U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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Licensee:	Commonwealth Edison Company
Facility:	Zion Nuclear Plant, Units 1 and 2
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EXECUTIVE SUMMARY
Zion Nuclear Plant, Units 1 and 2
NRC Inspection Reports 50-295/96-14; 50-304/96-14

This inspection included aspects of licensee operations, maintenance, and engineering. The report covers a seven-week period of inspection activities by the resident staff and regional projects inspectors.

Operational performance was characterized by frequent operational events, several of which resulted in inadvertent limiting conditions for operation (LCO) entries. The licensee was ineffective in averting the previously identified trend in personnel errors. Furthermore, several procedures were deficient, resulting in water spills and other events.

Operations

- An inadvertent isolation of component cooling water flow to the 2B safety injection pump and resultant LCO entry was caused by inadequate equipment attendant (EA) communications and understanding of duties. This event also resulted in a violation for the failure to follow procedures governing work controls (Section 01.1).

- The inspectors identified a violation involving multiple failures to stop withdrawing control rods and enter the appropriate abnormal operating procedure upon indications of rod misalignment. This event manifested deficiencies in communication of expectations for conduct of startup, in command and control during rod withdrawal, and in operator sensitivity to possible rod misalignment due to known position indication problems (Section 01.2).

- The inspectors identified a violation in which, due to an incorrect understanding of Technical Specifications (TS), the licensee did not complete TS action requirements for inoperable emergency diesel generators (EDGs) within the required time frame on several occasions (Section 01.3).

- A demineralized water spill in the Unit 2 containment resulted from a failure of a general operating procedure to provide sufficient plant configuration controls (Section 01.4).

- The failure to properly unload EDGs upon completing surveillance tests due to operator inattention to detail, resulted in a violation (Section 01.5).

- Isolation of the wrong air supply to residual heat removal (RHR) valves during out-of-service activities due to inattention to detail by the EA, resulted in a violation (Section 01.6).

- A violation was identified pertaining to an inadequate test procedure which contributed to a two hour delay in recognizing an LCO entry and taking appropriate action when the 2A atmospheric relief isolation valve did not satisfy stroke time testing requirements. Some operators also exhibited a non-conservative approach to operability (Section 03.1).

- A violation was identified involving an inadequate test procedure which resulted in an inoperable penetration pressurization air compressor and inadvertent LCO entry. The lack of a questioning attitude by a maintenance technician also contributed to this event (Section 03.2).

Maintenance

- Informal maintenance contractor work practices resulted in inappropriate cross-connecting of the service air and demineralized water systems (Section M1.1)

- Poor material condition of two check valves resulted in two radioactive gas releases in the Auxiliary Building and the Unit 1 containment, respectively. Initial licensee investigation of the releases was deficient (Section M2.1).

- A violation was identified involving an inadequate maintenance procedure which resulted in a loss of instrument air (IA) to the Unit 2 containment during installation of valve blocks on the IA containment isolation valves. An inadequate pre-job brief and deficient communications between departments also contributed to this event (Section M3.1).

- A violation was identified involving a failure to correctly assemble two pressurizer power operated relief valves (PORVs) in accordance with procedures during modifications, which resulted in the failure of one of the PORVs. Repairs required a plant shutdown (Section M4.1).

- The inspectors identified a violation pertaining to the licensee's failure to ensure that a quality control (QC) inspector remained independent of a maintenance activity involving reassembly of the 2B EDG jacket water cooler end cover, which the QC inspector was witnessing. The mechanic and QC inspector were also not familiar with the correct bolting torque sequence (Section M7.1).

Engineering

- A violation was identified involving an inadequate leak rate testing procedure which did not provide sufficient configuration controls, resulting in the inadvertent transfer of 500 gallons of water from the Unit 2 reactor water storage tank to the refueling cavity. The failure of an operator to follow verbal direction also contributed to this event (Section E1.1).

- A violation was identified involving the inadvertent omission of a test procedure step by a system engineer which resulted in actuation of the 2A service water pump breaker (Section E4.1).

- The inspectors identified a violation involving an unauthorized temporary alteration. A fan was taped on the Unit 2 manipulator crane over the refueling cavity while fuel assemblies were being moved (Section E4.2).

Report Details

Summary of Plant Status

At the beginning of this inspection period, Unit 1 was at 100 percent power. The unit was taken off-line on August 27 to repair an inoperable pressurizer PORV. The unit was placed back on-line on September 18 and operated at 100 percent power for the remainder of the inspection period.

Unit 2 began this inspection period at 100 percent power and remained there until September 19 when it was taken off-line for the start of a refueling outage.

Operational performance during the inspection period was characterized by frequent operational events, several of which resulted in inadvertent LCO entries. The licensee was ineffective in preventing personnel errors. An adverse trend in personnel errors was the subject of escalated enforcement, and corrective actions were described in the licensee's response dated September 27, 1996, to the Notice of Violation and Proposed Imposition of Civil Penalty - $50,000 (NRC Inspection Report Nos. 50-295;304/96007)). Furthermore, several procedures were deficient, resulting in water spills and other events. Several of the events occurred as a result of problems in maintaining appropriate configuration of plant systems during testing and other work activities. Examples are described in the following report sections. Although some examples were identified by the licensee, these examples are included in the cited violations because their causes are similar to previous underlying performance problems that the licensee has not yet effectively addressed.

I. Operations

O1 Conduct of Operations

O1.1 Inadvertent LCO Entry for Isolation of Component Cooling Water (CCW) Flow to the 2B Safety Injection (SI) Pump

a. Inspection Scope (71707)

On September 15, the Unit 2 control room received two unexpected alarms, "Safety Injection Cooling Water Low Flow" and "Charging Pump Cooling Water Low Flow." The inspectors interviewed operations department personnel and inspected the involved equipment.

b. Observations and Findings

The unexpected alarms were caused by equipment attendant (EA) actions while performing daily operator rounds. The Unit 2 Auxiliary Building EA partially disassembled the 2B SI pump CCW flow transmitter in an effort to reset the SI pump cooling water low flow annunciator, even though the annunciator was not alarming. This action caused magnetic

decoupling of the local indicator. In an attempt to recover local flow indication, the EA shut the CCW isolation valve to the pump, which caused one of the unexpected alarms. Since the SI pump would not have performed its required safety function while CCW was isolated, the EA's actions caused an inadvertent entry into the LCO for TS 3.8.2.C.

During the subsequent performance of operator rounds, the EA found the 2A charging pump cooling water flow high. In an attempt to return the flow to the expected range, the EA lowered flow sufficiently to cause another unexpected alarm in the control room. In both of these instances, the EA did not communicate with the control room before performing the manipulations.

The inspectors determined that no formal training had been provided to operations personnel on the manipulation of flow transmitters to clear an annunciator. However, during the previous week, while returning a residual heat removal (RHR) pump to service, local indication for CCW to the RHR pump was lost. In response to guidance received from an instrument maintenance supervisor, the same EA was directed to isolate and slowly re-establish flow. This previous evolution caused the EA to erroneously believe his routine duties included partial disassembly and manipulation of the flow transmitter without the need for additional controls.

c. Conclusions

The inspectors concluded that: (1) the EA did not consistently communicate with the control room before manipulating components in the field which had a potential to cause control room annunciators; (2) the EA partially disassembled and manipulated a flow instrument without any controls; and (3) based on interviews with operations department personnel, EA duties and responsibilities were not consistently understood within the Operations Department.

Zion Administrative Procedure (ZAP) 1200-08, "Risk Significant On-line Maintenance," Revision 4, required:

- In Section F.1.d, that the Risk Management Team identify compensatory measures and actions required to remove, test, or restore the system to service for each voluntary entry into an LCO or risk significant combination.

- In Section F.3.a, that the Work Control Center pre-plan and coordinate work activities by all involved work departments in order to minimize the downtime of out-of-service systems and the risk of losing redundant equipment.

- In Section F.5, that the Work Control Center be responsible for initiating Attachment A, "Voluntary LCO Entry Outage Approval Form."

The failure to establish work controls, as required by ZAP 1200-8, for the work activities associated with the 2B SI pump CCW flow transmitter, is considered a violation of 10 CFR Part 50, Appendix B, Criterion V (50-295/96014-01a, 50-304/96014-01a), as described in the attached Notice of Violation.

01.2 Positive Reactivity Addition During Indications of Control Rod Position Misalignment

a. Inspection Scope (71707)

The inspectors observed Unit 1 startup activities on September 16-17 which were conducted in accordance with General Operating Procedure GOP-2, "Plant Startup," Revision 9, and Operations Special Procedure OSP-96-016, "RCS Dilution to Criticality," Revision 0.

b. Observations and Findings

On September 16, the inspectors observed the infrequently performed evolution shift briefing for OSP-96-016. The inspectors also observed a subsequent control room operator briefing which was conducted just prior to commencing the control rod withdrawal. This second briefing was held as a result of an eight hour delay in the initiation of the control rod withdrawal and to focus the shift on the evolution.

The inspectors were concerned that the guidance provided by operations management/supervision on how to resolve expected control rod position indication deviation alarms, was different for each briefing. During the infrequently performed evolution briefing, the operations manager communicated the expectation that every deviation alarm would be corrected prior to continuing with rod withdrawal. However, during the control room shift briefing, the shift engineer, unit supervisor, and nuclear group supervisor stated that when rod position indication exceeded 12 steps from the demand position, the nuclear station operator (NSO) shall stop pulling rods and evaluate the deviation to determine whether the deviation was a rod misalignment or a position indication problem. If the deviation was due to rod position indication, the NSO shall continue withdrawing control rods to the desired position. Once the rods were at the desired position, the rod position indication system would be re-aligned.

The inspectors identified, through questioning of shift personnel immediately following the briefing, that confusion existed regarding TS requirements for control rod alignment and position indication. The inspectors discussed with operators the appropriateness of withdrawing control rods while in a TS LCO for rod position indication. An Independent Safety Engineering Group representative noted that shift personnel were unable to answer the inspectors' questions and he raised a concern with operator confusion in this area to licensee management. In response, the operations manager discussed the issue with shift personnel and clarified the proper response to rod position deviation alarms.

During the withdrawal of shutdown bank D, the inspectors identified that rod position indication appeared to deviate by greater than twelve steps near the top of the rod pull. The inspectors subsequently determined, through interviews with selected operations personnel, that on several occasions during the withdrawal of shutdown banks, the NSO continued to pull control rods even though control board rod demand and rod position indication deviated by greater than twelve steps.

The NSO indicated his reason for continuing with the rod withdrawal was that the qualified nuclear engineer had stated that the computer was indicating an acceptable alignment. However, the inspectors were concerned with this justification because the computer-did not give real time data and only provided information useful for evaluating rod position when rod motion had stopped and the computer had time to complete updating.

c. Conclusions

The inspectors concluded that: (1) the infrequently performed evolution briefing was ineffective at communicating licensee management's expectations for conduct of the startup; (2) command and control of the shutdown bank control rod withdrawal was weak; and (3) due to known rod position indication problems, the shift performing the shutdown bank rod withdrawal was not sensitive to adding reactivity when control rod indication was outside TS rod alignment limitations.

TS 6.2.1.a required that written procedures be prepared, implemented, and maintained for procedures listed in Appendix A of Regulatory Guide 1.33, Revision 2, dated February 1978. Appendix A of this regulatory guide specified nuclear startup as an example of a general plant operating procedure. General Operating Procedure GOP-2, "Plant Startup," Revision 9, Step 4.0.15, required, in part, that if any control rods were misaligned, refer to Abnormal Operating Procedure AOP-2.1, "Rod Control System Malfunction," and contact the Qualified Nuclear Inspector for further guidance. Appendix C, "Stuck Rod, Misaligned Rod, or Inoperable RPI [rod position indication]," of AOP-2.1 required, in part, that RPI be checked against the process computer. Failure to stop pulling control rods and enter AOP-2.1 when the control board RPI display indicated rod misalignment, is considered a violation of TS 6.2.1.a (50-295/96014-02).

O1.3 TS Action Requirements Not Completed Within the Required Time Frame

a. Inspection Scope (71707)

The inspectors observed portions of emergency diesel generator (EDG) operability surveillances and reviewed the TS required actions associated with the 2B EDG outages of August 12-13 and September 9-11, and the 2A EDG outage of September 15-17.

b. Observations and Findings

The inspectors identified that on two occasions during the September 9-11, 2B EDG outage, the licensee exceeded the required eight-hour time interval between verifications of the availability of off-site power sources. The inspectors also identified four additional examples during the EDG outages conducted on August 12-13 and September 15-17, where the required 8-hour interval between verification of off-site power sources was exceeded.

The inspectors determined that the failure to perform TS actions in the required time frame was a recurring problem. This deficiency was attributable to a misconception that a 25 percent extension could be applied to the time interval of repetitive action requirements in a manner similar to that allowed for TS surveillances. A similar problem was identified with different TS action requirements, as documented in NRC Inspection Report 50-295;304/96-16.

c. Conclusions

The inspectors concluded that the failure to perform TS actions for inoperable EDGs within the required time frame resulted from an incorrect understanding of TS. Technical Specification 3.15.2.C required demonstration of the availability of two sources of off-site power at least once every eight hours while the 2A or 2B EDGs were out-of-service (OOS). The failure to verify the availability of two sources of off-site power at least once every eight hours while the 2A and 2B EDGs were OOS, is considered a violation of TS 3.15.2.C (50-304/96014-03), as described in the attached Notice of Violation.

O1.4 3,000 Gallon Demineralized Water Spill in Unit 2 Containment

a. Inspection Scope (71707)

On September 22, 3,000 gallons of demineralized water were spilled inside Unit 2 containment. The inspectors interviewed operations personnel and inspected demineralized water valve, 2DW-0035.

b. Observations and Findings

In preparation for the Unit 2 outage, licensee personnel opened two demineralized water containment isolation valves to supply water to the containment for use by station personnel. The five demineralizer water service taps downstream of the isolation valves were normally closed between outages, and the licensee therefore assumed that these valves were closed at the time the containment isolation valves were opened. However, 2DW-0035, located on the 560' elevation of the reactor coolant pump deck, was open. As a result, water sprayed from the open tap inside the missile barrier where it collected in the containment sump. The containment sump water level set point was reached which automatically started the containment sump pumps.

A radwaste operator observed indication that the sump pumps were running. This unexpected condition was communicated to the control room shift engineer (SE) and the health physics (HP) supervisor, who subsequently dispatched an HP technician into containment to investigate. The HP technician took immediate corrective action to shut the valve. The licensee determined that approximately 3,000 gallons of demineralized water had been sprayed inside the Unit 2 containment.

At the conclusion of this inspection period, the licensee's investigation was still in progress. However, the licensee tentatively planned to revise the station shutdown procedure to require that operations personnel verify that valves off the demineralized water header were closed prior to opening the containment isolation valves.

c. Conclusions

The inspectors concluded that General Operating Procedure GOP-4, "Plant Shutdown and Cooldown," Revision 13, was inadequate, in that it failed to require verification of the position of demineralized water service tap valves prior to opening the containment isolation supply valves. This is not considered a violation of NRC requirements because the affected valves are nonsafety related and therefore, are not subject to Appendix B of 10 CFR Part 50.

O1.5 Procedure Steps Missed While Performing EDG Surveillances

a. Inspection Scope (71707)

On October 6, the licensee identified that the 1A EDG was incorrectly unloaded during shutdown when a licensed operator failed to perform a fifteen minute hold at one megawatt (MW). The inspectors reviewed the surveillance results and different revisions of procedures, and also interviewed the unit supervisor and several NSOs.

b. Observations and Findings

During shutdown of the 1A EDG in accordance with surveillance procedure PT-11-DG1A, "1A Diesel Generator Loading Test," Revision 6, Attachment 1, the operator was required to reduce power from 4 MW to 1 MW and hold the generator power at 1 MW for 15 minutes. However, the operator reduced power from 4 MW to 0 MW and failed to hold power at 1 MW.

The inspectors subsequently reviewed the results of EDG surveillances performed during this inspection period and identified that on September 9, the "0" EDG was run unloaded for seven minutes vice the 15 minutes required by surveillance procedure PT-11-DG0, "0 Diesel Generator Loading Test," Revision 7, Attachment 1.

c. Conclusions

The inspectors concluded that this event was caused by inattention to detail by the licensed operator. The failures to follow surveillance procedures PT-11-DG1A and PT-11-DG0 for proper unloading of the EDGs following the respective surveillance tests, are considered a violation of 10 CFR Part 50, Appendix B, Criterion V (50-295/96014-01b, 50-304/96014-01b), as described in the attached Notice of Violation.

01.6 Out-of-service (OOS) Errors on the Residual Heat Removal (RHR) System

a. Inspection Scope (71707)

On October 7, an equipment attendant (EA) identified two OOS errors while performing independent verification for two RHR system OOS tasks. The inspectors interviewed the EA and the shift engineer. The inspectors also reviewed the OOS documentation and walked down the affected portion of the RHR system.

b. Observations and Findings

Two EAs were performing a "child" (subordinate) OOS task on the RHR system. Out-of-service Nos. 960006991 and 960009514 directed the EA to close the instrument air (IA) supply to RHR system valves 2HCV-RH606 and 2HCV-RH618, respectively, by closing valves 2IA0662 and 2IA0663 which would isolate the main air supply to each respective RHR valve. However, the EAs isolated the backup air supply to the RHR valves instead of the main air supply. The OOSs were hung between 10:00 a.m. and 1:00 p.m. on October 7. An EA, on the following shift, was performing an IV of the two OOSs and identified the errors. The licensee took immediate corrective action to isolate the main air supply and unisolate the backup air supply.

During interviews, an EA stated he did not have a complete picture of how the plant was being configured which contributed to his course of action. The EA considered that isolating the backup air supply was correct because he was performing a "child" OOS which he believed should not isolate the main air supply. The EA further stated that the "parent" OOS, which was to be hung later, would actually isolate the main air supply to the RHR valves.

An incorrect location on the OOS sheet also contributed to the EA's actions. The sheet identified the 542' elevation of the Auxiliary Building as the location for isolating the main air supply to the RHR valves. But, the backup air supply, rather than the main air supply, was located on this elevation.

c. Conclusions

The inspectors concluded that this event was primarily caused by the EA's incomplete knowledge of the intended plant configuration. The independent verification process barrier was effective in identifying

the OOS error. However, the failure of the EAs to remove the main air supply to valves 2HCV-RH606 and 2HCV-RH618 from service in accordance with the OOS procedure is considered a violation of 10 CFR 50, Appendix B, Criterion V (50-295/96014-01c, 50-304/96014-01c), as described in the attached Notice of Violation.

O3 Operations Procedures and Documentation

O3.1 Inadvertent LCO Entry for Containment Isolation Valves

a. Inspection Scope (71707)

On September 18, the licensee identified that a TS LCO for containment isolation valves had been inadvertently entered during stroke testing of the 2A atmospheric relief isolation valve. The inspectors reviewed the completed surveillance, Inservice Testing (IST) Evaluation No. 10-9-96-3, and discussed the issue with an IST engineer.

b. Observations and Findings

On September 18, in preparation for the Unit 2 shutdown, the licensee cleared the OOS for the 2A atmospheric relief isolation valve, 2MOV-MS-0017. This isolation valve had been OOS for main control board position indication work. The subject valve was then stroked per PT-27G-ST, "Steam Generator PORV Stroke Time Testing," Revision 1, for return-to-service. The valve's stroke time of 63.2 seconds was greater than the action value, which was an operability threshold; however, the valve was not declared inoperable. Acceptable results were obtained during a second stroke test and MS-0017 was returned to service.

Two hours after the surveillance test had been completed, a licensed shift supervisor (LSS) who was reviewing the test results, determined that the motor-operated valve (MOV) was technically inoperable and that the appropriate four hour LCO action statement for TS 3.9.3, "Containment Isolation Valves," had not been entered. The LSS directed that a manual isolation valve, which had been reopened following the test, be closed to comply with the TS.

c. Conclusions

The inspectors concluded that PT-27G-ST was inadequate in that the procedure did not ensure that the valve stroke time was evaluated for acceptability by the personnel performing the test. Step 8 of Section 5.1 of PT-27G-ST required a yes or no answer for "stroke time in the acceptable range." However, this step did not reference Section 5.5, "Concluding Procedure," for guidance on actions to take when valve stroke times are outside of the acceptable range. Specifically, Step 1 of Section 5.5 required that an entry be made in the Unit Operator's Log that the valve was inoperable based on test results in the action range. This step also required sign-off by a LSS, which was not done at the time that the valve was stroked.

In addition, ZAP 300-02, "Use of Procedures in Operating Department," Revision 10, Attachment 2, "Valve Stroke Timing," required that if any valve stroke time was greater than the action limit then the valve immediately be declared inoperable. Procedure PT-27G-ST did not ensure that the intent of ZAP 300-02 would be met. The failure of PT-27G-ST to ensure a timely operability evaluation of valve stroke time testing results was considered a violation of 10 CFR Part 50, Appendix B, Criterion V (50-295/96014-04a, 50-304/96014-04a), as described in the attached Notice of Violation.

The failure of operators and the unit supervisor to recognize that valve 2MOV-MS-0017 should have been considered inoperable when stroke time testing requirements were not met, regardless of the procedure deficiency, indicated a lack of questioning attitude. Guidance in Generic Letter 91-18, "Information to Licensees Regarding Two NRC Inspection Manual Sections on Resolution of Degraded and Nonconforming Conditions and On Operability," clearly indicates that when test performance data falls in the required action range, the valve must be immediately declared inoperable. Using the results of a second stroke time test to conclude that the subject valve was operable following initial test failure, without interim evaluation and/or appropriate corrective action, reflected a non-conservative approach to operability determinations by the involved operators and supervisor.

03.2 Inadvertent LCO Entry for Inoperable Penetration Pressurization (PP) Air Compressors

a. Inspection Scope (71707)

On October 5, the licensee identified that Unit 1 had inadvertently entered into TS LCO 3.9.2.B.a, "Penetration Pressurization Systems." The inspectors interviewed the unit supervisor and site quality verification (SQV) personnel involved with this event.

b. Observations and Findings

The licensee was performing Technical Staff Surveillance (TSS) 15.6.123, "Leak Test of PP Check Valves," Revision 8, for Unit 2. The Unit 2 PP compressor had previously been taken OOS in accordance with the surveillance procedure. The procedure required the technician to lift the Unit 2 lead for the PP header low pressure signal. Another lead for automatic start of the "0" PP air compressor was at the same terminal point. When the technician lifted both leads and re-landed the lead for compressor automatic start, the "0" PP air compressor was rendered inoperable. However, this momentary inoperability of the "0" PP air compressor was not recognized until pointed out by SQV personnel in the control room. Site Quality Verification personnel idertified that the applicable drawing differed from the actual wiring configuration. The licensee subsequently determined that, in all cases, the approved procedure would have rendered the "0" PP air compressor inoperable resulting in an LCO entry per TS 3.9.2.B.a.

c. Conclusions

The inspectors concluded that the technician exhibited a lack of questioning attitude by lifting the additional lead without first ensuring a complete understanding of the possible consequences. In addition, TSS 15.6.123 was inadequate. The failure of TSS 15.6.123 to indicate the existence of an automatic start lead that would render the "0" PP air compressor inoperable when lifted, was considered a violation of 10 CFR Part 50, Appendix B, Criterion V (50-295/96014-04b, 50-304/96014-04b), as described in the attached Notice of Violation.

08 Miscellaneous Operations Issues

08.1 (Closed) LER 50-304/96006-00: Licensed shift supervisor error resulted in missed surveillance.

On June 12, the Unit 2 containment isolation valve, 2FCV-VN02A, was taken OOS to repair an open limit switch. Two licensed shift supervisors failed to obtain the appropriate post-maintenance testing (PMT) requirements from the system engineer. Each licensed shift supervisor independently and incorrectly determined that surveillance procedure PT-300-ST, "Containment Isolation Valve Stroke Time Verification," was sufficient to prove valve operability. Both individuals were confident of their knowledge regarding the appropriate PMT requirement. After the test was completed, the valve was declared operable.

On August 7, an NSO identified that surveillance procedure PT-40-300, "Valve Remote Position Indication," should also have been included in the PMT requirements for the valve. After identifying this deficiency, the licensee took the appropriate actions to return the valve to service. Valve FCV-VN02A provided a containment isolation function according to UFSAR Table 6.2-4. Therefore, when the valve had been returned to service on June 12, without performing the required testing, an inadvertent entry into TS 3.9.3 occurred.

The licensee's corrective actions included:

- Returning the valve to service,
- Counseling the involved individuals, and
- Discussing this event with other operators by January 1997.

The failure to accomplish the appropriate PMT activity in accordance with the applicable procedure, PT-40-300, before declaring containment isolation valve 2FCV-VN02A operable, is considered a violation of 10 CFR Part 50, Appendix B, Criterion V (50-304/96014-05). Other examples of inadvertent LCO entries due to the failure to perform appropriate PMT are described in NRC Inspection Report No. 50-295/96007; 50-304/96007. However, these instances involved the failure of engineering to specify PMT when requested, whereas the inadvertent LCO entry associated with containment isolation valve 2FCV-VN02A occurred because the PMT requirements specified by operations personnel were

incorrect. The inspectors concluded that the corrective actions for the events discussed in IR 96007 would not have precluded the event involving 2FCV-VN02A from occurring. Therefore, this licensee-identified and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy. Continuing inspector concern with inadvertent entries into LCO action statements are discussed in other sections of this report.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Contract Maintenance Worker Cross Connected Service Air (SA) and Demineralized Water Systems

a. Inspection Scope

The inspectors reviewed the recovery action following cross-connection of the demineralized water system with the SA system. The problem was identified when a worker in the Unit 2 containment noticed water flowing from a SA valve and notified the control room.

b. Observations and Findings

On October 8, a contract worker attempted to clear a blockage on a steam system valve. Apparently, the worker had been successful in clearing blockages at another plant by connecting SA and demineralized water with a "Y" connector. With air pressure higher than water pressure, the resultant mixture blew out the blockage. However, at Zion the demineralized water system is at a higher pressure than the SA system and as a result, the SA system was partially filled with water when the systems were cross-connected. Demineralized water and SA were isolated to the containment until the "Y" connector was discovered and disconnected and repairs and cleanup were completed.

The licensee directed the contractor to stand down from all work and brief workers on proper control of maintenance. The contractor committed to revise pre-job checklists and walkdowns, and make additions to its new employee orientation. The licensee commenced a root cause investigation of the incident.

c. Conclusions

The event appeared to be the result of informal work practices. However, the work stoppage, work control briefings, and root cause investigation were appropriate. The root cause investigation was hampered by the fact that the contractor fired the employee and removed him from the site before the licensee could interview him.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Poor Material Condition of Two Check Valves Resulted in Two Gas Releases

a. Inspection Scope (62703)

On October 5, there were two radioactive gas releases in the Auxiliary Building and the Unit 1 containment, respectively. The inspectors interviewed the unit supervisor, NSO, and mechanical maintenance lead; reviewed the plant and instrumentation diagrams (P&IDs) and appropriate procedures; and walked down the associating piping.

b. Observations and Findings

The Unit 1 volume control tank (VCT) hydrogen regulator valve, 1VC8155, was repaired by maintenance personnel because it was not working properly. After the maintenance activity was complete, an equipment operator (EO) was sent to adjust the regulator. The EO performed a bubble test around the fittings and found that the fittings were leaking. A check valve, 1VC8411, was also leaking which allowed contaminated gases and hydrogen to escape from the VCT through the regulator fittings into the Auxiliary Building, contaminating personnel.

During a non-related activity, the licensee was lowering VCT pressure by venting the VCT to the waste gas system. Check valve 0WG9280 leaked and released contaminated gases from the VCT into the Unit 1 reactor coolant drain tank (RCDT), which pressurized it. The relief valve for the RCDT opened and vented the gases to the containment sump, which caused a containment radiation alarm. The licensee immediately stopped the venting process and entered Abnormal Operating Procedure 5.1. A sample taken by the radiation protection personnel confirmed the alarm.

The licensee's initial review of this event was deficient. The licensee did not identify that the source of the contaminated gases from the VCT to the Auxiliary Building was through a failed check valve until pointed out by the inspectors.

c. Conclusions

The inspectors concluded that poor material condition of the check valves caused the radioactive gas releases. The failure to initially identify that a leaking check valve allowed gases to escape from the VCT into the Auxiliary Building, indicated a lack of questioning attitude by operations and maintenance personnel.

M3 Maintenance Procedures and Documentation

M3.1 Loss of Instrument Air (IA) to Unit 2 Containment

a. Inspection Scope (62703)

On September 25, 1996, the licensee identified that IA had been lost to the Unit 2 containment as a result of a maintenance activity involving the installation of valve blocks on IA containment isolation valves, 2FCV-IA01A and B. The inspectors reviewed the results of the licensee's investigation and the maintenance procedures used during the work activity.

b. Observations and Findings

Maintenance procedure M015-1, "Valve Block Fabrication, Installation, and Removal," Revision 2, required the installation of a hand loader when installing a valve block on an air operated valve. The hand loader would maintain the valve in the desired position during the valve block installation. However, the procedure did not contain any guidance to ensure control of plant system configuration during the installation of the hand loader. By observing the limit switches for valve 2FCV-1A01A, the mechanics incorrectly determined that the valve was closed when in fact, the valve was open. Believing that valve 2FCV-1A01A should remain closed, the mechanics isolated air to the valve actuator in order to disconnect the air line and connect the hand loader. This resulted in the valve shutting which caused a loss of IA to containment. Instrument air was restored 32 minutes later.

During the pre-job briefing for this activity, the licensee specified that the subject valves should be left "blocked open." However, the need to reposition the valves based upon the as-found condition was not discussed at this briefing.

c. Conclusions

The inspectors concluded that: (1) the pre-job brief was deficient since it did not discuss the expected as-found position of the valves, (2) mechanical maintenance did not contact the control room before operating a plant system valve, and (3) Maintenance Procedure M015-1 did not contain sufficient guidance to prevent the inadvertent isolation of IA to containment.

The failure of M015-1 to provide appropriate guidance to control the configuration of plant systems during the installation of a hand loader was considered a violation of 10 CFR Part 50, Appendix B, Criterion V (50-295/96014-04c, 50-304/96014-04c), as described in the attached Notice of Violation.

M4 Maintenance Staff Knowledge and Performance

M4.1 Mis-installation of Hypoid Key Resulted in Failure of Power Operated Relief Valve (PORV) Block Valve

a. Inspection Scope (62703)

On August 26, in preparation for isolating PORV block valve, RC-8000B, in order to replace the PORV block valve stem and yoke in response to Information Notice 92-60, "Valve Stem Failure Caused by Embrittlement," the valve tripped on thermal overload. The licensee visually verified that the valve was closed and attempted to manually stroke open the valve, but was not successful. On August 27, Unit 1 was shut down to repair the valve. The inspectors discussed the event with maintenance engineering personnel and reviewed the maintenance procedures for assembling the motor-operated valve (MOV) actuator.

b. Observations and Findings

The PORV block valve tripped on thermal overload. The licensee calculated that the thrust applied to the valve was 35,000 lbs., with the nominal thrust window being 9,200 to 11,000 lbs. Attempts to manually open the valve resulted in several broken gear teeth on the valve's handwheel. Upon disassembly of the valve actuator, the licensee identified that the locating pin associated with the hypoid gear was missing. The hypoid gear operates the limit switch. Without the locating pin in place, the hypoid gear could rotate on the drive sleeve, rendering the limit switch inoperable. No internal problems with the valve were evident. The valve seat, disc, and guide were penetrant tested with acceptable results.

The valve's failure was caused by a maintenance error. During the Fall 1995, Unit 1 refueling outage, maintenance personnel modified six MOV actuators from Limitorque SMB-00 to SB-00 style actuators. Following the PORV block valve failure, the licensee disassembled all six valves and identified that two block valves were missing the locating pins. The other four valves had the locating pin correctly installed. In addition, the licensee identified that among 51 safety-related, Unit 1 MOVs, work had been performed on 10 of the valves during which the locating pin could have been removed. The licensee selected five valves based on relative risk significance and inspected each valve to determine if the locating pin was installed. No discrepancies were identified. Based on the inspection results, the licensee determined that the Unit 1 MOVs were operable.

While Unit 2 did not have any SB-00 style actuators, the licensee identified 12 safety-related MOVs that could have missing locating pins due to previous work performed. The licensee planned to inspect 5 of the 12 MOVs during the Unit 2 refueling outage. This decision was based on the absence of identified problems during inspection of the Unit 1 MOVs.

c. Conclusions

Maintenance Procedure P/M016-2N, "Limitorque Motor-Operated Valve Actuator SMB-00," Revision 2, required the installation of the locating pin and hypoid gear on the MOV drive sleeve. However, during the 1995 Unit 1 refueling outage, maintenance personnel failed to install the hypoid gear locating pin on two PORV block valve drive sleeves. The failure to follow procedure P/M016-2N is considered a violation of 10 CFR Part 50, Appendix B, Criterion V (50-295/96014-01d, 50-304/96014-01d), as described in the attached Notice of Violation.

M7 Quality Assurance in Maintenance Activities

M7.1 Incorrect Torquing Technique During 2B Emergency Diesel Generator (EDG) Maintenance and Inadequate Quality Control (QC) Inspection

a. Inspection Scope (62703)

On September 9, the 2B EDG failed the monthly operability surveillance test due to high lube oil temperature. The inspectors interviewed maintenance and QC personnel, observed selected portions of the maintenance activities associated with the inspection and cleaning of the lube oil and jacket water coolers, and observed the replacement of the EDG intercooler and the lube oil temperature control valve.

b. Observations and Findings

The inspectors observed that mechanical maintenance personnel performing the maintenance activities were generally knowledgeable of their assigned task. The mechanics placed an appropriate emphasis on foreign material exclusion control. Work packages were available at the work location and were used by the mechanics. The work packages were also adequate, based on the inspectors review.

However, the inspectors identified that an improper torque sequence was used by the mechanic during the reassembly of the 2B EDG jacket water cooler end cover. The inspectors were concerned that the QC inspector performing the inspection of the joint reassembly did not identify the use of an improper torque sequence. The licensee considered reassembly of mechanical joints within the skill-of-the-craft, and as a result, a torque sequence was not specified as part of the work procedure. In addition, the QC inspector was not independent of the maintenance activity since the inspector was setting the torque wrench for each torque increment.

During an interview with the QC inspector, the inspectors learned that the QC inspector's training background was not mechanical in nature, and that he did not know the proper torque sequence for reassembly of mechanical joints. The QC inspector was aware of the requirement to remain independent from the work activity being inspected, however, he involved himself in the work activity by setting the torque wrench.

c. Conclusions

The inspectors concluded that: (1) the mechanic performing the reassembly of the 2B EDG jacket water cooler end cover used an improper torque sequence, (2) the QC inspector performing the inspection of the torquing of the end cover was not knowledgeable of the proper torque sequence for the reassembly of mechanical joints, and (3) the QC inspector was not independent of the work activity since he set the torque wrench for each torque increment. A similar problem was identified involving an inadequate quality control inspection during EDG maintenance in NRC Inspection Report 50-295/96006, 50-304/96006.

Zion Administrative Procedure (ZAP) 520-08, "Station QC Inspection Program for Maintenance Work," Revision 3(G), requires, in part, that independent inspection/quality verification be performed by qualified individuals other than the group performing the maintenance task. The failure to ensure that the quality control inspection of the jacket water cooler end cover reassembly was independent of the work activity, in accordance with ZAP 520-08, is considered a violation of 10 CFR Part 50, Appendix B, Criteria X (50-304/96014-06), as described in the attached Notice of Violation.

III. Engineering

E1 Conduct of Engineering

E1.1 Safety-Related Piping Support Anchor Plates Exceeded the Specified Gap Criteria Between the Plate and the Building Structure

a. Inspection Scope (37551)

During plant tours and system walkdowns, the inspectors identified piping supports with gaps between the building structure and the piping support anchor plate.

b. Observations and Findings

On September 3, during a tour of the Auxiliary Building, the inspectors identified at least ten examples of piping supports for the containment spray and safety injection (SI) systems with gaps between the building structure and the support anchor plate. As described in Nuclear Station Work Procedure NSWP-S-05, "Concrete Expansion Anchors," Revision 3, Section 6.20, the acceptance criteria for the gap between the building structure and the piping support anchor plate is less than or equal to 1/32 of an inch, not to exceed 30 percent of the length of the anchor plate, for each side of the plate.

In response to this issue, the licensee initiated a Problem Identification Form and performed limited scope walkdowns of the SI and auxiliary feedwater systems in order to better characterize the magnitude of the issue. The walkdowns revealed that 15 of the 29 piping

supports inspected had gaps in excess of the acceptance criteria specified in NSWP-S-05. The license initiated an operability assessment to determine if the piping supports could perform their intended function with the gaps present.

c. Conclusions

The issue with piping support gaps exceeding acceptance criteria is considered an Inspection Follow-up Item (50-295/96014-07; 50-304/96014-07) pending NRC review of the licensee's operability assessment and supporting engineering calculations. In addition, a related issue involving the failure of VT-3 inspections, conducted in accordance with the inservice inspection program, to include verification of the clearance between the building structure and the piping support anchor plate, was discussed in NRC Inspection Report 50-295/96013, 50-304/96013.

E1.2 High Ambient Temperature in 125 Volt-DC Battery Room

a. Inspection Scope (37551)

On September 3, during a walkdown of the 011 125 Volt-D.C. station battery, the inspectors identified that the ambient temperature of the battery room was abnormally high. The inspectors reviewed the results of a surveillance test performed earlier in the day, the logs for auxiliary operator tours, and battery vendor information.

b. Observations and Findings

The inspectors noted that the licensee had performed maintenance procedure EMSP-01, "Station Battery Monthly and Quarterly Surveillance", on September 3. During the surveillance test, the licensee identified that the ambient temperature for the 011 battery room was approximately 99° Fahrenheit (F) while the expected value was between 60 and 90°F. The licensee attributed the cause of the high ambient temperature to the closed position of the battery exhaust fan discharge damper. The licensee determined that the damper had failed closed. The licensee started the redundant train of ventilation, but did not evaluate the hydrogen concentration of the room before initiating ventilation flow. As a result, the licensee was unable to use the hydrogen concentration to determine the approximate duration that the exhaust ventilation system had been inoperable and therefore was not able to evaluate the associated operability of the battery.

Through a review of auxiliary operator logs, the inspectors determined that operability of the battery exhaust ventilation system was checked daily by verifying that the exhaust fan was energized rather than verifying that air flow existed. In addition, the expected range for the battery pilot cell temperature specified in licensee procedures was between 60 and 100°F. However, the nominal temperature range specified in battery vendor information was between 60 and 90°F.

c. Conclusions

Zion Operability Determination Manual guidance allows the 011 125 Volt-D.C. battery to be considered operable for five days without battery room exhaust ventilation. This issue is considered an Inspection Follow-up Item (50-295/96014-08; 50-304/96014-08) pending NRC review of the basis for this guidance and operation of the battery in an environment with an ambient temperature greater than that specified by the vendor.

E1.3 Inadvertent Transfer of 500 Gallons of Water From the Refueling Water Storage Tank (RWST) to the Refueling Cavity

a. Inspection Scope (37551)

On September 26, during testing performed by system engineering, 500 gallons of water were inadvertently transferred from the Unit 2 RWST to the refueling cavity. The inspectors interviewed operations department personnel and reviewed both Technical Staff Surveillance (TSS) 15.6.10B, "Special Type B and C Leak Rate Test," Revision 3, and the control room "posted instruction drawing."

b. Observations and Findings

While performing TSS 15.6.10B for the refueling cavity to refueling water purification pump (RWPP) valve, 2SF8767, a drain path was created between the Unit 2 RWST and the refueling cavity. Valve 2SF8758 (RWST to RWPP valve) had been left open after filling the transfer canal with water from the RWST to support fuel moves. The drain path was created when valve 0SF0012, the refueling cavity to RWPP containment isolation valve, and valve 2SF8767 were opened during the surveillance test.

The surveillance procedure for TSS 15.6.10B was inadequate in that it did not require verification of initial valve positions to assure that a leakage path was not created during the performance of the surveillance test. In addition, a barrier that should have prevented the inadvertent water transfer from the RWST failed, in that a non-licensed operator did not follow the Unit 2 supervisor's direction to review the Posted Instruction Drawing. This drawing provided the status of the valves in the spent fuel pit cleanup and cooling systems, and had the operator referred to this drawing, he may have recognized that specific valves were not positioned for performance of the surveillance test.

c. Conclusions

The failure of TSS 15.6.10B to require verification of initial valve positions contributed to the inadvertent transfer of 500 gallons of water from the Unit 2 RWST to the refueling cavity and is considered an example of a violation of 10 CFR 50, Appendix B, Criterion V (50-295/96014-04d, 50-304/96014-04d), as described in the attached Notice of Violation. The failure of a non-licensed operator to follow verbal direction also contributed to this event.

E3.1 Review of UFSAR Commitments

The discovery of a licensee operating its facility in a manner contrary to the Updated Final Safety Analysis Report (UFSAR) description highlighted the need for a special focused review that compares plant practices, procedures and/or parameters to the UFSAR descriptions. The inspectors reviewed the applicable portions of UFSAR that related to the areas inspected. The inspectors verified that the UFSAR wording was consistent with the observed plant practices, procedures, and/or parameters.

E4 Engineering Staff Knowledge and Performance

E4.1 Inadvertent Pump Breaker Actuation Due to Engineering Personnel Error

a. Inspection Scope (37551)

On September 23, a system engineer did not perform the action required in a procedural step resulting in actuation of the 2A Service Water (SW) pump breaker while it was racked out in the test position. The inspectors interviewed the system engineer and the electrical engineer supervisor and reviewed the procedure and electrical prints.

b. Observations and Findings

While performing Technical Staff General Procedure (TSGP) 97, "Test of the Autostart Inhibit Circuitry for Bus 47 Pumps," the system engineer signed off a step which was not yet performed. This step directed the system engineer to energize undervoltage relay 427TD1 before de-energizing relay SDR/27-2. When the system engineer did not perform this step and de-energized relay SDR/27-2, the logic was satisfied for automatic closure of the 2A SW pump breaker. The pump breaker had previously been racked out to the remote test position, and therefore, closing of the pump breaker did not cause the SW pump to start.

c. Conclusions

Inattention to detail and lack of self-checking by the system engineer resulted in the failure to perform a required procedural step causing closure of the 2A SW pump breaker. The failure to ensure undervoltage relay 427TD1 was energized prior to de-energizing relay SDR/27-1, in accordance with TSGP 97, is considered an example of a violation of 10 CFR Part 50, Appendix B, Criterion V (50-295/96014-01e, 50-304/96014-01e) as described in the attached Notice of Violation.

E4.2 Unauthorized Temporary Alteration of the Unit 2 Manipulator Crane

a. Inspection Scope (37551)

On October 4, the inspectors observed that a fan was taped to the Unit 2 manipulator crane over the refueling cavity while fuel assemblies were being moved. The inspectors interviewed involved system engineers and

their supervisor, fuel handling personnel, and an administrative operating engineer, and reviewed ZAP 510-05, "Temporary Alteration Program," Revision 4.

b. Observations and Findings

While observing fuel moves, the inspectors noted that a fan was taped to the manipulator crane. The fan was being used to blow air to cool the manipulator crane motor and the pilot generator. The licensee concluded that the fan was originally taped to the crane to address the generation of heat due to excessive use of the jogging function while performing incore shuffling of the fuel assemblies.

After the licensee decided to perform a full core offload for the refueling outage, the use of the jogging function was limited. However, the fan was not removed and the crane was never tested for operation without cooling from the fan. The condition with the taped fan had existed since the late 1970's and the licensee had not determined whether or not use of the fan impacted the function of the manipulator crane.

The licensee planned to remove the fan from the crane and test the operation of the crane without additional cooling. If additional cooling was warranted, the licensee planned to install the fan according to ZAP 510-05 requirements and process an exempt change to install a permanent fan.

c. Conclusions

Zion Administrative Procedure (ZAP) 510-05, "Temporary Alteration Program," Revision 4, defines a temporary alteration (TA) as an alteration made to the plant configuration, including equipment and facilities, intended to be temporary, that does not conform to approved drawings or other plant documents.

The failure to process a TA for the installation of a portable fan on the Unit 2 fuel manipulator crane in accordance with design controls specified in ZAP 510-05 is considered a violation of 10 CFR Part 50, Appendix B, Criterion III (50-304/96014-09) as described in the attached Notice of Violation.

V. Management Meetings

XI Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on October 21, 1996. The licensee acknowledged the findings presented.

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

X2 Management Meeting Summary

On October 7, a public management meeting with ComEd was held in Region III. The topic of discussion was the continuation of personnel errors at Zion and the licensee's plans to stop this trend.

Partial List of Persons Contacted

Licensee

J. Mueller, Site Vice President
G. Schwartz, Station Manager
W. Stone, Regulatory Assurance Supervisor
B. Fitzpatrick, Operations Manager
B. Giffin, Engineering Manager
K. Hansing, Site Quality Verification Director
W. Strodl, Radiation Protection Supervisor
D. St. Clair, Work Control Manager
M. Weis, Services Director

NRC

M. Dapas, Chief, Reactor Projects Branch 2
M. Parker, Senior Resident Inspector, Palisades
R. Westberg, Acting Senior Resident Inspector

List of Inspection Procedures Used

IP 37551	Engineering
IP 62703	Maintenance Observation
IP 71707	Plant Operations
IP 93702	Prompt Onsite Response to Events at Operating Power Reactors

List of Items Opened, Closed, and Discussed

Opened

50-295/304-96014-01a	VIO	Inadvertent LCO entry for inoperable SI pump
50-295/304-96014-01b	VIO	EDG was not cooled down for 15 minutes as required by surveillance procedure
50-295/304-96014-01c	VIO	EAs performing OOS, isolated the backup air supply to the RHR valves vice the main air supply
50-295/304-96014-01d	VIO	Maintenance personnel failed to install the hypoid gear locating key for two PORV block valve drive sleeves
50-295/304-96014-01e	VIO	System engineer omitted step during surveillance resulting in automatic closure of the 2A SW pump breaker
50-295-96014-02	VIO	Failure to stop pulling control rods and enter abnormal operating procedure following indicated rod misalignment
50-304-96014-03	VIO	Failure to demonstrate the availability of two sources of off-site power at least once every eight hours while the 2A and 2B EDGs were OOS
50-295/304-96014-04a	VIO	Inadequate procedure for stroke time testing of the 2A atmospheric relief valve
50-295/304-96014-04b	VIO	Inadequate procedure for leak testing of Unit 2 penetration pressurization system check valves
50-295/304-96014-04c	VIO	Failure to have a step in maintenance procedure for installation of the hand loader
50-295/304-96014-04d	VIO	Failure to have a step in test procedure for verification of initial valve position
50-304-96014-05	NCV	Licensed shift supervisor error resulted in missed surveillance
50-304-96014-06	VIO	Failure of quality control inspector to remain independent of activity involving jacket water cooler end cover reassembly
50-295/304-96014-07	IFI	Operability assessment and supporting engineering calculations for base plates gaps
50-295/304-96014-08	IFI	Basis for 125 volt battery operability without battery room exhaust ventilation
50-304-96014-09	VIO	Unauthorized temporary alteration for portable fan on fuel manipulator crane

Closed

50-304/96014-05	NCV	Licensed shift supervisor error resulted in missed surveillance
50-304/96006-00	LER	Licensed shift supervisor error resulted in missed surveillance

List of Acronyms

AB	Auxiliary Building
AOP	Abnormal Operating Procedure
CCW	Component Cooling Water
EA	Equipment Attendant
EDG	Emergency Diesel Generator
EO	Equipment Operator
GOP	General Operating Procedure
IA	Instrument Air
IFI	Inspection Followup Item
IP	Inspection Procedure
IR	Inspection Report
ISEG	Independent Safety Engineering Group
ISI	Inservice Inspection
IST	Inservice Testing
IV	Independent Verification
LCO	Limiting Conditions For Operation
LSS	Licensed Shift Supervisor
MOV	Motor-Operated Valve
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
NSO	Nuclear Station Operator
OOS	Out-of-service
OSP	Operations Special Procedure
P&ID	Plant and Instrumentation Drawing
PDR	Public Document Room
PIF	Problem Identification Form
PMT	Post-Maintenance Testing
PORV	Power Operated Relief Valve
PP	Penetration Pressurization
QC	Quality Control
RCDT	Reactor Coolant Drain Tank
RHR	Residual Heat Removal
RWPP	Refueling Water Purification Pump
RWST	Refueling Water Storage Tank
SA	Service Air
SE	Shift Engineer
SI	Safety Injection
SQV	Site Quality Verification
SW	Service Water
TA	Temporary alteration
TS	Technical Specification
TSGP	Technical Staff Group Procedure
TSS	Technical Staff Surveillance
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VCT	Volume control tank
VIO	Violation
ZAP	Zion Administrative Procedure