U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos. 50-528/91-15, 50-529/91-15, and 50-530/91-15

Docket Nos. 50-528, 50-529, and 50-530

License Nos. NPF-41, NPF-51, and NPF-74

Licensee: Arizona Public Service Company
P. O. Box 53999, Station 9012
Phoenix, AZ 85072-3999

Facility Name: Palo Verde Nuclear Generating Station
Units 1, 2 and 3

Inspection Conducted: March 31 through May 11, 1991

Inspectors: D. Coe, Senior Resident Inspector
F. Ringwald, Resident Inspector
J. Sloan, Resident Inspector
C. Myers, Resident Inspector (Rancho Seco)

Approved by: H. J. Wong, Chief — 6/25/91 Date Signed
Reactor Projects Section II

Inspection Summary:

Inspection on March 31 through May 11, 1991 (Report Numbers 50-528/91-15, 50-529/91-15, and 50-530/91-15)

Areas Inspected: Routine, onsite, regular and backshift inspection by the three resident inspectors, and one other inspector from the Region V staff. Areas inspected included: previously identified items; review of plant activities; engineered safety feature system walkdowns - Unit 3; surveillance testing - Units 1 and 3; plant maintenance - Units 1, 2 and 3; feedwater isolation valve failures - Unit 1; Agastat relay installation procedures - Unit 2; blocked auxiliary building floor drains - Unit 2; refueling activities and foreign material exclusion controls - Unit 3; motor operated valve maintenance - Unit 3; quality verification function - Units 1, 2 and 3; licensee modification of safety system unavailability goals - Units 1, 2 and 3; and review of licensee event reports - Unit 3.

During this inspection the following Inspection Procedures were utilized: 35702, 60710, 61726, 62703, 71707, 92700, 92701, 92702, and 93702.

Results: Of the 13 areas inspected, no violations were identified.

General Conclusions and Specific Findings

Significant Safety Matters:	None
Summary of Violations:	None
Summary of Deviations:	None
Open Items Summary:	10 items closed, 1 item left open, and 2 new items opened.

Strengths Noted:

During this reporting period, no significant operational events occurred. In addition, the facility staff responded rapidly to restore the Unit 1 feedwater isolation valves to an operable status, avoiding a plant shutdown that Technical Specifications would have required within another four hours. Additionally, the staff completed a refueling outage in Unit 3 with no notable operational problems.

Weaknesses Noted:

Continued weakness was observed in the involvement of engineering personnel in decision-making in appropriate situations in the field. Supervisors and managers failed to recognize or follow up on identified conditions which should have received a technical review. Examples of conditions for which management should have pursued technical support were: floor drains found covered with steel plates and plastic, the use of a soluble plastic material which was incompatible with the system and application, and marginal quality of grease in motor operated valve operators.

DETAILS

1. Persons Contacted

The below listed technical and supervisory personnel were among those contacted:

Arizona Public Service (APS)

# R. Adney,	Plant Manager, Unit 3
# B. Ballard,	Quality Assurance, Director
*D. Blackson,	Central Maintenance, Manager
# T. Bradish,	Compliance, Manager
*S. Coppock,	Engineering Department, Engineer
# E. Dotson,	Engineering and Construction, Site Director
*B. Druin,	Central Maintenance, Consultant
*R. Ebann,	Central Maintenance, Foreman
*T. Fitzpatrick,	Maintenance Standards, Supervisor
# R. Flood,	Plant Manager, Unit 2
# R. Fullmer,	Quality Audits and Monitoring, Manager
# D. Gouge,	Plant Support, Manager (Chairman, Plant Review Board)
*R. Hazelwood,	Quality Assurance and Monitoring
# P. Hughes,	Site Radiation Protection, General Manager
# W. Ide,	Plant Manager, Unit 1
*D. Kanitz,	Compliance, Engineer
F. Larkin,	Security, Manager
# J. Levine,	Nuclear Power Production, Vice President
#*D. Mauldin,	Site Maintenance, Manager
#*G. Overbeck,	Technical Support, Site Director
*R. Rouse,	Compliance, Supervisor
# C. Russo,	Quality Control, Manager
G. Shell,	Quality System, Manager
*J. Stone,	Maintenance Standards, Advisor
*G. Waldrep,	Component & Specialty Engineering, Supervisor
*B. Webster,	Component & Specialty Engineering, Manager
# M. Czarnylas,	Deputy Chief, Fire Department

Other Personnel

J. Draper,	Southern California Edison, Site Representative
# K. Hall,	El Paso Electric, Site Representative
# R. Henry,	Salt River Project, Site Representative

The inspectors also talked with other licensee and contractor personnel during the course of the inspection.

*Attended the Exit meeting held with the NRC Resident Inspectors and Chris Myers, Region V Inspector, on April 26, 1991.

#Attended the Exit meeting held with the NRC Resident Inspectors on May 16, 1991.

2. Previously identified items - Units 1, 2 and 3 (92701 and 92702)

a. (Closed) Violation (528/90-54-03): "Inadvertent Dilution of Reactor Coolant System (RCS) Boron Concentration" - Unit 1 (92702)

This violation was cited because procedures for placing an ion exchanger (IX) with a new resin bed in service were inadequate to prevent an inadvertent dilution of the RCS. In addition to revising the operating procedure to limit the difference in boron concentration between the RCS and the IX to less than 20 ppm before placing the IX in service, the licensee has planned or completed several other corrective actions. The licensee recognized the need for more stringent controls over plant evolutions and counselled the shift supervisor to this effect. Evolution prebriefings are to include predetermined conditions to halt the evolution and instructions that if uncertainties arise about an evolution, not to proceed until the uncertainties are resolved. The procedure development and revision process was also examined and chemistry technical personnel were briefed regarding the need for formal documentation of the technical basis for qualitative and quantitative information in new and revised procedures and the importance of complete and accurate cross-disciplinary reviews. Administrative procedures will be revised to increase the formality of communication of cross-disciplinary reviews. Technical inputs to procedures required from other departments will now be documented on an Engineering Evaluation Request.

The inspector concluded that the licensee's corrective actions for this violation are adequate. This item is closed.

b. (Closed) Followup item (528/91-04-03): "Floor Drains Covered" - Unit 1 (92701)

This item refers to the effect on the flooding analysis of two floor drains found covered with plastic in the Unit 1 Auxiliary Building. The licensee subsequently covered the drains. The inspector reviewed Engineering Evaluation Request 91-AZ-017, in which the licensee determined that there was no adverse effect on the flooding analysis for the Shutdown Cooling Heat Exchanger (SDCHX) rooms because the flooding analysis assumes that only one of the two drains is available, and only one drain was found covered. The same determination was made for the 77' West Mechanical Penetration room, which had one of two drains covered with plastic.

Based on the NRC inspector's questions, the water-soluble plastic film, known as QSA-2000, was evaluated by the licensee and determined to be composed of polyvinyl alcohol (PVA) with additives. The licensee concluded that PVA is inappropriate for use as a drain cover in the Auxiliary Building because it becomes insoluble and gels when wet or when exposed to gamma radiation, borated water, alkalis, or temperatures over 120 degrees Fahrenheit. Additionally, PVA could have a negative effect on the radwaste system by fouling

the radwaste evaporator or precipitating in radwaste system piping. Also, Total Organic Carbon (TOC) could be carried over in the evaporator distillate, which would negatively impact Reactor Coolant System chemistry.

As a result of this evaluation, the licensee has removed QSA-2000 from availability by deleting it from warehouse stocks and by removing he remains of the only roll issued. The licensee also committed to verify that QSA-2000 soluble plastic was not covering other drains in any unit and to ensure appropriate personnel were aware of this issue. The inspector concluded that unit supervisory personnel failed to request appropriate engineering evaluations prior to covering the drains. Licensee management acknowledged these comments at the exit meeting.

Based on the licensee's evaluation and subsequent actions, this item is closed. However, paragraph 9 of this report discusses another observation related to supervisory involvement with maintaining adequate floor drain capability.

c. <u>(Closed) Followup Item (529/90-23/02): "Reactor Coolant System (RCS) Spill" - Unit 2 (92701)</u>

This item was opened to track licensee actions in response to design change implementation deficiencies identified as the result of a 30-gallon RCS spill on July 12, 1990. The programmatic deficiencies were documented in Incident Investigation Report (IIR) 3-2-90-017, Quality Deficiency Reports (QDRs) 90-309 and 90-310, and Corrective Action Reports (CARs) 89-076 and 90-009. The status of this item was previously updated in Inspection Report 50-529/90-45 (Paragraph 2).

The licensee determined that substantial changes were needed in the control of work associated with design modifications. This is to be accomplished in part by a change to the routing of Work Orders (WOs) used for plant modifications. These WOs will be placed in a special category, designated as Plant Change Work Orders (PCWOs). Instead of being routed to the releasing organization (usually Operations) upon completion, they will go to the System Engineer (SE) for review and concurrence before the PCWO goes to the releasing organization. this should ensure the SE's cognizance of plant modification work activities and implementation of the full scope of installation and test work documents prior to the releasing organization back-end review.

This should ensure equipment is not prematurely released to Operations.

Equipment tagging will be revised such that clearances associated with PCWOs will require double tags (one red danger tag and one yellow caution tag). The red tag will apply to the physical installation and the yellow tag will apply to the required testing

activities. The SE should then be able to control the inservice verification process. When the SE is satisfied with this testing, the tags can be cleared and the inservice verification can be signed.

More stringent guidance and control have been placed on the impact assessment process. This process requires departments to formally assess the impact of a design change on procedures or other technical documentation for which that department is responsible. The items identified in the impact assessment are then tracked by the SE to ensure completion prior to implementation of the design change.

The inspector noted that the Quality Monitoring organization has had a positive impact on the resolution of this complex issue. While these changes have not yet been implemented, this item is being closed based on the written internal commitments regarding the proposed corrective actions, which appear to be adequate. The NRC will continue to monitor plant design modification activities in future inspections. This item is closed.

d. <u>(Closed) Violation (529/90-45-01): "Motor Operated Butterfly Valve Retests" - Unit 2 (92/02)</u>

This violation was cited for several examples in which Motor Operated Butterfly Valve (MOBV) operators were not adequately verified to be properly adjusted following maintenance or during surveillance testing.

For the first example, involving 2EWA-UV-145 (Essential Cooling Water to Nuclear Cooling Water Cross-connect Valve), the licensee promptly readjusted the limit switches and stop nuts and performed a leakage test to ensure the adjustments were properly made.

The second example involved Spray Pond Isolation Valve 2SPA-HV-49A and Spray Pond Bypass Valve 2SPA-HV-49B. The licensee successfully performed an operational performance task several days after the maintenance was performed, though after the system was required to be operable. While this task was not performed or intended as a functional retest, it is a system performance indicator. The inspector discussed this task with the licensee and concluded that the operational parameters monitored do demonstrate adequate system function, based on the licensee's assertion that the design flow and heat transfer requirements are achieved when the supply header pressure is above the specified minimum value and within its expected range. The inspector reviewed the data on which this assertion was based and found it to support the assertion.

The last example involved the ASME Section XI test for 2SPA-HV-49B, covered in Surveillance Test (ST) procedure 73ST-2XI07, "Section XI Valve Stroke Timing & Position Indication Verification, Mode 1 through 4 - GA, GR, SP, and WC." The licensee reviewed this

procedure to provide objective acceptance criteria for the position verification (observation of valve stem position). The revised procedure appears adequate to accomplish the Section XI purpose of the ST. The inspector noted that the ST does not address overall system performance, as unspecified leakage past the bypass valves is still allowed by the Section XI classification assigned by the licensee, and total flow rate through the spray nozzles is not verified. Post-maintenance retests for these valve involve the performance of both the Section XI test and the operational performance task.

The licensee's revised procedure 32MT-9ZZ48, "Maintenance of Limitorque Motor Operated Valves," approved prior to the occurrence of the violations, though not effective until afterwards, explicitly requires a retest evaluation if the limit switches are adjusted. However, the retest guidance used by the work planners, contained in procedure 73PR-9ZZ04, "Valve Motor Operator Monitoring and Test Program," did not address MOBVs and may not have resulted in adequate retest being specified during the required retest evaluation. Procedure 73PR-9ZZ04 has since been revised to add an appendix to identify the appropriate retests for safety-related MOBVs, including leak checks in certain cases.

The central safety issue involved with this violation involves the ability of MOBVs to perform their safety functions, as verified by post-maintenance testing and surveillance testing. The licensee's response to this violation is that retest requirements have been strengthened and that the identified weakness in surveillance procedure 73ST-2XI07 has been rectified.

The inspector concluded that the licensee's corrective actions and actions to prevent recurrence were adequate. This item is closed.

e. <u>(Closed) Followup Item (530/90-20-02): "ECCS Pump Room Material Control" - Unit 3 (92701)</u>

This item involved identification of material in the ECCS pump rooms which could block floor drains, preventing the draining of water in the event of an internal flooding event. The licensee initiated EER 90-SI-113 which concluded that the pump room floor drains are not credited in the safety analysis for internal flooding. The inspector noted that the EER analysis appeared appropriate except for an internal inconsistency between the EER and calculation 13-MC-ZA-809 which it referenced. The inconsistency was explained and the inspector had no further question. This item is closed.

An additional issue involving floor drains is described in paragraph 9 of this report.

f. <u>(Closed) Unresolved Item (530/90-45-01): "Reactor Trip - Design Basis Uncertainty" - Unit 3 (92701)</u>

The inspector reviewed the licensee's Justification for Continued

Operation (JCO) dated November 1, 1990 and December 31, 1990 with regard to the design deficiency identified following the Unit 3 reactor trip event of October 20, 1990 during which a single power distribution module failure resulted in the inadvertent opening of all Steam Bypass Control Valves. The JCO's were forwarded to NRC:NRR for technical review and comment. The result of this review was that the JCO appeared to provide adequate justification for operation until such time as a design modification can be made to the Steam Bypass Control System. The inspector noted that a design change modification to address this issue was installed in Unit 3 during its current refueling outage and has been scheduled for subsequent refueling outages at Units 1 and 2.

In addition, NRR reviewed the question of whether an unreviewed safety question existed following discovery of this design deficiency. This review concluded that based on the licensee's JCO analysis (which showed an additional five percent reserve overpower margin placed in the Core Operating Limit Supervisory System, and APS's final commitment to restore the design configuration to that described in the FSAR), an unreviewed safety question did not exist. Based on this conclusion, this item is closed.

g. <u>(Closed) Followup Item (528/90-28-01): "Margin to Reactor Trip on Loss of Load" - Units 1, 2, and 3 (92701)</u>

This item resulted from failure of the Steam Bypass Control System (SBCS) to prevent a reactor trip in Unit 1 following a loss of load from approximately 65 percent power.

Quality Deficiency Report (QDR) 90-0329 was issued to evaluate the discrepancy between the Updated Final Safety Analysis Report (UFSAR) and the actual plant capability. the QDR concludes that the SBCS design should be modified to provide the full load rejection capability described in the UFSAR. The current schedule for implementation of the vendor recommended design modifications to adjust the control scheme (Plant Change Request 90-13-SF-021) is the fourth refueling outage for Units 1 and 2, and the third refueling outage for Unit 3. As an interim measure, procedure changes have been implemented to require one valve to be taken out of service above 75 percent power and all valves to remain in service below 75 percent power, and to ensure operators are aware of possible SBCS shortcomings for step load reductions in the critical ranges.

The licensee also committed to evaluate why its previous review of the vendor evaluation failed to identify the zero margin to trip. Through discussions with the licensee, the inspector determined that the engineering personnel who reviewed the vendor evaluation did identify the zero margin to trip. However, previous licensee experience, dating back to 1984, indicated a previous awareness of a potential zero margin to trip at low power levels, and the licensee engineers considered the results of the vendor evaluation, which at the time of their review was documented only in loose engineering

notes, as merely supporting previously known information. Since this was the expected result, the engineers did not communicate this finding as a problem. The inspector concluded that the engineers' communication was weak, and was not challenged by licensee management. Licensee management understood that the evaluation had shown that the SBCS was designed to provide adequate trip margin and closed post-restart action item #807 on this basis.

Based on the review of QDR 90-0329 and discussions with the licensee, the inspector concluded that appropriate corrective actions have been initiated by the licensee. This item is closed.

h. <u>(Open) Followup Item (529/90-28-02): "Plant Monitoring System Database Errors" - Units 1, 2, and 3 (92701)</u>

This item was opened to follow licensee actions with respect to several database errors effecting important computer applications, particularly the Core Operating Limits Supervisory System (COLSS). NRC Inspection Reports 529/90-39 and 529/90-45 updated this item and increased the scope to include followup for emergent errors detailed in those reports. NRC Inspection Report 530/90-46 addresses a COLSS operability issue which is included in this followup item.

(1) Incident Investigation Report (IIR) 3-2-90-030

A COLSS software modification was performed without all the affected databases being appropriately adjusted, resulting in inaccurate COLSS secondary calorimetric values being calculated during power ascension testing on July 18, 1990. The licensee determined that the technical review of the software change was inadequate due to lack of attention to detail. The licensee also determined that although the off-line testing of the software bypassed the aspect of the database (the scaling table) that was later found to be in error, the final retest of the software is the on-line power ascension testing. The inspector noted that off-line testing is generally performed to the extent that simulation facilities allow, but that facilities could be enhanced to enable more complete off-line testing.

(2) IIR 3-2-90-031

Incorrect incore detector sensitivity database values in the Unit 2 Plant Computer (PC) resulted in COLSS point AZTILT not updating as expected during power ascension testing on July 21, 1990. This error was not present in the Core Monitoring Computer (CMC) COLSS database. The databases were updated as a result of the replacement of several incore detectors. However, the format of the vendor-supplied data was such that the card numbers were concatenated with the detector sequence numbers, resulting in misinterpretation of the sequence numbers. The database corrections were then made to these incorrect sequence numbers. These database errors were noted

on July 20, but miscommunication resulted in their not being corrected before the event. The vendor information was not received by the licensee in a timely manner to allow for adequate work preparation without impacting the outage schedule. Also, an independent reviewer of the database changes was not designated.

The licensee's corrective actions address work scheduling and communications. The inspector noted that no corrective actions addressed the level of review or testing of the completed work.

(3) Human Performance Evaluation System (HPES) 90-050 Quality Deficiency Report (QDR) 90-0424

Inaccurate transcription of data from a Surveillance Test (ST) log to the COLSS Addressable Constants (AC) log in Unit 2 on August 23, 1990, resulted in the incorrect data being used to update the COLSS AC during the next performance of the ST on September 20, 1990, which caused the COLSS core flow calculation to be slightly non-conservative. The error was corrected the same day it occurred.

As a result of this event, the licensee developed procedure 72DP-9RJ01, "COLSS Addressable Constants," to provide formal controls required independent verification of constant changes and log entries. Additionally, QDR 90-0424 was generated to review the requirements for independent verification.

(4) Material Nonconformance Report (MNCR) 90-RJ-0001 IIR 3-1-90-043

The setpoint in the Plant Monitoring System (PMS) database (all three units) for the Part Length Control Element Assembly (PLCEA) Lower Group Stop (LGS) was found to be incorrect on April 23, 1990. The Combustion Engineering (CE) Setpoint Document had the correct value. The error had negligible safety significance. The IIR concluded that the configuration management of the PMS is inadequate, and refers to IIR 3-1-90-046 for resolution. (This IIR is addressed below.)

(5) MNCR 09-RJ-0002

The Unit 1 PMS database value for the Control Element Assembly (CEA) Major Group Deviation Limit was found to be incorrect on October 5, 1990. The CE Setpoint Document had the correct value. The error had negligible safety significance. The configuration management of the PMS is further evaluated in IIR 3-1-90-046, below.

(6) MNCR 09-RJ-0005

The Unit 2 PMS database was found to have incorrect incore sensitivity values on October 17, 1990. Several opportunities

to identify and correct this error were missed, as documented in Inspection Report 528/90-45. The effect on COLSS calculations was later determined to be negligible. Review and control of information to and from the vendor is a central issue in this event. IIR 3-1-90-046 was issued to address root causes.

(7) IIR 3-390-017, QDR 91-034

NRC Inspection Report 530/90-46, Paragraph 13, identifies that the licensee has no guidance and specific criteria for determining the ability of COLSS to meet the Technical Specification definition of being "in service." An incorrect, although conservative, determination of PC COLSS functional status was made in Unit 3 on November 26, 1990.

As a result of this IIR and QDR, several minor training and procedural deficiencies were identified and corrective actions initiated. A guideline or checklist to assist the operators in determining the COLSS functional status will be developed. Such a checklist was promulgated via a Night Order on April 25, 1991. A group display for the CMC and PC was developed which displays parameters on a CRT required for assisting in evaluating the COLSS functional status. A page display of a COLSS block diagram will also be developed.

(8) IIR 3-1-046

IIR 3-1-90-046, approved on January 4, 1991, addresses the general problems described above, recognizing a developing trend of errors in the administration and control of reactor engineering related software and information. The inspector reviewed this IIR along with the corrective action documents associated with the individual errors.

The inspector noted that the IIR concluded that the quality classification of COLSS, the Core Protection Calculators (CPCs), and the CECORE computer code have been reviewed and determined to be appropriate. COLSS and CECORE are considered Not Quality Related (NQR), while the CPCs are classified as Quality Related. The licensee recognizes that COLSS calculates a Technical Specification Limiting Condition for Operation limit for maximum power, and that exceeding this power limit is not precluded by any active protection equipment, and that exceeding this power limit may place the plant outside of its design basis. However, because COLSS does not perform any active safety function, the licensee currently considers it NQR. The inspector noted that some other CE licensees consider COLSS or their incore analysis computer program as Quality Related, and that there is still some debate within APS regarding the appropriate classification.

Quality Deficiency Reports (QDRs) 91-0002 and 91-0003, dealing with software configuration management and control of vendor information, respectively, were written to initiate some of the corrective actions resulting from IIR 3-1-90-046. As an interim measure, the Nuclear Fuels Management (NFM) department will provide other licensee organizations with written instructions on the use of COLSS, CPC, and CECORE computer code information received from the vendor after approval by NFM. A comprehensive software configuration management program is scheduled to be developed and implemented by December 1, 1991.

A complete COLSS simulator, with the ability to simulate input parameter, has been requested.

QDR 91-0004 resulted in ensuring that incore instrumentation (ICI) parts and information are procured as required by the quality assurance program.

(9) Conclusion - Remaining Actions

As a result of these items, the inspector concluded that the licensee's actions to date are appropriate. Because configuration management is the essence of these issues, this item will remain open until disposition of QDR 91-0002 and 91-0003 is completed, and the COLSS "in service" guidelines are formalized. In addition, the licensee's quality classification for COLSS will be further reviewed by the inspector. Other aspects of this item are considered satisfactory.

3. Review of Plant Activities (71707 and 93702)

a. Unit 1

Unit 1 operated essentially at 100 percent power throughout this period.

b. Unit 2

Unit 2 operated essentially at 100 percent power throughout this period.

c. Unit 3

Unit 3 remained shutdown for a refueling outage during this inspection period. Significant work during the outage included refueling, the integrated safeguards system surveillance, major inspections on both emergency diesel generators, significant motor operated valve work including several design basis differential pressure tests, and a containment integrated leak rate test. The inspection period ended with the plant in mode 5.

d. Plant Tours

The following plant areas at Units 1, 2, and 3 were toured by the inspector during the inspection:

- Containment Building
- Auxiliary Building
- Control Complex Building
- Diesel Generator Building
- Radwaste Building
- Technical Support Center
- Turbine Building
- Yard Area and Perimeter

The following activities were observed during the tours:

(1) Operating Logs and Records - Records were reviewed against Technical Specifications and administrative control procedure requirements.

(2) Monitoring Instrumentation - Process instruments were observed for correlation between channels and for conformance with Technical Specifications requirements.

(3) Shift Staffing - Control room and shift staffing were observed for conformance with 10 CFR 50.54(k), Technical Specifications, and administrative procedures.

(4) Equipment Lineups - Various valves and electrical breakers were verified to be in the position or condition required by Technical Specifications and administrative procedures for the applicable plant mode.

(5) Equipment Tagging - Selected equipment, for which tagging requests had been initiated, was observed to verify that tags were in place and the equipment was in the condition specified.

(6) General Plant Equipment Conditions - Plant equipment was observed for indications of system leakage, improper lubrication, or other conditions that could prevent the systems from fulfilling their functional requirements.

During a routine inspection of the Unit 2 Remote Shutdown Panel, the inspector noted that a step stool which was normally staged at this location was missing. The function of the stool is to assist operators in reading panel meters at the top of the panel, which is over seven feet high. The inspector confirmed that the stool was required to be available pursuant to a previous commitment made by the licensee to the NRC. Licensee personnel located the stool in the control room and acknowledged that it should remain in the Remote Shutdown Panel room. The stool was promptly replaced.

(7) Fire Protection - Fire fighting equipment and controls were observed for conformance with Technical Specifications and administrative procedures.

The inspector observed a roving fire watch open a closed and latched door to the Unit 2 "B" DC equipment room, inspect for fires, then leave the door ajar, resting on a defective latch. This is a repeat of a similar observation documented in Inspection Report 529/89-43. The licensee responded by issuing a memo to all plant personnel reminding them to shut and latch fire doors. The licensee also reported that they sampled the effectiveness of this memo by asking several fire watches and other plant personnel if they had received and read the memo after it was issued and found that they were all aware of the issue.

(8) Plant Chemistry - Chemical analysis results were reviewed for conformance with Technical Specifications and administrative control procedures.

(9) Security - Activities observed for conformance with regulatory requirements, implementation of the site security plan, and administrative procedures included vehicle and personnel access, and protected and vital area integrity.

(10) Plant Housekeeping - Plant conditions and material/equipment storage were observed to determine the general state of cleanliness and housekeeping.

(11) Radiation Protection Controls - Areas observed included control point operation, records of licensee's surveys within the Radiological Controlled Areas (RCA), posting of radiation and high radiation areas, compliance with Radiation Exposure Permits (REP), personnel monitoring devices being properly worn, and personnel frisking practices.

No violations of NRC requirements or deviations were identified.

4. Engineered Safety Feature System Walkdowns - Unit 3 (71710)

Selected engineered safety feature systems (and systems important to safety) were walked down by the inspector to confirm that the systems were aligned in accordance with plant procedures.

During this inspection period the inspectors walked down accessible portions of the following system.

Unit 3:

Emergency Core Cooling system Sump "B"

No violations of NRC requirements or deviations were identified.

5. Surveillance Testing - Units 1 and 3 (61726)

a. Selected surveillance tests required to be performed by the Technical Specifications (TS) were reviewed on a sampling basis to verify that: 1) the surveillance tests were correctly included on the facility schedule; 2) a technically adequate procedure existed for performance of the surveillance tests; 3) the surveillance tests had been performed at the frequency specified in the TS; and 4) test results satisfied acceptance criteria or were properly dispositioned.

b. Specifically, portions of the following surveillance tests were observed by the inspector during this inspection period:

Unit 1

Procedure	Description
- 41ST-1DF01	Diesel Fuel Oil Transfer Pump Operability "B"
- 36ST-1SB17	Core Protection Calculator Input Loop Calibration - Channel "B"

Unit 3

Procedure	Description
- 36ST-9S105	Safety Injection/Shutdown Cooling System Instrumentation Calibration Check - Calibration Check of RCB-PT-104
- 31ST-9S101	ECCS "B" Surveillance Test
- 36ST-9SB02	PPS Relay Card Contact Resistance

No violations of NRC requirements or deviations were identified.

6. Plant Maintenance - Units 1, 2 and 3 (62703)

a. During the inspection period, the inspector observed and reviewed selected documentation associated with maintenance and problem investigation activities listed below to verify compliance with regulatory requirements, compliance with administrative and maintenance procedures, required Quality Assurance/Quality Control involvement, proper use of safety tags, proper equipment alignment and use of jumpers, personnel qualifications, and proper retesting. The inspector verified that reportability for these activities was correct.

b. Specifically, the inspector witnessed portions of the following maintenance activities:

Unit 1

Description

- Removal of "B" Charging Pump Block
- Replacement of Capacitors in Voltage Regulator "PND"

Unit 2

Description

- Replacement and Inspection of "A" Emergency Diesel Generator Fuel Injector

Unit 3

Description

- Refueling Activities
- Sleeving of Control Element Drive Mechanism Coils
- Refill Transmitter for "B" Refueling Water Level Indication System
- Rebuild Motor Operated Valve (MOV) Operators:
  - SIA-644
  - MTN-258
  - HPB-6
  - CHA-507
- Grease inspection of MOV operators:
  - SIB-646
  - SIA-673
  - SIB-675
  - SIA-684
  - SIB-652
  - SIB-636
  - SIA-637
- Rewire Operator for CPB-3A
- MOVATS Testing of AFB-35
- MOVATS Testing of SIA-637
- Adjust Limit Switches on FWN-31 MOV Operator

The inspector noted that during the disassembly of valve SI-646 a wire identification tag was dropped from a wire inside the limit switch housing where it then fell through the deck grating to the floor below. Despite the presence of two Technicians, a Foreman, a QC Inspector and an Engineer, the dropped tag was not noticed until the inspector raised the question. One Technician subsequently retrieved the dropped tag. The inspector concluded that this represented inattention to detail on the part of the work team.

The inspector also noted that during the performance of WO 494977 to inspect SI-646 the Technicians completed work order steps 4.10 through 4.17 before the QC Hold Points in steps 4.6 and 4.7 were

signed or waived. Procedure 30DP-9MP01, "Conduct of Maintenance", step 3.4.6 states, "Quality inspection points shall not be bypassed or changed without proper QC acknowledgement and documentation." When questioned, the licensee asserted that since the QC Inspector was present during this entire activity, tacit approval was given for work to proceed while the inspection was being performed. The Director of Quality Assurance indicated that QC sometimes utilizes Hold Points such that work may proceed beyond the hold point while QC is conducting the required inspection, in a manner such that the inspection is not interfered with, and that QC approves working steps beyond the Hold Point. The inspector noted that procedure 60DP-0QQ08, "Quality control Plant Inspection Program", merely states in step 3.2.3 that "Hold points identified within work controlling documents indicate that continuation of the activity past the hold point is prohibited unless the required inspection has been performed or waived." The inspector concluded that there was no safety significance associated, but there was an apparent inconsistency between field procedures and management's expectations. Management committed to reviewing the administration of Hold Points and revising procedures as needed to make the procedures consistent with management's expectation of in-field practice.

No violations of NRC requirements or deviations were identified.

7. <u>Feedwater Isolation Valve (FWIV) Failures - Unit 1 (92700 and 62703)</u>

On April 20-21, 1991, Unit 1 FWIVs SGB-UV-132 and SGA-UV-174 failed to pass Surveillance Test (ST) 73ST-1XI16, "Section XI Valve Stroke Timing, Partial Stroke Exercise and Position Indication Verification - Mode 1 through 6 - FWIVs (Economizer)," due to apparent control system problems. On May 9, 1991, the Unit 1 FWIV SGB-UV-132 accumulator pressure dropped below the allowed limit of 5000 psig, indicating another control system problem. Previous failures have occurred due to deficiencies in the 4-way valve which are part of the control system for the FWIVs (see NRC Inspection Report 528/90-28, Paragraph 14).

As a result of these failures, the licensee initiated a Root Cause of Failure (RCF) investigation. This investigation was being performed in an aggressive manner utilizing a team approach. The team was led by the Assistant Manager - Systems Engineering and included several experienced people, including consultants. Facilitating the investigation, a special test bench had been designed and constructed, enabling the team to evaluate nearly all mechanical components in the control system.

The team concluded that failures in the non-safety related portions of the control systems (Air Driven Hydraulic Pump and Air Regulator) had occurred, preventing performance of the partial stroke surveillance tests in April 1991. The May 9, 1991, failure of a safety-related 4-way valve for SGB-UV-132 was due to a cut O-ring apparently caused by misassembly by the vendor. The licensee's Vendor Quality Assurance department is currently performing an audit at the vendor's assembly facilities.

The team approach to RCF determination was initiated by the licensee following discussions with industry organizations and individuals considered to be specialists in that field. Prior to this problem, special RCF training was given to engineering supervisory personnel by a consultant. The licensee decided to use a team approach for this investigation due to the safety significance and the potential economic impact of the failures, and as an experiment in the team RCF method. The licensee stated that the process will be formalized and applied on a case-by-case basis.

No violations of NRC requirement or deviations were identified.

8. Agastat Relay Installation Procedures - Unit 2 (62703)

While observing Agastat relay testing on a new relay, the inspector observed technicians allowing the relay time delay setpoint to stabilize over several hours on a test bench prior to installation. They did this based on a vendor supplied information sheet which accompanied the new relay and which recommended monthly monitoring of the setpoint until no substantial change occurs.

The inspector noted that licensee procedure 32MT-9ZZ82, "Time Delay Relay Test," and the associated surveillance test 32ST-9ZZ03 did not require a newly set relay to be checked following three hours of operation. The inspector also noted that, once installed, the surveillance test only checks the time delay on a quarterly basis, and the monthly preventive maintenance task only exercises the relay without checking the time delay setpoint. Thus, a newly installed relay was not required by existing procedures to be retested following three hours of operation nor was it required to be tested monthly until the setpoint was assured to be stabilized as per vendor recommendations.

The inspector's questions prompted Engineering to examine this issue and resulted in directions to modify the MT, ST, and PM procedures to include a requirement for retesting relay time delay following three hours of operation after initial setting in both the MT and ST procedures, and during each monthly PM to measure the time delay. The inspector considered these changes, when implemented, to be appropriate.

At the exit meeting the inspector encouraged licensee maintenance supervisors to get early Engineering involvement in cases where technical adequacy of procedures might be in question. The licensee acknowledged these comments.

No violations of NRC requirements or deviations were identified.

9. Blocked Auxiliary Building Floor Drains - Unit 2 (71707 and 92701)

On May 8, 1991, the inspector found plastic sheeting covering the normal floor drain in the Unit 2 "A" Essential Cooling Water (EW) Heat Exchanger (HX) room. The plastic was taped to the floor on all sides, and was being used for contamination control. A licensee Radiation Protection

supervisor indicated that a steel plate blocked the drain, and that the plastic had been in place for a long time. The inspector noted that markings on the tape indicated survey results and was dated May 11, 1990. The inspector noted that the same drain in the Unit 1 EW "A" HX room was not blocked, and asked the licensee if the Unit 2 condition had been considered in the Auxiliary Building flooding analysis.

On May 15, 1991, a licensee engineer looked at the drain in Unit 2 and confirmed that a custom fitted steel plate was bolted to the grating over the drain, effectively blocking the drain. The licensee then found similar plates on the floor drain in the EW "B" HX room, on both floor drains in the "B" Shutdown Cooling (SDC) HX room, and on one floor drain in the "A" SDC HX room, all in Unit 2. The licensee stated that the flooding analysis assumed that the EW HX room drains were available, and that at least one drain in each SDC HX room was available. The licensee issued a Problem Resolution Sheet (PRS 1943) to address this issue. The licensee also completed a walkdown of the auxiliary buildings in all three units and found no other drains obstructed by steel plates or plastic.

However, the normal drain in the Unit 2 "B" SDC HX room was found to have a plug installed. Additionally, the alternate "clean" drains in the SDC HX rooms in all three units, and in the EW HX rooms in Units 2 and 3, were found to be open when they were supposed to be plugged. These alternate drains, particularly those in the EW HX rooms which drain to the control building, could represent a potential unmonitored release path for contaminated water.

The steel plates were apparently intentionally installed to help reduce gas migration through the drain system. The plates had tags indicating that they were not to be removed without Shift supervisor concurrence.

The inspector concluded that additional information and evaluation would be necessary to determine the significance of this issue with respect to the flooding analysis, configuration control, and potential radiological consequences. The inspector also noted that supervisors and management personnel were aware of the steel plate under the plastic, but apparently had not challenged the acceptability of this condition, and in particular apparently had not requested engineering support when the installation decision was originally made or when the condition was observed during their plant tours (Unresolved Item 529/91-15-01).

10. <u>Refueling Activities and Foreign Material Exclusion Controls - Unit 3 (71707 and 60710)</u>

The inspector observed fuel handling activities, Foreign Material Exclusion (FME) controls associated with the licensee's Zone III boundary surrounding the reactor refueling cavity, Zone III cleanliness, and licensee response to actual and potential intrusion of foreign materials into reactor systems.

The inspector noted that Zone III recordkeeping appeared to formally account for entry and exit of all tools and other articles into the zone, and that zone attendants appeared to be conscious of proper dressout precautions and the need for other precautions such as lanyards on tools. In addition, QC personnel in the zone were observed to halt refueling activities in order to retrieve small items floating on the pool surface. The inspector considered these positive indications of FME controls.

The inspector inspected the Zone III area following the discovery of 25 loose ball bearings outside of, but adjacent to the Zone III boundary. Although no ball bearings were found inside the Zone III area during this walkdown, the inspector identified several items of debris within the zone, including wads of tape, a plastic respirator faceshield protector, and loose lockwire. In addition, one opening in the zone boundary, approximately four inches in diameter, was found nearest the area where ball bearings were found outside the zone. The inspector concluded that licensee zone attendants could be more thorough in their required daily walkdowns and routine observation of zone cleanliness and integrity.

The inspector reviewed an Incident Investigation Report (IIR 3-3-01-014) describing the circumstances surrounding loose ball bearings found outside of the Zone III area in containment. The report could not positively identify the source of the bearings, or why their loss of control was not immediately reported. It was noted that although the report concluded that no bearings had entered Zone III, no mention was made of any Zone III walkdowns performed by the licensee specifically for bearings. Since such a walkdown was performed, the inspector concluded that the only deficiency was that the IIR review and approval process failed to identify this discrepancy. In addition, at the NRC's request the licensee submitted their evaluation of the ball bearing incident to Region V in a letter dated May 16, 1991. The licensee performed an engineering evaluation based in part on a previous evaluation of a 1988 event and concluded that there would be no undue risk if one or more ball bearings entered the RCS. In addition, the licensee stated that employees would be reminded, at the beginning of each refueling outage, of the necessity to adhere to the FME Program. The licensee's evaluation and corrective actions appear appropriate.

At the exit meeting the inspector encouraged the licensee to do this in a manner which results in employees understanding the safety significance of foreign objects entering reactor systems such that there will be a willingness to admit or identify a possible compromise to FME control. Licensee management acknowledged these comments.

The inspector also reviewed an Engineering Evaluation Request (EER 91-RC-66) which evaluated the impact to reactor systems on the intrusion of a neoprene electrical connection gasket into the reactor vessel and shutdown cooling system. The inspector noted that the supporting documentation for the EER identified two previous occasions that similar gaskets from the same type of electrical connections were dropped into the refueling cavity at Unit 2 and the spent fuel pool at Unit 3 both within the previous year. The inspector stated during the exit meeting

that if responsive corrective action had been taken for these earlier incidents in which the gaskets were retrieved, that the most recent event might not have occurred. This example suggested the need for more thorough supervisory management follow through when problems occur.

Licensee management acknowledged all the above comments and committed to resolve the electrical gasket question prior to the Unit 2 refueling outage.

No violations of NRC requirements or deviations were identified.

11. Motor Operated Valve (MOV) Maintenance - Unit 3 (62703)

A substantial amount of Limitorque and Rotork Motor Operated Valve (MOV) overhaul and maintenance occurred during the Unit 3 outage. The inspector reviewed various aspects of MOV maintenance activities.

a. Adequacy of Maintenance Procedures

The inspector reviewed maintenance procedure 32MT-9ZZ49 which directs the adjustment of Rotork A-Range style (nonsafety-related) and NA-style (safety-related) actuators. The inspector found that the procedure appeared to be appropriate for adjusting the limit and torque switches in both types of actuators. The licensee demonstrated the use of the procedure to the inspector on both styles of actuators. The inspector found the guidelines to be adequate.

During the informal demonstrations, the inspector noted that the two electricians and the field foreman on-shift were unfamiliar with the use of the procedure for adjustment of the NA-style limit switches. Due to the limited use of the procedure, the electricians and foreman stated that they would need additional explanation of the technique described and the differences between A-Range and NA-style Rotork actuator limit switch adjustment.

The inspector discussed the training available for maintenance personnel on the adjustment of Rotork actuators and found that only the A-Range style actuator was used for training demonstration purposes because it was the predominant style used in the plants. The inspector noted that the licensee relies on the experience and availability of a few key personnel to support the infrequent adjustment of NA-style Rotork actuator limit switches.

The inspector noted that the licensee had not yet implemented procedures for the detailed assembly and disassembly of MOV actuators. The lack of such procedures had been previously identified as a weakness in their MOV program and the licensee had committed to develop appropriate procedures. The inspector found that the licensee had prepared draft procedures but had delayed implementing them to include additional technical detail. The licensee planed to implement their procedure by June 14, 1991. The inspector encouraged the licensee to expedite the use of more

detailed procedures during the Unit 3 refueling outage in progress to improve their control of the MOV activities which are establishing baseline performance characteristics to be used as the standard for future trending.

b. Control of Parts and Lubricants

The inspector observed maintenance activities in progress in the Unit 1 MOV shop including overhaul and inspection of Limitorque and Rotork actuators. The inspector observed that spare parts and greases were controlled in the shop area. A replacement parts kit consisting of replacement gaskets, O-rings, bolts, and other hardware was individually assembled and logged for each work order and maintained in the work area with work in progress. Bulk quantities of greases were maintained in the shop area with adequate labeling and cleanliness. Documentation within the work packages identified replacement parts and greases used. The inspector concluded that control of spare parts and greases appeared to be adequate.

During the observation of maintenance activities described below, the inspector found the equipment to be appropriately assembled consistent with good practice. No missing washers, loose fasteners, or improper assembly techniques were observed. However, due to the lack of detailed assembly or disassembly procedures, the inspector found that the quality of the maintenance activity was highly dependent on individual maintenance personnel performance. The inspector had observed Quality Control (QC) involvement in the maintenance activity, but limited only to specific hold points. There did not appear to be a routine QA/QC surveillance of the overall scope of MOV maintenance.

c. Adequacy of Periodic Grease Inspections

The inspector reviewed the licensee's procedures controlling the lubrication of Limitorque actuators. The inspector found that the lubricant was checked as a preventive maintenance activity on a refueling outage basis. There was no routine lubricant replacement schedule established. Lubrication replacement was done as corrective maintenance based on degradation identified in periodic sampling. The inspector found this practice to be consistent with the manufacturer's recommendation. It is noted that the lack of periodic replacement appeared to place heavy reliance on the periodic grease sampling and evaluation to detect degraded conditions.

The inspector observed the maintenance activities involved in the overhaul and inspection of the Limitorque actuator for SI-644 under Work Order (WO) 321790. This maintenance activity was being performed as part of an MNCR disposition for an over-thrusting condition of the actuator during as-found testing. When the motor was removed from the actuator housing during disassembly, the

inspector observed a lack of grease on the motor pinion gear. Exposed grease in the actuator housing did not appear to be homogeneous, with some hardening and separation noted. The hardened grease appeared to have been spun off the gearing at the bottom of the housing. Grease near the fill port at the top of the housing appeared to be fresh. The inspector discussed the grease condition with the maintenance personnel performing the overhaul who also considered the grease condition to be degraded.

However, the inspector subsequently noted that the degraded condition was not documented by the licensee maintenance personnel on the work order or any other deficiency reporting document as a deficiency encountered during the prescribed work activity. When questioned by the inspector, the maintenance personnel stated that the condition was outside the scope of the work order and therefore they were not supposed to document it as a deficiency in the overhaul work order. Furthermore, they indicated that the grease had been previously sampled and found acceptable under another preventive maintenance work order performed as part of the licensee's program to maintain the environmental qualification of the equipment (procedure 32MT-9ZZ48). Through discussions with maintenance personnel and observation of maintenance on valve SI-644, the inspector concluded that the dip stick technique used for grease sampling may not result in a representative sample of grease and therefore may lead to erroneous conclusions on grease acceptability.

The inspector discussed the training available to the licensee maintenance personnel in evaluating degraded grease conditions. Training personnel described their use of new grease to demonstrate the expected consistency and color of the correct type of grease. However, they did not include samples of degraded grease conditions to enable evaluation of the acceptability of conditions other than new.

The inspector expressed several concerns when discussing the findings with licensee maintenance management on April 26, 1991.

- The inspector expressed concern regarding the potentially non-representative grease sampling technique. The licensee identified that a procedural change was in process to standardize and improve the sampling technique by using a straw dip stick to obtain a core sample of the entire grease cavity.

- The inspector expressed concern for the lack of documentation of the degraded grease condition encountered during the overhaul of SI-644 and the apparent failure of management to communicate their expectations regarding the reporting of deficiencies to maintenance personnel.

- The inspector pointed out that without routine documentation of such deficient conditions, the generic implications affecting other equipment may not be addressed by corrective actions.

- The inspector was concerned that there appeared to be inadequate engineering involvement in establishing guidance and acceptance criteria for evaluating observed degraded conditions.

The licensee responded to the inspector's concerns by conducting shop briefings with the Site Maintenance Manager and the Central Electrical Maintenance MOV group to clearly communicate management's expectation for workers to document and raise all concerns with their supervision.

The licensee acknowledged the inspector's concern for the lack of guidance in the area of grease condition evaluation and initiated an investigation (IIR 3-3-91-108) to evaluate program weaknesses and possible corrective action.

In response to the inspector's observations of degraded grease on SI-644, the licensee re-sampled grease on six valves (SI-636, SI-646, SI-673, SI-684, and SI-652). These valves represented 10 percent of the safety significant valves which had previously been determined to be satisfactory during the current Unit 3 outage. These valves had not been disassembled nor had the grease been changed. A sample of grease from SI-636 was initially determined to be unacceptable by a QC inspector based on the existing guidance in procedure 32MT-9ZZ48. The licensee subsequently concluded that the grease sampling was intended for engineering to evaluate the quality of the grease irrespective of existing procedural acceptance criteria. As a result, Quality Control judgements based on the established criteria were deemed inappropriate for SI-636 and subsequent grease sampling.

The inspector was present for each inspection, except the initial inspection of SI-636. The inspector noted considerable variation in grease characteristics among these valves. This included varying quantity, separation of oil from the grease, hardening and discoloration, and grease thrown away from the motor pinion gears. The grease level in SI-675 was below the bottom of the motor pinion gears and approximately one-half inch high in SI-673 touching the bottom of these gears. The inspector noted the grease condition in several of these valves did not meet the general criteria in 32MT-9ZZ48.

The licensee determined that the grease condition in all valves was acceptable for operation during the upcoming cycle, but as a measure of conservatism, grease was added to SI-673 and SI-675, and the motor pinion gearbox grease was changed in SI-652. The acceptability determination was based on engineering judgement which, in turn, was based on current industry research and guidance.

A review of WO 445102 for SI-652 revealed that the technician who initially evaluated the grease determined that it was degraded and needed to be changed. The technician's foreman subsequently

determined the condition to be acceptable, but wrote a work order to have it changed at the next refueling outage. As discussed above, the grease in this valve was resampled and determined by engineering to be acceptable. However, the motor pinion housing grease was changed as a measure of conservatism. The inspector concluded that due to the subjective nature of the evaluation of degraded grease and the absence of definitive criteria, case-by-case engineering involvement appeared to be required for the licensee to establish an appropriate level of control.

Discussions with Engineering revealed that their engineering judgement on lubricant adequacy was based largely on the Electric Power Research Institute's (EPRI's) Nuclear Maintenance Applications Center (NMAC) "Lube Notes" publication dated November 1990 and telephone conversations with the author, as well as telephone conversations with Limitorque. "Lube Note" Number 4 addresses grease consistency limitations in Limitorque actuators and states that the grease consistency limits are: "No limit on the soft side; [and] high 3- to 4- grade on the hard end of the grease scale." This degree of grease hardness may cause difficulty in actuator spring reset from manual to automatic operation. The licensee reported that Limitorque does not have guidance for grease acceptability and considers it "a maintenance item."

The inspector noted that this guidance addresses the grease adequacy as a lubricant, but not for meeting EQ requirements. The licensee was unable to identify why grease conditions in the motor pinion housing are included in their EQ PM inspection program, and stated that Limitorque's EQ requirement documents LC-8 and LC-9 do not mention the motor pinion housing. Discussions between the licensee and Limitorque have indicated that these documents need to be updated. The inspector concluded that the technical basis for declaring the grease acceptable in the additional sampled actuators could not be firmly substantiated and that this appears to be an industry problem. The inspector further concluded that the licensee did not appear to fully understand their EQ requirements for Limitorque actuators, and that this also appears to be an industry problem.

The licensee committed to continue their review of Limitorque grease requirements for both lubrication and EQ, and to evaluate defining more specific minimum acceptability requirements as part of the incident investigation IIR 3-3-91-018. The inspector will monitor the licensee's progress on this issue and will review the IIR when it is completed (Inspector Followup Item 528/91-15-01).

d. Torque Switch Setting Adjustment

During the grease sampling of the actuator of SI-684, the inspector requested and then observed a mechanic check the torque switch setting adjustment. The inspector and mechanic noted that the torque switch setting indicator appeared to move slightly when checked. However, the mechanic was unable to move the stop any

further in either direction and was unable to tighten the screw any further. To ensure that the actuator torque switch was set properly and had not been inadvertently changed, the licensee performed an as-found MOVATS test on SI-684. No adjustment of the torque switch was necessary. The licensee postulated that since the torque switch setting indicator has "teeth" to lock it into position, the indicator could have been tightened with tooth-to-tooth rather than tooth-to-groove contact and the apparent movement could have been the indicator settling into full tooth-to-groove mesh. The Component and Specialty Engineer for MOVs indicated that one "tooth" misalignment of the torque switch setting indicator was enough to put a torque switch outside the required torque band. The inspector concluded that this underscores the importance of "skill-of-the - craft" in ensuring that these actuators are properly assembled.

e. Limit Switch Spring Discrepancies

During the grease sampling inspection, the licensee noted two missing springs on the limit switch assembly for SI-646. These springs hold the limit switch contactors against the rotors to ensure positive contact. Although these springs are captured at each end by a "cup," some jarring of the limit switch could free the spring. A search of the area around the actuator and the floor below the deck grating did not locate the missing springs. The reason the springs were missing is not known. The inspector identified an additional identical missing spring and cups on SI-636. The inspector noted that there is no requirement to check for the presence of these springs during overhaul of the actuator under procedure 32MT-9ZZ48. The missing springs were not identified until after the limit switch had been removed. The licensee was unable to determine if the springs had been removed or were ever present. The inspector considered it fortuitous that the springs were missing from SESS and spare contacts and not from valve open contacts that have a safety function during postulated accident scenarios. The licensee opened the limit switch housing on three other SMC-004 actuators in Unit 3 which had been subject to maintenance during this refueling outage and found no discrepancy. The inspectors' discussions with MOV and test engineers indicated no history of such deficiencies. The inspector concluded that although the absence of these springs represented a potential operability concern, it appeared that the observed deficiency was an isolated occurrence. The licensee further stated that these valves are periodically tested to demonstrate that they are operable.

No violations of NRC requirements or deviations were observed.

12. <u>Quality Verification Function - Units 1, 2 and 3 (35702)</u>

The inspector assessed the effectiveness of licensee quality verification organizations in identifying safety significant technical issues and problems and ensuring that issues and problems are resolved in a timely manner. The following issues were reviewed.

a. Motor Operated Butterfly Valve (MOBV) Testing

This issue, documented in Inspection Reports 529/90-20 (Paragraph 25), 528/90-45 (Paragraph 2), and in Paragraph 2 of this Inspection Report, resulted from the failure of valve 2EWA-UV-145 following maintenance, and the subsequent identification of several other MOBVs which did not receive appropriate post-maintenance retests.

Quality Audits and Monitoring (QA&M) has monitored several aspects of routine Motor Operated Valve (MOV) work, though MOBV retesting has not specifically been monitored. The QA&M organization did not appear to have contributed to identification or resolution of the MOBV retest deficiencies, partially because no corrective action documents (e.g., Quality Deficiency Reports [QDRs]) were initiated.

Quality Engineering (QE) performed a routine back-end review on a sample of selected Work Orders (WOs) from the previous month. QE did not identify the deficiencies in the retest and did not react to review this aspect of WOs for concurrent work on other MOBVs. QE is generally focused on areas of interest by periodic industry news reports (e.g., Nuclear Network and NRC Information Notices), and not necessarily to emergent onsite problems. The inspector noted in the back-end review of some older WOs (from mid-19910) that QE had looked at retests, though not associated with MOBVs or MOVs. Some reviews did include assessments of the adequacy of the retests. More recent WO reviews appeared to more thoroughly address the adequacy of retests. The inspector reviewed procedure 64DP-0QQ01, Revision 0, dated July 3, 1990, "Sample Review of Work/Test Documents," which suggested that the back-end reviews should address post-maintenance/modification action performed, operability requirements, and the importance to nuclear safety and reliability. The inspector reviewed one back-end review report which indicated that QE had challenged the adequacy of the work planner's retest evaluation. QE activities in this area appeared to be adequate.

Quality Control (QC) does not review test methods for adequacy, and has not been involved in activities which could have prevented the retest deficiency. No QC hold-points were in the applicable procedure which could have affected or identified the retest deficiency. The inspector noted that some QC personnel have recently received MOV and MOVATS training.

The inspector concluded that Quality Assurance (QA) organizations were not and are not involved in MOBV retests to a degree which would improve licensee performance in this specific area. Also, these organizations were not involved in the resolution of the identified MOBV deficiencies, other than by participation in the review of quality related procedures. However, a definite increase in the level of attention given to MOVs and retests was observed. Appropriate attention appears to be now given to retests in general, which could avert deficiencies in this or other areas.

b. Control of Safety-Significant Computer Data

This issue related to several licensee-identified deficiencies associated with computer data used by the Core Operating Limits Supervisory System (COLSS) and the Core Protection Calculators (CPCs). Some of these issues are documented in Inspection Reports 528/90-28, 528/90-39, and 528/90-45, in several licensee documents, and in Paragraph 2 of this Inspection Report.

The Quality Audits department had had some involvement in development and control of safety-significant computer data:

- QA Audit 89-009, dated June 26, 1989 - The scope of this audit included modification of CPC Addressable Constants, and some procedural deficiencies were identified.

- QA Audit 89-028, dated February 28, 1990 - This audit identified the need for establishment of a chain of custody for transmittal of data and software from Nuclear Fuels Management (NFM) to Reactor Engineering.

- QA Audit 91-006 (Unit 3 Refueling Audit), which was still in progress - included software control (NFM, COLSS, CPC, etc.) in its scope. The inspector noted that a reactor engineering consultant was hired to assist in the performance of this audit, and that it appears that several aspects of software control are being addressed. Several monitoring reports have been issued. QDR 91-0201 was issued because of the absence of a procedure for the control or use of the CEFAST and CECORE computer codes, and QDR 91-0202 was issued because power dependent insertion limit alarm setpoints are calculated without an approved procedure.

Quality Monitoring has monitored three activities in this category: 1) low power physics testing, which generates some data for CPC and COLSS addressable constants, 2) performance of a Reed Switch Position Transmitter power supply regulator integrated circuit, and 3) calibration of a Control Element Assembly Calculator. The majority of important computer databases have not been monitored. However, the inspector noted that the Quality Monitoring Activity Implementing Log (AIL) for the Operations Computer Group discipline/area, approved on February 7, 1991, includes the CPCs, Control Element Assembly Calculators, and Plant Monitoring System as primary activities to be tracked. Quality Monitoring uses this AIL to make recommendations regarding Quality Control activities.

QA&M also is involved in monitoring resolution of the Quality Deficiency Reports (QDRs) 91-0002 and 91-0003 as part of their routine activities. These QDRs involve substantial changes to the software configuration management program.

QE was extensively involved as a participant in the investigation

team for Incident Investigation Report (IIR) 91-017, which addressed some of the software configuration management control problems experienced at Palo Verde.

The inspector concluded that the quality verification organizations have been somewhat involved in oversight of these important computer-related safety-significant functions.

No violations of NRC requirements or deviations were identified.

13. Licensee Modification of Safety System Unavailability Goals - Units 1, 2 and 3 (62703)

In response to the results of the Probabilistic Risk Assessment (PRA) for PVNGS, one of the licensee's actions was to reevaluate the goals for safety system unavailability for Auxiliary Feedwater (AF), Emergency AC (DG), and High Pressure Safety Injection (HPSI) systems.

SITE SAFETY SYSTEM UNAVAILABILITIES

	1990 ACTUAL	1991 GOAL
AF	3.01%	2.1%
DG	3.45%	2.5%
HPSI	1.1 %	1.0%

The licensee also identified that a 1.0% increase in actual unavailability of AF results in approximately 16% increase in Core Damage Frequency (CDF) probability. An identical increase in DG unavailability results in approximately 8.5% CDF probability.

The inspector acknowledged that the licensee's efforts appeared to provide an understandable basis for controlling the amount of safety system outage time while the plants are operating. This is an area of continuing NRC interest and will be reviewed as part of the routine inspection program.

No violations of NRC requirements or deviations were identified.

14. Review of Licensee Event Reports - Units 1 and 3 (92700)

The following LERs were reviewed by the Resident Inspectors.

Unit 1

(Closed) LER 538/91-04-00: "Loss of Power to 4160V Bus During Maintenance" - Unit 1

This event was described and reviewed in Inspection Report 50-528/91-04, Paragraph 7. Based on this review, this LER is closed.

Unit 3

(Closed) LER 530/89-11-00/01: "Missed ASME Surveillance Test on Generator Air Start System Check Valve" - Unit 3

This report documented that the ASME surveillance was missed due to confusion resulting from the way the procedure alternated between air receivers to accomplish quarterly testing of the check valves in the procedure which is performed monthly. The surveillance tests are tracked on a procedure level basis, and a procedure performance was incorrectly counted as accomplishing the quarterly test for a check valve, even though the procedure section for that valve was not performed.

The applicable procedure was revised to increase the visibility of the quarterly ASME testing requirement for the check valves and to ensure that the appropriate valves were tested at the required frequency. The acceptance review for the surveillance now addresses this requirement.

The licensee has also implemented a component level tracing system for ASME tests. This system is generally updated every normal workday, though the completed surveillance may not get to the personnel performing the tracking for up to three weeks after the test is actually completed. The personnel performing the tracking check for overdue ASME surveillance on a daily basis. While there is no direct tie from this system to the actual surveillance scheduling system, personnel manually monitor the ASME tracking system and coordinate with the surveillance scheduling personnel to ensure surveillance are not missed.

The inspector concluded that the licensee's actions have reduced the likelihood of missing an ASME surveillance. Based on the procedure revision and acceptance review this LER is closed.

15. Exit Meeting

An exit meeting was held on April 26, 1991, with licensee management, the NRC Resident Inspectors and the Region V Inspector.

An exit meeting was held on May 16, 1991, with licensee management during which the observations and conclusions in this report were generally discussed. The licensee did not identify as proprietary any materials provided to or reviewed by the inspectors during the inspection.