EXECUTIVE SUMMARY

Palo Verde Nuclear Generating Station, Units 1, 2, and 3
NRC Inspection Report No. 50-528/99-19; 50-529/99-19; 50-530/99-19

Operations

- The Unit 1 reactor shutdown for the eighth refueling outage was well planned and conducted in accordance with approved procedures. Supervisory oversight and direction of the operating crew and operator performance during the shutdown were excellent (Section O1.1).

- Operator oversight and direction of the evolution to drain Unit 1 to the midloop condition, and decisions to take conservative actions during the evolution, were excellent (Section O1.2).

- In December 1998, the licensee identified that incorrect acceptance criteria had been used for the calibration of nuclear power channels during power ascension testing on three occasions. Three examples of a violation of Technical Specification Surveillance Requirement 4.3.1.1 were identified for not calibrating nuclear power indications to within the acceptance criteria during power ascension testing. These violations were reported in Licensee Event Report 50-528,-529/96-008-00. This severity Level IV violation is being treated as a noncited violation, consistent with Appendix C of the NRC Enforcement policy. These issues are in the licensee's corrective action program as Condition Report/Disposition Request 9-8-1874 (Section O8.1).

Maintenance

- Knowledgeable technicians used approved procedures to perform routine maintenance activities. Good work and foreign material control practices were observed (Section M1.1).

- Knowledgeable technicians used approved procedures to conduct surveillance activities (Section M1.2).

- Observable material condition of the three units was good (Section M2.1).

- Inadequate preventive maintenance on the humidifier in the Unit 2 control room normal ventilation system caused the humidifier reservoir to overflow into the essential control room filtration unit. This resulted in the Train B essential control room filtration unit becoming inoperable. The licensee's actions to address the issue were appropriate (Section M2.2).

- The licensee identified a procedural deficiency that caused a failure to demonstrate the capability of the remote shutdown control circuit for Essential Air Cooling Unit HAB-Z06 to isolate from the control room during remote shutdown operation. The licensee effectively addressed this issue (Section M3.1).

Engineering

- The design and administrative controls established for the emergency core cooling system were sufficient to preclude common mode failure similar to that described in NRC Generic Letter 98-02, "Loss of Reactor Coolant Inventory and Associated Potential for Loss of Emergency Mitigation Functions while in a Shutdown Condition" (Section E8.1).

- The operability determination that addressed inadequate cable separation in both trains of balance-of-plant engineered safety features actuation system cabinets on all three units was comprehensive and sufficient to demonstrate that the systems remained operable (Section E8.2).

Plant Support

- Radiation protection personnel promptly responded to the contamination of three individuals in the Unit 1 auxiliary building by identifying and isolating the contaminated area. Subsequent decontamination of the area was timely, and the investigation to determine the cause of the contamination was adequate (Section R1.1).

- Good radiological controls and prejob planning resulted in divers in the Unit 1 fuel transfer canal accomplishing repair work on the fuel transfer machine with very low radiation exposure (Section R1.2).

Report Details

Summary of Plant Status

Unit 1 operated at 100 percent power until September 26, 1999, at which time the unit began reducing power for the planned eighth refueling outage. The unit was shut down on October 2, entered Mode 6 on October 4, and remained in that mode for the duration of this inspection period.

Unit 2 operated at essentially 100 percent power for the duration of this inspection period.

Unit 3 began this inspection period at 75 percent power. On September 7, after repairs to Main Feedwater Pump B were completed, reactor power was increased 100 percent. The unit operated at that power for the duration of this inspection period.

I. Operations

O1 Conduct of Operations

O1.1 Plant Shutdown (Unit 1)

a. Inspection Scope (71707)

On October 1 and 2, 1999, the inspectors observed the control room (CR) staff commence a planned reactor shutdown in preparation for the eighth refueling outage.

b. Observations and Findings

At 9:50 p.m. on October 1, operators commenced a power reduction from approximately 94 to 21 percent power in accordance with Procedure 40OP-9ZZ05, "Power Operations," Revision 35. Reactor engineering had prepared a detailed power reduction plan to maintain the axial shape index (ASI) within a predetermined band as power was reduced. ASI values were continuously monitored and adjustments, as approved by reactor engineering, were made to maintain ASI within the acceptable band as power was reduced. The reactor was manually tripped at 12 a.m. on October 1. Following the trip, the operators performed Procedures 40EP-9EO01, "Standard Post Trip Actions," Revision 2; and 40EP-9EO02, "Reactor Trip," Revision 1.

The CR supervisor displayed excellent oversight and direction during the reduction in power prior to the trip and during performance of posttrip activities. The shift manager provided excellent supervisory oversight of the CR staff. The shutdown was monitored by key managers, as well as a representative from the Nuclear Assurance Department. The reactor engineer played a key role in monitoring reactor parameters during the downpower preceding the reactor trip and provided advice to the CR operators, as necessary. The CR operators exhibited excellent attentiveness and responsiveness to plant conditions. Proper three-way communications were implemented by the CR staff.

c. Conclusions

The Unit 1 reactor shutdown for the eighth refueling outage was well planned and conducted in accordance with approved procedures. Supervisory oversight and direction of the operating crew and operator performance during the shutdown were excellent.

O1.2 Midloop/Reduced Inventory Activities (Unit 1)

a. Inspection Scope (71707)

On October 4 and 5, 1999, the licensee drained the reactor coolant system (RCS) to the midloop condition using Procedure 40OP-9ZZ16, "RCS Drain Operations," Revision 14. This was done to allow installation of steam generator nozzle dams, in preparation for eddy current testing of the steam generator tubes. The inspectors reviewed the licensee's preparations for midloop operations, including specific training on this evolution. Inspectors observed CR operators as they performed the various evolutions.

b. Observations and Findings

The licensee augmented the onshift operating crew with a team dedicated to perform midloop operations. The midloop team was comprised of a control room supervisor, reactor operator (RO), and shift technical advisor, who acted as the midloop coordinator. There was a clearly defined division of the CR activity oversight between the midloop team and the normal shift crew. The inspectors observed that the midloop team maintained positive control of the evolution at all times.

The inspectors determined that the dedicated midloop crews had undergone training prior to the scheduled draindown to midloop. The inspectors reviewed Procedure 40OP-9ZZ16 prior to the reduction of RCS inventory and verified that all the prerequisites were met. From discussions with the midloop crew members, the inspectors determined that the crew was knowledgeable of the draindown procedure, contingency plans, and the shutdown risk assessment. The inspectors verified that the licensee had calculated and was sensitive to the short amount of time that existed between loss of shutdown cooling and boiling in the core.

The licensee minimized unnecessary work while the unit was in a reduced inventory condition. To prevent loss of shutdown cooling or RCS level perturbations, the licensee stationed a senior RO at the entry of the auxiliary building to screen work activities. In addition, the licensee maintained sources of offsite and onsite power available and limited access to critical equipment areas. The licensee also limited the number of open containment penetrations during reduced inventory and midloop operations and had a plan in place to close the open containment penetrations in the event of a threat to fuel integrity.

On October 4, at 8:41 p.m., after RCS level had been drained below the level of the reactor vessel head flange, the reactor head was de-tensioned and Mode 6 was entered. On October 5, at approximately 6:40 a.m., the midloop RO secured the RCS

draindown at the midloop level of 101 feet, 9 inches, in accordance with Procedure 40OP-9ZZ16. That afternoon, following completion of nozzle dam installation, RCS level was raised and the midloop condition was exited at 2:26 p.m.

c. Conclusions

Operator oversight and direction of the evolution to drain Unit 1 to the midloop condition, and decisions to take conservative actions during the evolution, were excellent.

O8 Miscellaneous Operations Issues

O8.1 (Closed) Licensee Event Report (LER) 50-528,-529/96-008-00 Inadequate Procedure Results in Nuclear Power Channels Not Calibrated During Power Ascension Testing

On December 21, 1998, engineering personnel identified that incorrect acceptance criteria had been used for the calibration of nuclear power channels during power ascension testing in Units 1 and 2. A licensee review of Procedure 72PA-9RX01, "Power Calibration," Revision 6, identified that the acceptance criteria for nuclear power channel calibration was less conservative than that required by Technical Specification (TS) Surveillance Requirement (SR) 3.3.1.4.

The acceptance criteria contained in TS SR 4.3.1.1 had been revised on December 14, 1995, by TS Amendments 98, 86, and 69 for Units 1, 2, and 3, respectively. The TS amendments changed the nuclear power channel calibration acceptance criteria from +/- 2.0 percent between actual reactor power and the indicated power channel to -0.5 percent to +10 percent, when reactor power is between 30 percent and 80 percent. However, Procedure 72PA-9RX01 was not revised to reflect the new acceptance criteria. The licensee did not use the revised acceptance criteria following refueling outages for Unit 1 in April 1998 and Unit 2 in May 1996 and October 1997. In each case, the calibration of indicated power was more negative than -0.5 percent of rated thermal power, with reactor power at approximately 70 percent.

The failure to calibrate power indications within the allowed acceptance criteria is a violation of TS SR 4.3.1.1. This severity Level IV violation is being treated as a noncited violation, consistent with Appendix C of the NRC Enforcement Policy. This violation is in the licensee's corrective action program as Condition Report/Disposition Request (CRDR) 9-8-1874 (50-528,-529/9919-01).

Conclusions

In December 1998, the licensee identified that incorrect acceptance criteria had been used for the calibration of nuclear power channels during power ascension testing on three occasions. Three examples of a violation of TS SR 4.3.1.1 were identified for not calibrating nuclear power indications to within the acceptance criteria during power ascension testing. These violations were reported in LER 50-528,-529/96-008-00. This

severity Level IV violation is being treated as a noncited violation, consistent with Appendix C of the NRC Enforcement policy. These issues are in the licensee's corrective action program as CRDR 9-8-1874.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments on Maintenance Activities (Units 1, 2, and 3)

a. Inspection Scope (62707)

The inspectors observed all or portions of the following activities performed per the listed work document:

899798	"Air Line Replacement for Economizer Feedwater Control Valve 2JSGNFY1112" (Unit 2)
788508	"Replacement of SMB1 with SMB2 motor operator on SIA-HV-686, Shutdown Cooling Heat Exchanger A Outlet Valve to RC Loops 1A/1B" (Unit 1)
898913	"Test Emergency Diesel Generator Train A Fuel Racks" (Unit 3)
889158	"Adjust Turbine Driven Auxiliary Feedwater Pump Bearing Oil Pressure Regulator" (Unit 3)

b. Observations and Findings

The inspectors found the work performed under these activities to be properly performed. All work observed was performed with the work package present and in active use. Work and foreign material exclusion practices observed were good. Technicians were experienced and knowledgeable of their assigned tasks.

c. Conclusions

Knowledgeable technicians used approved procedures to perform routine maintenance activities. Good work and foreign material control practices were observed.

M1.2 General Comments on Surveillance Activities (Units 1, 2, and 3)

a. Inspection Scope (61726)

The inspectors observed all or portions of the following activities performed per the listed surveillance procedures:

72ST-9SB02 "CPC/CEAC Auto Restart Check," Revision 9 (Unit 2)

73ST-9XI13 "Train A HPSI Injection and Miscellaneous SI Valves - Inservice Test," Revision 10 (Unit 1)

73ST-9ZZ18 "Main Steam and Pressurizer Safety Valve Set Pressure Verification," Revision 14 (Unit 1)

73ST-9CL06 "Containment Ventilation Purge Isolation Valve (42") Penetration 56," Revision 9 (Unit 1)

73ST-9AF02 "AFA-P01 Inservice Test," Revision 12 (Unit 3)

b. Observations and Findings

The inspectors found that knowledgeable personnel performed these surveillances satisfactorily, as specified by applicable procedures.

c. Conclusions

Knowledgeable technicians used approved procedures to conduct surveillance activities.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Review of Material Condition During Plant Tours (Units 1, 2, and 3)

a. Inspection Scope (62707)

During this inspection period, routine tours of all units were conducted to evaluate plant material condition.

b. Observations and Findings

Observation of plant material condition during this inspection period identified no major observable material condition deficiencies. Minor deficiencies brought to the attention of the licensee were documented with work requests.

c. Conclusions

Observable material condition of the three units was good.

M2.2 Flooding of Train B Control Room Essential Filtration (CREF) Unit 2MHJBF04 (Unit 2)

a. Inspection Scope (62707)

The inspectors reviewed the circumstances surrounding the flooding of Train B CREF Unit 2MHJBF04. The inspectors reviewed unit logs and CRDR 101002 and held discussions with licensee personnel.

b. Observations and Findings

On September 4, 1999, at 8:45 p.m., an auxiliary operator notified the CR that the Train B CREF unit was flooded. Upon notification, the shift manager declared the Train B CREF unit inoperable and appropriately entered TS Limiting Condition for Operation 3.7.11 and TS Limiting Condition for Operation 3.7.12. The operators determined that the Train B CREF unit had accumulated approximately 18 inches of water from the domestic service (DS) makeup water supply to the CR Normal Humidifier 2MHJNE06. The operators immediately isolated the DS makeup water supply and de-energized the heater. By design, the CR area normal air handling unit utilizes portions of the Train B CREF ductwork. The DS makeup water supply lines to the CR normal humidifiers in Units 1 and 3 were isolated using station clearances, pending determination of the root cause of failure.

The licensee removed and replaced the charcoal bed, the bottom row of high efficiency particulate air filters in the upstream and downstream filter banks, and the bottom row of prefilters. Procedure 33ST-9HJ02, "Surveillance Testing of the Control Room Nuclear Air Treatment System," Revision 4, was then successfully performed and the Train B CREF unit was declared operable on September 9.

The licensee generated CRDR 101002 to determine the root cause of the failure and determine if a maintenance rule functional failure had occurred. Flooding occurred in the Train B CREF unit because the duct mounted humidifier failed to control the water level in the evaporation chamber and water spilled over into the CREF unit. The root cause of this event was determined to be inadequate maintenance on the control room normal humidifier. The current preventive maintenance failed to identify the plugged overflow drain line and a malfunctioning float in the level controller. The licensee determined that this event constituted a maintenance rule function failure. However, this was not a repeat functional failure and did not indicate a declining trend since the control building heating, ventilation, and air conditioning system had met its performance criteria of 95 percent average train reliability. The inspectors reviewed the licensee's planned corrective actions and identified no concerns.

c. Conclusions

Inadequate preventive maintenance on the humidifier in the Unit 2 control room normal ventilation system caused the humidifier reservoir to overflow into the essential control room filtration unit. This resulted in the Train B essential control room filtration unit becoming inoperable. The licensee's actions to address this issue were appropriate.

M3 Maintenance Procedures and Documentation

M3.1 Entry into TS SR 3.0.3 for a Surveillance Test Deficiency (Units 1, 2, and 3)

a. Inspection Scope (61726)

At 10:20 a.m. on September 15, 1999, all three units entered SR 3.0.3 for Essential Air Cooling Unit (ACU) HAB-Z06 being declared inoperable, after the licensee discovered a deficiency in its surveillance test. The inspectors investigated the circumstances leading to the missed surveillance requirement and the actions to restore the ACU to compliance with its surveillance requirement.

b. Observations and Findings

The licensee reviewed Procedure 41ST-1ZZ20, "Remote Shutdown Disconnect Switch and Control Circuit Operability," as a corrective action to a previously identified problem. Procedure 41ST-1ZZ20 was performed every 18 months as required by TS SR 3.3.11.2. It verified operability of the remote shutdown system by testing each remote shutdown disconnect switch and every power and control circuit, including the actuated components. At the conclusion of the review, the licensee identified that Procedure 41ST-1ZZ20 did not perform testing to verify that the disconnect switch for Essential ACU HAB-Z06 was able to isolate its control circuit from the control room during remote shutdown operation. Furthermore, Procedures 42ST-2ZZ20 and 43ST-3ZZ20, the similar procedures for Units 2 and 3, also contained the same deficiency. The licensee initiated CRDR 102442 to document the issue.

The licensee devised and implemented a plan to demonstrate the capability of the remote shutdown control circuit for Essential ACU HAB-Z06 to isolate from the control room during remote shutdown operation. SR 3.0.3 was exited at 3:28 p.m. the same day, following successful completion of the required surveillance. The inspectors observed that the individual unit procedures were combined into a new procedure applicable to all three units, Procedure 40ST-9ZZ20, "Remote Shutdown Disconnect Switch and Control Circuit Operability," Revision 0, dated October 1, 1999. The new procedure incorporated the requirement to demonstrate the capability of the remote shutdown control circuit to isolate from the control room during remote shutdown operation.

c. Conclusions

The licensee identified a procedural deficiency that caused a failure to demonstrate the capability of the remote shutdown control circuit for Essential Air Cooling Unit HAB-Z06 to isolate from the control room during remote shutdown operation. The licensee effectively addressed this issue.

III. Engineering

E8 Miscellaneous Engineering Issues

E8.1 Temporary Instruction (TI) 2515/142, "Draindown During Shutdown and Common Mode Failure (NRC Generic Letter 98-02)" (Units 1, 2, and 3)

a. Inspection Scope (TI 2515/142)

The inspectors performed TI 2515/142 to determine if surveillance, maintenance, modification, and operational activities allowed during shutdown could potentially drain the RCS and void the suction of high pressure safety injection (HPSI), low pressure safety injection (LPSI), and containment spray (CS) systems. These issues were reported to the industry via generic letter (GL) (GL 98-02, "Loss of Reactor Coolant Inventory and Associated Potential for Loss of Emergency Mitigation Functions while in a Shutdown Condition"). The inspectors reviewed the licensee's internal response to GL 98-02, interviewed licensee personnel, and reviewed pertinent piping and instrument drawings.

b. Observations and Findings

As requested by GL 98-02, the licensee conducted an assessment to determine the susceptibility of the emergency core cooling systems (ECCS) to common mode failure as a result of RCS draindown while in a hot shutdown condition. The objective was to determine if any activities could potentially lead to diverting RCS to the refueling water tank (RWT), resulting in a draindown of the RCS concurrent with voiding in the suction header for the ECCS pumps. The licensee's assessment stated, in part, that:

> The ECCS does not have a common suction header. Based on the physical configuration of the safety injection (SI) system, a draindown of the RCS would only render the shutdown cooling portion of the system inoperable. Train A or B of CS and both HPSI pumps would be unaffected and capable of performing their intended functions with the RWT as an operable water source. Therefore, the ECCS is not susceptible to common mode failure. System operating procedures specifically recognize potential draindown paths from the RCS to the RWT and include added measures, such as requiring the placement of yellow caution tags while aligning the SI system for shutdown cooling. Lower mode functional recovery procedures contain adequate provisions to restore both the inventory control and heat removal functions following an RCS draindown.

The inspectors noted that separate suction headers are provided for each of the two ECCS trains and check valves are provided to prevent backflow into the RWT. Check valves are provided throughout both ECCS trains to prevent backflow wherever such potential existed. When RCS coolant is diverted to the RWT, it enters the RWT at the top of the tank. The ECCS suction lines connect near the bottom of the RWT. Since

the RWT is maintained at approximately 90 percent full, any hot RCS coolant entering at the top of the would not be able to cause flashing and voiding at the bottom of the tank where ECCS suction piping connects.

After independently reviewing the ECCS piping and instrument drawings and the licensee's GL 98-02 plant specific evaluation, the inspectors agreed that the licensee's assessment of potential credible flow paths to divert RCS coolant to the RWT was accurate.

The licensee identified that two potential flow paths existed. The first flow path would be created if the suction of the LPSI or CS pump is lined up to the RCS and a LPSI/CS miniflow recirculation valve is opened on the same SI train.

The inspector verified that the licensee had administrative controls designed to prevent this situation. Specifically, Procedure 40OP-9SI01, "Shutdown Cooling Initiation," Revision 15, Step 8.3.2, required that the recirculation valves be closed. According to the licensee, briefings are held in the CR prior to initiating shutdown cooling, and these briefings emphasize the importance of procedural compliance, second verification, and potential vulnerabilities for inadvertent draindown of the RCS.

The second flow path from the RCS to the RWT occurs if the same train manual cross-connect valve and the combined recirculation 6-inch header manual isolation valve are opened while the suction of the LPSI or CS pump was aligned to the RCS.

The inspector determined that, for this occur, two of three locked manual valves, which require senior reactor operator approval prior to manipulation, would need to be mispositioned.

c. Conclusions

The design and administrative controls established for the ECCS were sufficient to preclude common mode failure similar to that described in NRC Generic Letter 98-02, "Loss of Reactor Coolant Inventory and Associated Potential for Loss of Emergency Mitigation Functions while in a Shutdown Condition."

E8.2 Inadequate Cable Separation in Balance-of-Plant (BOP) Engineered Safety Feature Actuation System (ESFAS) Cabinets (Units 1, 2, and 3)

a. Inspection Scope (37551)

While performing a walkdown in preparation for installing a new inverter for the BOP ESFAS cabinet cooling fans, engineering determined that the required 6-inch separation between Class 1E and nonclass cables was not satisfied. The condition existed for both BOP ESFAS trains on all three units. The inspectors reviewed the licensee's operability determination for this issue.

b. Observations and Findings

At 10:30 a.m. on September 16, 1999, the licensee identified that the Class 1E cables, which supply power to the BOP ESFAS cabinet fans, are attached to a terminal block at the top of the cabinet and that nonclass cables attach to the same block approximately 1 inch away. These cables provide annunciation for a cabinet high temperature alarm. In addition, at one point, the nonclass cables for the door switch alarm are tie-wrapped to the Class 1E cabling.

IEEE-384, 1974 edition, the code of record for Palo Verde, requires a 6-inch minimum physical separation between cable classifications, but allows the use of analyses/ evaluation to deviate from the separation criteria.

Palo Verde control rooms do not meet the separation requirement of 10 CFR Part 50, Appendix R. However, Appendix R allows alternative shutdown capability, as exists at Palo Verde, as an alternative to the separation requirement. Nevertheless, the Class 1E power cables to the BOP ESFAS cabinets are installed per Appendix R requirements due to spurious operation concerns. The cabling complies with IEEE-384 for flamibility requirements. None of the Appendix R requirements applicable to the BOP ESFAS cabling were compromised by the lack of cable separation.

The licensee provided the following evaluation, in lieu of meeting the minimum 6-inch cable separation criteria between cable classifications. The evaluation stated that, since the affected Class 1E cabling provides no control circuit signals, control circuit interferences from adjacent cabling were not a concern. The nonclass cables are low voltage 24 Vdc. Potential full faulted current under worst case conditions for the nonclass annunciator cables was less than the design ampacity of the lines; thus, the nonclass lines were expected to survive any credible circuit fault. There was not a concern that the nonclass cables would degrade the adjacent Class 1E cabinet fan cabling, regardless of proximity. The operability determination concluded that the affected Class 1E BOP ESFAS trains were operable with out the 6-inch cable separation.

c. Conclusions

The operability determination that addressed inadequate cable separation in both trains of BOP ESFAS cabinets on all three units was comprehensive and sufficient to demonstrate that the systems were operable.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 Contamination in the Auxiliary Building (Unit 1)

a. Inspection Scope (71750)

On September 8, 1999, three personnel contaminations occurred when the personnel encountered a previously unidentified contaminated area on the 100-foot elevation of the Unit 1 auxiliary building. The inspectors reviewed the response of radiation protection (RP) department personnel to the contamination events.

b. Observations and Findings

On September 9, 1999, three individuals alarmed the personnel radiation monitor in the process of exiting the Unit 1 radiologically controlled area. RP technicians promptly determined that all three individuals had been in the 100-foot auxiliary building east side hallways. The three individuals (a floor polisher, security officer, and contract employee) were all decontaminated. Of the three individuals, the most significant dose, a shallow dose equivalent of approximately 1.95 rem, was received by the security officer in the vicinity of the back of the pants at about knee level. The shallow dose limit is 50 rem.

RP technicians surveyed the areas visited by the three individuals, found contamination in the 100-foot auxiliary building east side hallways, and immediately established a contaminated area boundary. Other individuals who had been in or near the area were surveyed and found not to have been contaminated.

The inspectors interviewed operations personnel in the CR and determined that any operator actions, including actions associated with abnormal operating procedures and emergency operating procedures, would not be significantly impacted by the newly added contaminated area boundary. RP technicians decontaminated the area and were able to remove the contaminated area boundary within approximately 1 day.

RP department personnel investigated the cause of the incident. Based on the radioisotopes present in the contaminated material, RP personnel surmised that the material had likely recently been deposited (i.e., within the last few months). RP technicians conducted extensive surveys and record reviews. As of the end of the inspection period, RP personnel believed that the contamination was most likely due to a small amount of contaminated material that burped up from a floor drain and then was spread around the 100-foot auxiliary building east side hallways as a result of the floor polishing process.

c. Conclusions

Radiation protection personnel promptly responded to the contamination of three individuals in the Unit 1 auxiliary building by identifying and isolating the contaminated area. Subsequent decontamination of the area was timely, and the investigation to determine the cause of the contamination was adequate.

R1.2 Radiological Controls for Diving in the Fuel Transfer Canal (Unit 1)

a. Inspection Scope (71750)

On October 6, 1999, portions of the fuel transfer machine were damaged during functional tests of the machine conducted prior to fuel movement. On October 8, divers entered the fuel transfer canal on the fuel building side of containment to repair the damage. The inspectors attended the formal prejob brief and reviewed the Radiation Exposure Permit (REP) 1-0234 for performing the task.

b. Observations and Findings

The formal prejob briefing consisted of two separate segments. The briefing for the required work followed guidance in the Palo Verde Sensitive Issues Manual. The radiological control requirements were covered in a separate briefing. Each segment provided the detailed information necessary to accomplish the task while minimizing the diver's radiation exposure. The radiological controls segment covered the items required by Procedures 75RP-9OP01, " Radiological Controls For Diving Operations," Revision 4, and 75RP-9RP02, "Radiation Exposure Permits," Revision 14. The briefing included a discussion of previous industry events, contingency plans, and communications and emphasized the special circumstances presented by diving in a radiologically controlled area. The briefing was well attended by technicians, engineers, divers, and managers of the involved departments. Personnel in attendance raised valid issues for discussion and the issues were resolved.

The inspectors reviewed REP 1-0234, which was issued as a single use REP for the dive. The REP contained two tasks. One task provided radiological control requirements for support personnel and the other provided radiological control requirements for the diver. A special addendum to the REP specific to the dive was also issued. The addendum provided additional information, such as the dive authorization, field reference checklist, and ALARA review. The inspectors determined that the REP and the addendum contained the information required by Procedures 75RP-9OP01and 75RP-9RP02.

A total of three dives by different divers was necessary to accomplish the job. The inspectors reviewed exposure records of the three divers. Total exposure for the job was 36 millirem to the extremities. There was no whole body exposure and no skin contamination.

c. Conclusion

Good radiological controls and prejob planning resulted in divers in the Unit 1 fuel transfer canal accomplishing repair work on the fuel transfer machine with very low radiation exposure.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee's staff at the conclusion of the inspection on October 20, 1999. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any material examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

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INSPECTION PROCEDURES USED

37551	Onsite Engineering
61726	Surveillance Observations
62707	Maintenance Observations
71707	Plant Operations
71750	Plant Support Activities
92901	Plant Operations Follow-up
TI 2515/142	Draindown During Shutdown and Common-Mode Failure

ITEMS OPENED AND CLOSED

Opened

50-528,-529,/99-19-01	NCV	TS Violation Due to Reactor Power Channels Not Being Within Acceptance Criteria (Section O8.1)

Closed

50-528,-529/96-008-00	LER	TS Violation Due to Reactor Power Channels Not Being Within Acceptance Criteria (Section O8.1)
50-528,-529,/99-19-01	NCV	TS Violation Due to Reactor Power Channels Not Being Within Acceptance Criteria (Section O8.1)

LIST OF ACRONYMS USED

ASI	axial shape index
ACU	air cooling unit
BOP	balance of plant
CFR	Code of Federal Regulations
CR	control room
CRDR	condition report/disposition request
CREF	control room essential filtration
CS	containment spray
DS	domestic service
ECCS	emergency core coolant system
ESFAS	engineered safety feature actuation system
GL	generic letter
HPSI	high pressure safety injection
LER	Licensee Event Report
LPSI	low pressure safety injection
NCV	noncited violation
NRC	Nuclear Regulatory Commission
PDR	Public Document Room
RCS	reactor coolant system
RO	reactor operator
REP	radiation exposure permit
RP	radiation protection
RWT	refueling water tank
SI	safety injection
SR	surveillance requirement
TS	Technical Specifications
TI	Temporary Instruction