U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos. 50-528/89-30, 50-529/89-30 and 50-530/89-30

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

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

Licensee: Arizona Nuclear Power Project
P. O. Box 52034
Phoenix, AZ. 85072-2034

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

Inspection Conducted: June 12 through August 6, 1989

Inspectors: T. Polich, Senior Resident Inspector

D. Coe, Resident Inspector

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Approved By: _____ 8-24-89
S. Richards, Chief Date Signed
Reactor Projects Section II

Inspection Summary:

Inspection on June 12 through August 6, 1989. (Report Nos. 50-528/89-30, 50-529/89-30 and 50-530/89-30)

Areas Inspected: Routine, onsite, regular and backshift inspection by the two resident inspectors, and two Regional inspectors. Areas inspected included: previously identified items; review of plant activities; engineered safety feature system walkdowns; monthly surveillance testing; monthly plant maintenance; review of licensee contractor qualifications - Units 1, 2, and 3; restart - Unit 2; missed procedure step while flashing generator field - Unit 2; forced outage due to pipe break - Unit 2; reactor trip and safety injection - Unit 2; main feedwater suction piping overpressurization - Unit 2; load rejection from 100% power - Unit 2; improper maintenance on atmospheric dump valve nitrogen supply reducing regulator valves (ADV regulator valves) - Unit 2; integrated safeguards surveillance testing - Unit 3; review of licensee event reports - Units 1, 2 and 3; and review of periodic and special reports - Units 1, 2 and 3.

During this inspection the following Inspection Procedures were utilized: 40500, 61701, 61726, 62703, 64704, 71707, 71710, 92700 and 93702.

Safety Issues Management System (SIMS) Items: None

Results: Of the nine areas inspected, two violations were identified. One violation pertained to failure to control work on safety-related equipment with an approved work order. The second violation pertains to fire protection in that flammable liquid lockers had expired storage permits.

General Conclusions and Specific Findings

Significant Safety Matters:	None
Summary of Violations:	Two
Summary of Deviations:	None
Open Items Summary:	Two items closed, and five new items were opened.

DETAILS

1. Persons Contacted:

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

Arizona Nuclear Power Project (ANPP)

*R. Adney,	Plant Manager, Unit 3
J. Allen,	Relief Plant Manager
*R. Badsgard,	Supervisor Nuclear Engineering Department
J. Bailey,	Assistant Plant Manager, Unit 3
*B. Ballard,	Quality Assurance Director
*C. Belford,	Supervisor Fire Protection
*H. Bieling,	Emergency Planning/Fire Department Manager
P. Brandjes,	Central Maintenance Manager
C. Churchman,	Work Control Manager, Unit 3
*W. Conway,	Executive Vice President - Nuclear
*J. Haynes,	Vice President, Nuclear Production/Site Director
*D. Heinicke,	Plant Manager, Unit 2
P. Hughes,	Radiation Protection & Chemistry Manager
*W. Ide,	Plant Manager, Unit 1
*D. Karner,	Vice President - Nuclear
J. Kirby,	Director, Nuclear Production Support
J. LoCicero,	Independent Safety Engineering Manager
*W. Marsh,	Plant Director
A. McCabe,	Maintenance Manager, Unit 1
D. Phillips,	Outage Management Manager
J. Reilly,	Standards and Technical Support Director
*A. Rogers,	Licensing Manager
C. Russo,	Assistant Quality Assurance Director
*T. Shriver,	Compliance Manager
G. Sowers,	Engineering Evaluations Manager
R. Younger,	Plant Standards and Control Manager
*W. Quinn,	Nuclear Safety and Licensing Director

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

*Attended the Exit meeting held with NRC Resident Inspectors on August 10, 1989.

2. Previously Identified Items - Units 1, 2, and 3 (92702, 92701)

a. (Closed) Followup Item (529/88-31-01): "Maintenance Work Order Steps Not Signed Off" - Unit 2.

The inspector reviewed the training records documenting retraining of maintenance personnel in the proper stepwise signoff technique to be used in performing work under a maintenance work order.

The inspector questioned several crafts personnel and found them to be aware of the proper signoff techniques.

The inspector found the licensee's actions to be adequate. This item is closed.

b. (Closed) Followup Item (529/88-42-02): "Damaged Battery Cell"- Unit 2.

This item involved damage to a battery cell case in the class 1E, "B" battery, channel "D," which the licensee discovered during surveillance testing. Upon discovery on January 16, 1989 the licensee had initiated a controlled shutdown in compliance with technical specifications. A temporary modification to jumper out the affected cell was installed, and the licensee restored the battery to service after completing the surveillance test to demonstrate the battery operable in the modified condition.

The inspector reviewed the licensee's event investigation report, Special Plant Event Evaluation Report (SPEER) 89-02-002, dated February 7, 1989, which identified that the damage most probably occurred during dismantling of scaffolding in the battery room on January 12, 1989.

The inspector found the licensee's evaluation to be thorough in identifying the cause of the damage and establishing corrective actions to preclude reoccurrence. This item is closed.

No violations of NRC requirements or deviations were identified.

3. Review of Plant Activities (71707, 71710, 93702)

a. Unit 1

Unit 1 remained in a refueling outage status with fuel off loaded during the entire reporting period.

b. Unit 2

Unit 2 began the inspection period in mode 3. On June 23, 1989 the licensee requested NRC concurrence to restart Unit 2 after completing repairs to Steam Bypass Control Valve 1008. The licensee determined the Steam Bypass Control Valve 1008 had been incorrectly modified in April 1988. The licensee subsequently submitted a second letter requesting NRC concurrence for restart of Unit 2 after modification of valve 1008 and three other Steam Bypass Control valves.

The unit was restarted on June 29, 1989 and paralleled onto the grid on June 30, 1989. On July 4, 1989 at 12:33 am, MST, a power reduction was initiated due to an unisolable feedwater leak from a Main Feed Pump (MFP) suction drain line (see paragraph 10). The reactor was taken to mode 2 at 3:31 am,

MST. The plant entered Mode 1 on July 6, 1989. The unit operated at 100% power until July 12, 1989 when a reactor trip and safety injection occurred (see paragraph 11). The reactor was restarted on July 20, 1989. The plant operated until August 4, 1989, when a turbine trip occurred. The plant was synchronized to the grid on August 6, 1989 (see paragraph 12).

c. Unit 3

Unit 3 remained in a refueling outage status. The core was refueled beginning on July 24, 1989, when Mode 6 was reestablished. The fuel reload was completed on July 31, 1989. The unit remained in mode 6 until the end of the inspection period.

d. Plant Tours

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

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

The following areas were observed during the tours:

1. Operating Logs and Records Records were reviewed against Technical Specification and administrative control procedure requirements.

2. Monitoring Instrumentation Process instruments were observed for correlation between channels and for conformance with Technical Specification requirements.

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

   The inspectors observed licensee operators to be attentive and alert during backshift and weekend tours.

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. This verification included routine control board indication reviews and the conduct of partial system lineups.

5. Equipment Tagging Selected equipment, for which tagging requests had been initiated, were 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 would prevent the systems from fulfilling their functional requirements.

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

   On August 1, 1989, the inspector identified three flammable storage lockers with expired flammable storage permits in Unit 1. One was on the Auxiliary Building roof and expired on March 2, 1989. The other two were on the 120' elevation of the Radwaste Building and the permits expired on July 15, 1989. The storage of combustible/-flammable materials with expired permits was identified as a potential violation of a license condition (528/89-30-01).

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.

   The licensee reported two instances of security guard inattentiveness during this inspection period. The events will be followed as part of the next routine security inspection.

10. Plant Housekeeping Plant conditions and material/equipment storage were observed to determine the general state of cleanliness and housekeeping. Housekeeping in the radiologically controlled areas was evaluated with respect to controlling the spread of surface and airborne contamination.

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

The licensee discovered several radioactive isotopes [Cobalt-60 (Co-60), Cesium-137 (Cs-137), Manganese-54 (Mn-54) and Antimony-125 (Sb125)] in the Unit 1 and 3 cooling tower sludge on July 14, 1989. This sludge had been dumped on-site in the Water Reclamation Facility landfill in May 1989. The licensee's Quality Audits and Monitoring personnel identified the problem during a routine audit. Regional health physics inspectors will followup on the licensee's monitoring and disposal of the sludge.

One violation of an NRC license condition was identified.

4. Engineered Safety Feature System Walkdowns - Units 1, 2 and 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 the walkdown of the systems, items such as hangers, supports, electrical cabinets and cables, were inspected to determine that they were operable, and in a condition to perform their required functions. Accessible portions of the following systems were walked down during this inspection period.

Unit 1

- Class 1E Batteries
- Remote Shutdown Panel
- "B" Emergency Diesel Generator

Unit 2

- Class 1E Batteries
- Remote Shutdown Panel
- Auxiliary Feedwater System
- "A" and "B" Emergency Diesel Generator

Unit 3

- Class 1E Batteries
- "B" Emergency Diesel Generator

During the inspection period, the inspector walked down the Unit 3 Class 1E batteries. The inspector observed that the inter-cell bus ties for the "C" battery had been removed from 42 of the 60 cells in the battery. The inspector inquired into the work in progress and found that the "C" battery had been out of service for approximately 3 weeks pending resolution of a problem involving proper torque for the bolted connector for the inter-cell bus ties to the cell posts. Licensee representatives from electrical maintenance stated that the problem was found to exist only on the "C" battery and not the other batteries which were in service. The inspector found the ongoing resolution of the problem to be adequate.

No violations of NRC requirements or deviations were identified.

5. Monthly Surveillance Testing - Units 1, 2 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 surveillances were observed by the inspector during this inspection period:

Unit 1

Procedure	Description
o 36MT-9SQ01	Radiation Monitoring Monthly Functional Test
o 36MT-9ZZ02	Remote Shutdown Panel System Instrumentation Calibration

Unit 2

Procedure	Description
o 42ST-2ZZ16	Routine Surveillance Daily Midnight Logs
o 42ST-2AF02	Auxiliary Feedwater Pump AFA-P01 Operability Test

Unit 3

Procedure	Description
o 73ST-3DG01	Class 1E Diesel Generator and Integrated Safeguards Surveillance Test Train "A".

No violations of NRC requirements or deviations were identified.

6. Monthly 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 QA/QC 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

- o Plant Protective System Power Supply Replacement.
- o Emergency Diesel Generator "A" Piston/Cylinder Replacement.

Unit 2

Description

- o Steam Bypass Control Valve Tear Down of 1008.
- o Steam Bypass Control Valve Modifications.
- o Atmospheric Dump Valve Nitrogen Regulator Rebuild.
- o Main Feed Pump Drain Line Die Penetrant Test.
- o Replacement of the Linear Calibrate Switch on Nuclear Instrument Channel "B".

Unit 3

Description

- o Repacking of Shutdown Cooling System Suction Line Isolation Valve SI-654.
- o Calibration of High Pressure Safety Injection Pump S04E Agastat Time Delay Relay.

No violations of NRC requirements or deviations were identified.

7. Review of Licensee Contractor Qualifications - Units 1, 2, and 3 (62703)

The inspector reviewed the qualifications and background verifications of two licensee contract employees from two different contractor organizations. The inspector assessed each individual's reported training and experience against their assigned duties. In addition, the inspector assessed the adequacy of the contractor documented background verification check. Finally, the inspector spot checked the validity of the background checks by independently verifying one of each employee's most recent employment positions which supported the required qualification level per ANSI/ANS 3.1-1978.

The inspector concluded that the training and experience of each employee was accurately represented on the employee's resume, that the stated qualifications were sufficient for the duties assigned and that the contractor organization background verification check was sufficiently detailed to provide assurance that the qualifications were accurate. The inspector had no further questions.

No violations of NRC requirements or deviations were identified.

8. Restart - Unit 2 (92700)

Palo Verde Unit 2 was voluntarily shutdown on March 15, 1989 after problems were identified with the Unit 1 Atmospheric Dump Valves (ADVs). The NRC subsequently issued a Confirmatory Action Letter (CAL) on March 28, 1989, which confirmed the course of action the licensee would take prior to requesting NRC concurrence to restart any of the Palo Verde units.

The licensee compiled a list of all NRC concerns, as well as all concerns identified by their own investigation. The NRC review of licensee actions taken in response to these concerns was documented in inspection report 50-529/89-21.

On June 23, 1989, the licensee responded in writing to the CAL dated March 28, 1989. The licensee confirmed that the agreed upon actions to restart Palo Verde Unit 2 were complete with the exception of work on Steam Bypass Control Valve (SBCV) 1008. The licensee also agreed to provide due dates for the completion of Unit 2 Post Restart items within 30 days of Unit 2 restart. Additionally, the licensee indicated that a Category 3 Investigation regarding the vendor interface with maintenance during the setting of ADV nitrogen regulators was expected to be complete by July 10, 1989.

On June 28, 1989, the licensee sent another letter to the NRC explaining the discovery that SBCV 1008 internals were not in the configuration required by the design. Specifically, three wave springs were found in the valve rather than the one required. The licensee also indicated that a formal investigation was initiated to determine the root cause of the extra wave springs. Additionally, the letter stated that SBCV 1008 was restored to its design configuration and tested satisfactorily. The licensee certified that the Steam Bypass Control System was fully functional.

The NRC responded to the licensee on June 28, 1989, indicating the licensee had NRC concurrence to restart Palo Verde Unit 2.

The Palo Verde Unit 2 reactor was taken critial on June 29, 1989 at 0401 MST.

No violations of NRC requirements or deviations were identified.

9. Missed Procedure Step While Flashing Generator Field - Unit 2 (71707)

On June 29, 1989, at 1800 MST, with reactor power at approximately 12%, the Unit 2 Main Turbine tripped. The secondary operator (licensed reactor operator) was attempting to flash the main generator field when he observed the field ammeter increase to approximately 4000 amps vice the normal 2100 amps, just prior to the turbine trip.

The licensee's initial review determined that the operator apparently failed to perform a portion of the step prior to attempting to flash the generator field. The operators performed the immediate actions for a turbine trip and no further attempts were made to flash the generator field. The Plant Manager, who was in the Control Room at the time, requested that the System Engineer return to the site to trouble shoot the problem and verify that the higher than normal current observed did not damage the control circuit.

The licensee's subsequent investigation indicated the operator had missed a procedure step by not minimizing AC and DC voltage regulator settings and observing the proper indicating lights prior to flashing the generator field. The licensee is continuing the investigation and has removed the operator from control room duties. The generator was successfully placed in service on June 30, 1989.

The licensee changed the investigation to a Human Performance Evaluation, HPES-89-018, which was not complete at the end of the report period. The inspector will followup on this HPES and the licensee's HPES backlog in a future inspection (529/89-30-01).

No violations of NRC requirements or deviations were identified.

10. Forced Outage Due To Pipe Break - Unit 2 (93702)

On July 4, 1989, at 0033 MST, the licensee began a power reduction from 100% power due to a leak on a Main Feed Pump suction pipe drain line. The initial leak was from a one inch line upsteam of valve FWN-V110, however, a one inch line upstream of valve CDN-V628 also started leaking and eventually failed. The unit was taken off the grid at 0324 MST and the reactor entered Mode 2 at 0331 MST.

The licensee initiated an incident investigation to determine the cause of the piping failures. The incident investigation was not complete at the end of the inspection period, however the licensee suspects that the drain valves failed due to high cyclic fatigue caused by a feedwater recirculation valve not being fully closed. Additionally, the licensee initiated Engineering Evaluation Request EER-89-FW-013, which was not complete at the end of the inspection period. This item will be followed in a future inspection (529/89-30-02).

The licensee completed repairs to the piping and dye penetrant testing of the other valves on the Main Feed Pump suction. The licensee increased power and paralleled onto the grid on July 20, 1989.

No violations of NRC requirements or deviations were identified.

11. Reactor Trip and Safety Injection - Unit 2 (93702 and 92700)

On July 12, 1989 at 2212 MST, the Unit 2 reactor tripped from 100% power on low DNBR due to the loss of power to 13.8 KV bus NAN-S02, which supplys the 1B and 2B Reactor Coolant Pumps (RCPs). The resulting transient caused Reactor Coolant System (RCS) pressure to decrease below the 1837 psig setpoint for the Safety Injection and Containment Isolation Actuation Signals (SIAS) and (CIAS). The licensee declared an Unusual Event (UE) at 2223 MST due to low RCS pressure, which decreased to 1823 psig. The licensee terminated the UE at 2322 MST after the plant was stabilized in mode 3 with two RCPs running.

The licensee did not activate the autodialer at the Shift Supervisor's discretion and the wrong number was dialed to activate the county wide beeper system, resulting in a failure to notify emergency response personnel as required. Although these notification methods failed an adequate number of licensee personnel and management responsed to the event.

The inspector responded to the event and personally observed that the unit had been stabilized in mode 3. The inspector closely followed the licensee's review of the event, and in particular, the licensee engineering organization's efforts to determine why RCS pressure decreased to the point at which a SIAS occurred. The licensee concluded that the excessive RCS depressurization was caused by a combination of an improper Steam Bypass Control System (SBCS) response and excessive leakage past the pressurizer spray valves. Through discussions with licensee personnel, the inspector determined that the spray valves had a 2-3 year history of problems with the calibration of the valve operators. Repeated attempts had been previously made to correct the problem, apparently without success. In discussions with licensee managers, it appeared that the spray valve issue had only recently been brought to the attention of a management level high enough to ensure that a more comprehensive review of the problem would be undertaken. The inspector questioned why this issue had taken such a long period of time to be addressed by management and suggested that the licensee thoroughly review the issue to assess how it had been previously handled. The licensee agreed that such a review would be useful.

Pending further inspector review of the adequacy of the licensee's previous corrective actions for the spray valve, this was identified as unresolved Item 89-30-05.

Regarding the SBCS, the licensee determined that the "Quick Open" controllers had been calibrated with data that had been superseded.

This resulted in the bypass valves being open longer than anticipated, thereby resulting in an excessive cooldown of the RCS. The loss of power to bus NAN-S02 was caused by a failed potential transformer fuse. The licensee was unable to determine why the fuse opened, and returned the fuse to the manufacturer for evaluation. The inspector reviewed the actions taken by the licensee to determine whether the fuse had opened due to a valid circuit fault and considered the licensee's actions appropriate. As discussed in Licensee Event Report (LER) 50-529/89-009, the licensee's review of the event is continuing. The LER will be supplemented with the results of this review.

The licensee restarted the unit on July 21, 1989, after the immediate restart concerns were addressed.

No violations of NRC requirements or deviations were identified.

12. Main Feedwater Pump Suction Piping Overpressurization - Unit 2

On July 21, 1989, during restart of Unit 2 following a reactor trip on July 12, the licensee discovered all six of the main feedwater pump (MFP) suction pressure switches deformed due to overpressurization. The licensee evaluated the cause and consequences of the overpressurization and determined that it did not offset continuation of power escalation. The licensee determined that the piping was overpressurized when a MFP recirculation valve was opened, thereby connecting the pump suction and discharge piping. This allowed the MFP suction piping to be pressurized by the AFW system due to a leaking check valve.

The inspector reviewed the event and the licensee's resolution of the problem as part of the licensee's post trip review. Based on interviews with licensee personnel involved in the event, the inspector determined the following to be an approximate time line for the event.

1989:

7/12 2200 Reactor Trip due to potential transformer fuse failure.

7/13 0100 Operations started the non-safety related auxiliary feedwater pump (AFN-P01).

0800 Post trip walkdown by systems engineers and operations identified unexpected cooldown of 7A feedwater heater outlet from 350 degrees F to 140 degrees F. Also cooldown was noted affecting leakage flow through the economizer control valve to the No. 1 steam generator.

1000 Operations initiated Long Path Recirculation (LPR) of main feedwater inorder to cooldown the feedwater heaters.

- Operator noted difficulty in opening MFP bypass valve V-13 due to high differential pressure. (Apparently, due to pressurization of the downstream piping caused by the leaking check valve V-431).

1530 A MFP low pressure trip alarm. (Apparently due to failure of the pressure sensor due to over pressurization of the MFP suction piping).

1930 B MFP low pressure trip alarm.

Operations opened V-46 to initiate LPR in support of testing to determine leakage past V-431

- MFP alarms were noted by Operations and Systems Engineers but no work order was written to investigate the problem.

7/14 V-431 seat leakage was repaired.

7/19 Work Order to investigate MFP pressure switch problem was written when alarms were again noted during startup preparations.

7/20 Reactor startup commenced.

7/21 0030 Reactor Critical.

Six MFP pressure switches were replaced when found to be unable to calibrate in place.

0700 Pressure switch was disassembled in I&C shop and found deformed due to overpressure.

- EER-89-CD-029 initiated.

0840 Main generator was synchronized to grid.

0900 Management informed of concern for overpressurization. (Rx power 13%).

- o Calculation to evaluate consequences were initiated.

1200 I&C destructively evaluated a new pressure switch to confirm failure mode due to overpressure at 1200 psi. (Rx power 18%)

1330 Onsite engineering concluded piping stresses were acceptable.

1400 Management decision made to continue power escalation.

1700 Corporate engineering concurred with acceptable stress analysis results

- EER-89-CD-029 dispositioned.

Based on a review of this time line, the inspector observed several weaknesses in the licensee's approach to resolution of this problem.

1. The licensee's post trip review did not identify the abnormally pressurized feedwater piping due to the recognized check valve leakage. Neither did it identify the overpressure condition resulting from initiation of LPR. The post trip review did address the leakage past V-431 to ensure that it was repaired prior to startup. However, the inspector found that the review did not formally evaluate the potential for pressurization of the feedwater piping as a consequence of the leakage. As a result, the abnormally pressurized condition of the feedwater piping was not recognized or evaluated prior to initiating LPR to cooldown the feedwater heaters. Although the operator noted unusual difficulty in opening V-13 to initiate LPR indicating an unexpected high differential pressure across the valve, the potential for overpressurizing the MFP suction piping was not recognized.

2. Due to inadequate communications between Operations and Systems Engineers, a work order to investigate and repair the unexpected MFP low pressure alarms was not initiated in a timely fashion when the condition was noted on July 13, 1989. The inspector found that the delay in initiating corrective actions until July 19, 1989, appeared to contribute to the hurried review and disposition which resulted during startup.

3. The management decision to continue power escalation appeared to have been based on an informal resolution of the consequences of the overpressurization. The initial bounding calculations and reviews appeared to have been performed in a hurried and informal manner with questionable conservatism. The review was not documented and checked, but rather consensus was obtained from various engineering organizations over the phone. Walkdowns of the affected portions of the systems were done without procedures or written guidance.

In resolving this problem involving non-safety related equipment, the inspector found that the licensee exhibited a considerable relaxation from the rigor and formality exercised in the control of safety related systems and equipment. Although the post trip review addressed all identified problems resulting from the trip, the inspector found the licensee's resolution to be less thorough in dealing with non-safety related problems. The inspector considered that this lack of a consistent methodology appeared to be a weakness in the conduct of the licensee's post trip review.

With the assistance of technical personnel from the NRC Office of Nuclear Reactor Regulation (NRR), the inspectors reviewed in some

detail the licensee's engineering analysis of the effect of the overpressure condition on the MFW pipe. The associated pipe has a design pressure of 500 psia. The licensee analyzed the pipe for an overpressure condition of approximately 1580 psia. Initially the licensee assumed that the weakest component of the system was the large bore pipe. The licensee therefore analyzed the pipe, assuming that if the pipe were found acceptable, it would bound all other components. The inspector strongly questioned this assumption, and based on prompting from the NRC, the licensee reviewed other components. The licensee then determined that several 30 inch flanges were actually the limiting components, and that these flanges may have exceeded the minimum yield strength. The licensee concluded that the flanges were acceptable for continued use based in part on hardness testing, magnetic particle testing, and visual inspections, all of which indicated that the flanges were not damaged by the event.

The inspector discussed the various above observations with licensee management who acknowledged the inspector's concerns. The licensee indicated that they were continuing their investigation into the incident and would be revising their Incident Investigation Report IIR-2-2-89-001 to include a more thorough review of the overpressurization incident. This report was not complete at the end of the inspection period.

Pending further inspector review of licensee corrective actions, this was identified as a second corrective action item for unresolved item 89-30-05.

No violations of NRC requirements or deviations were identified.

13. Load Rejection From 100% Power - Unit 2 (93702, 92700)

On August 4, 1989, at 0822, MST, Unit 2 experienced a load rejection due to a turbine trip from 100% power. The operators stabilized the plant at 40% reactor power on the Steam Bypass Control System after the turbine trip and subsequently reduced power to 10% while the cause of the trip was being investigated.

The licensee initiated a Catagory 3 investigation immediately. The licensee found that the turbine trip was initiated from Control Element Drive Mechanism (CEDM), Control System Power Bus Under Voltage (UV) coils that deenergized with power still present. The drop out voltage as found to be abnormally high for UV coils 1 and 3, and within acceptable limits for coils 2 and 4. Additionally, the CEDM Motor Generator (MG) output voltage was found to be set at 233 volts rather than the required 240 plus-or-minus 3 volts. Coils 1, 2, and 3 were replaced and the output of the MG sets was increased.

No violations of NRC requirements or deviations were identified.

14. Improper Maintenance on Atmospheric Dump Valves Nitrogen Supply Reducing Regulator Valves (ADV Regulator Valves) - Unit 2, (62703)

The inspector reviewed several completed work packages and interviewed craftsmen, supervisors, engineers and a vendor representative, all associated with the Unit 2 ADV regulator valves (2JSGAPCV0310, 2JSGAPCV0317, 2JSGBPCV0303, and 2JSGBPCV0323) due to ongoing difficulties with the operability and reliability of the ADV regulators.

Work order No. 00354032 for ADV regulator valve 2JSGAPCV0317 required the valve to be disassembled, cleaned and inspected, and re-assembled per technical manual No. J091-32 using sections applicable to MDL No. 7GQ-010. This work order was performed from April 14 to April 16, 1989. The instructions for re-assembly and setting the regulator valve contained in the technical manual were not used; instead the regulator valve was re-assembled and set based on verbal information obtained from a vendor representative. This assembly and setting of the regulator valve caused a continued lack of reliability and operability until the valve was reworked in mid June 1989.

Upon subsequent rework of the regulator valve, with the aid of a different vendor representative, it was determined that the regulator valves were incorrectly set and that proper reassembly and setting could be achieved by following the instructions in the technical manual.

Craftsmen, supervisors, and quality control personnel were aware that the information provided by the first vendor representative deviated from the technical manual; however, no actions were taken to resolve the issue.

Working per verbal information and failing to follow approved work orders and the vendor technical manual, which resulted in lack of reliability of the ADV regulator valves, is considered a violation of regulatory requirements (529/89-30-03). Arizona Public Service Company memorandum No. 260-00112-WCM, dated June 21, 1989, briefly describes the improper maintenance and immediate corrective actions.

Work orders 365985, 365995, 365996, and 365997 for ADV regulator valves 2JSGBPCV0303, 2JSGAPCV0310, 2JSGAPCV0317, and 2JSGBPCV0323, respectively, were all performed during June 17-20, 1989, and required work to be performed per vendor technical manual No. J691-32. This technical manual, dated November, 5, 1980, was superseded when the vendor issued a new technical manual dated December 28, 1983. The new technical manual, No. J691-83, was reviewed by engineering, plant standards, engineering evaluation, and the material control group, and subsequently approved on April 19, 1989. The new manual, J691-83 was not used or referenced in the above work orders, except in an amendment to work order 365997, where technical manual No. J691-83 was required for several steps but technical manual No. J691-33 was required for a later step. It was not clear as to what technical manual should have been

used on all four of the work orders and it was not clear that there were adequate measures to ensure that vendor technical manuals were properly controlled to provide the most recent, approved versions for maintenance. This item is open pending further review (529/89-30-04).

15. Integrated Safeguards Surveillance Testing - Unit 3 (61701)

The inspector reviewed procedure 73ST-3DG01, Revision 1, "Class 1E Diesel Generator and Train "A" Integrated Safeguards Surveillance Test", and observed selected portions of this test.

During the review of the procedure the inspector noted that there was no mention of pretest briefings and that the pre-requisites for the procedure were complex and confusing in that not all pre-requisites are required for each test section and not all test sections indicated the applicable pre-requisites. The procedure did require that the shift supervisor and test engineer establish the pre-requisites as required.

The inspector observed the pre-test briefing for section 8.3 of the procedure. The test director briefed the operators on the objectives of the test and the actions expected of each operator during the test. Questions about the test were properly resolved at this time.

During the test the inspector observed that the operators maintained control of plant conditions and the test sequence. When a procedural problem arose, the inspector observed that the test director and shift supervisor took proper actions to ensure that plant administrative procedures were properly followed. Problems identified by the test appeared to be properly documented by plant personnel to be resolved by following the proper Palo Verde Nuclear Generating Station procedure.

During this test the inspector also observed operations of the "A" Train emergency diesel generator. The operators properly adhered to the plant written procedures. The equipment functioned as designed.

No violations or deviations of NRC requirements were identified.

16. Quality Hotline Review (71707)

The inspector reviewed the licensee's Quality Hotline status and selected several current and closed investigations for review. The files that were reviewed appeared to address the concerns, and contained conclusions and supporting documentation. The inspector will continue to followup on selected Quality Hotline concerns in future inspections.

No violations or deviations of NRC requirements were identified.

17. Office of Nuclear Reactor Regulation (NRR) Reviews

Several issues associated with restart of Unit 2 were referred to NRR for review. The issues were as follows:

- Multiple Control Element Assembly (CEA) slippage
- Position indication problems with CEA #9
- Steam generator tube plug integrity
- Low pressure safety injection header drain valve weld performed by an unqualified welder.

NRR interfaced directly with the licensee on these issues and concluded that the licensee's actions were acceptable for restart of Unit 2.

18. Review of Periodic and Special Reports - Units 1, 2 and 3 (90713)

Periodic and special reports submitted by the licensee pursuant to Technical Specifications 6.9.1 and 6.9.2 were reviewed by the inspector.

This review included the following considerations: the report contained the information required to be reported by NRC requirements; test results and/or supporting information were consistent with design predictions and performance specifications; and the validity of the reported information. Within the scope of the above, the following reports were reviewed by the inspector.

Unit 1

- Monthly Operating Report for June, 1989.

Unit 2

- Monthly Operating Report for June, 1989.

Unit 3

- Monthly Operating Report for June, 1989.

No violations of NRC requirements or deviations were identified.

19. Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations. One new unresolved item identified during the inspection is discussed in paragraphs 11 and 12.

20. Exit Meeting

The inspector met with licensee management representatives periodically during the inspection and held an exit meeting on August 10, 1989. The licensee acknowledged the inspectors comments and concerns.