APPENDIX A

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 50-528/94-28
50-529/94-28
50-530/94-28

Licenses: NPF-41
NPF-51
NPF-74

Licensee: Arizona Public Service Company
P.O. Box 53999
Phoenix, Arizona

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

Inspection At: Palo Verde Site, Maricopa County, Arizona

Inspection Conducted: September 27 through October 7, 1994

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EXECUTIVE SUMMARY

This inspection was conducted using Inspection Procedure 40500, "Effectiveness of Licensee Control Systems to Identify and Resolve Problems." Engineering, Maintenance, and Radiological Controls were the functional areas chosen for emphasis.

LICENSEE CONTROL SYSTEMS

Overall, the team found that Palo Verde had a good self-assessment capability. Performance issues were known and identified, and usually addressed. The team found that management attention and priority had been recently directed to many historical issues.

Licensee performance assessment activities had identified a programmatic weakness in the effectiveness of corrective actions for Category 3 and 4 condition report/disposition requests. This was documented in Condition Report/Disposition Request 94-Q017. The licensee determined that the root cause of this programmatic weakness was that Palo Verde did not fully understand or fully embrace root-cause culture. Followup corrective action effectiveness reviews conducted by the licensee found weaknesses in management attention and priority to the implementation of corrective actions. The team also found some examples of protracted implementation of corrective actions.

At the time of the inspection, the licensee was in the process of implementing corrective actions to address the programmatic weakness. The team concluded that the implemented and planned corrective actions addressed the licensee identified cause.

MAINTENANCE

The team found, for observed maintenance activities, good quality of maintenance, good supervision, appropriate work instructions, and good work control.

The team assessed material condition by performing plant and system walkdowns and by reviewing the maintenance history on selected components. The team found that fuel oil leaks on the diesel generators in Unit 2 were excessive, including fuel oil pump discharge pressure regulating valves. The causes for these leaks were apparently known, but not yet addressed. The team identified other system leaks where work requests or work orders had not been initiated to correct. The team's findings were generally consistent with a maintenance department self-assessment which had identified that walkdowns of systems had not always been conducted, or were not always effective. The licensee's corrective actions in response to the self-assessment had not yet been effective.

The team noted a high number of drip catches. This concern had been identified by the licensee and a program and priority to reduce these leaks had been initiated. The team also noted that efforts to improve material condition included the reduction of operator work arounds, control room

deficiencies, and eliminating plant deficiencies that caused control room annunciators. The team considered that the accumulation of these maintenance items reflected a historic willingness to live with problems. However, recent senior management emphasis to eliminate these problems was a positive indication of problem identification. The team could not assess the long-term effectiveness of the actions planned.

The team found that housekeeping was generally good. The general appearance, and preservation of plant buildings was fair.

The maintenance "Corrective Action Assessment," completed September 29, 1994, was self-critical, noting that there was ineffective followup by management to schedule corrective action implementation, untimely corrective actions, and interim controls were not always in place. The self-assessment considered that increased management attention and the condition report/disposition request program enhancements put into place in August should help management focus on significant condition report/disposition requests. The self-assessment found that while maintenance had made improvements at identifying the cause of problems and what actions are needed to address these issues, maintenance management was not well focused on nurturing these solutions through completion. The team concluded that maintenance had a good self-assessment capability.

In the area of preventive maintenance, the team found one equipment failure that was attributed to not performing vendor-recommended preventive maintenance. The vendor-recommended actions had been excluded because the corrective maintenance history on the component was good. The team also found that vendor recommended checks on motor bearings were excluded without a written justification. This may have contributed to one bearing failure. The team concluded that the exclusion of some vendor-recommended preventive maintenance checks without a valid justification was a weakness in the preventive maintenance program.

The team found that the number of preventive maintenance tasks requiring technical review was increasing. The team also found that 132 overdue Unit 2 preventive maintenance items occurred during the last 15 months. In addition, equipment failure trend information was not proactively used to determine equipment performance.

ENGINEERING

The licensee had significantly changed the modification process recently, and only the pilot modification had been through the process. Consequently, the team was not able to assess the effectiveness of the licensee's revised modification process. During interviews, engineers seemed enthusiastic about the new modification process.

The team found some weaknesses in the implementation of corrective actions. These included corrective actions that had not been implemented for March 1992 diesel generator starting problems and diesel generator cooldown trips. For a charging pump cross head failure, corrective actions were narrow in that other pumps were not inspected. The team considered that the weaknesses that were

seen were consistent with the performance issues identified by Condition Report/Disposition Request 94-Q017.

The team found that corrective actions to address 10 CFR 50.59 screening weaknesses appeared comprehensive and included the initiation of periodic training for those qualified to perform the screening.

In the area of engineering backlog, the team found that the licensee had categorized and developed a plan to address the modification backlog. The team considered that the backlog of engineering work, although substantial, was understood and was receiving priority for reduction.

The team found that a high number of uncompleted impact reviews existed and that the number was increasing. At the time of the inspection, there were over 2000 uncompleted reviews affecting safety-related components and documents. This had been identified previously by the licensee but had not been effectively addressed. Licensee representatives indicated that the outstanding reviews had been considered and did not have immediate safety significance.

Plant review board meeting minutes discussed motor-operated valve torque spring mispositioning on about 20 large motor-operated gate valves. The team found that the licensee's operability determination was good. The licensee identified the root cause and implemented corrective actions that addressed the identified cause. The licensee developed a schedule of repair based on safety significance.

The team found inadequate evaluation of several hundred weld failures identified in a welding program assessment, dated February 8, 1993. At the time of the inspection, the licensee had not performed any followup or review of the stated weld failures. During the inspection, the licensee performed an assessment of the weld failures and determined that there were no trends or safety significance to the weld failures.

RADIOLOGICAL CONTROLS

The radiation protection organization was appropriately staffed and had little turnover. The latest quality assurance audit of radiation protection was comprehensive and identified significant findings. The radiation protection organization demonstrated the ability to be self-critical; however, it was not clear that it had a mechanism to ensure that recommendations for change were evaluated and implemented. The exposure control program was appropriately implemented. Good prejob briefings were presented by the radiation protection personnel. Good job coverage was provided by radiation protection technicians. The team found good performance with respect to the midcycle outage radiation exposure goals. The average person-rem totals for each unit were below national averages. A noncited violation was identified by the team for inadequate implementation of the vehicle, equipment, and materials release log.

DETAILS

1 INTRODUCTION

This inspection was conducted using Inspection Procedure 40500, "Effectiveness of Licensee Control Systems to Identify and Resolve Problems." Engineering, Maintenance, and Radiological Controls were the functional areas chosen for emphasis. In preparation for this inspection, the team reviewed past inspection reports, licensee event reports, the most recent audits in maintenance and engineering, minutes of the plant review board and offsite review committee, and self-assessments that had been performed in engineering and maintenance.

2 MAINTENANCE

2.1 Quality of Maintenance Activities

The team assessed if maintenance activities were being conducted according to procedures and instructions, and if the procedures and instructions were sufficient to accomplish the maintenance task. The team assessed maintenance problem identification and resolution. The team observed maintenance activities as discussed below:

2.1.1 Charging Pump B, Unit 2

The team observed the disassembly and assembly of Unit 2, Charging Pump B. Work Order 00678402 instructed maintenance technicians to disassemble the charging pump and inspect or replace any defective parts such as packing, plungers, discharge and suction valves. Before the start of work, the team observed a radiation protection job briefing of the proposed work activity.

The team followed the disassembly of the pump by reviewing Maintenance Procedure 31MT-9CH01, "Charging Pump Disassembly And Assembly," Revision 3. Discussions with maintenance technicians indicated that training had been provided for disassembly and assembly and that this task had been performed many times before. The maintenance technicians inspected valve internals for wear, damage, and foreign debris. The seats were also inspected by the maintenance technicians for degradation. After the inspection, maintenance technicians installed new packing, plungers, discharge, and suction valves. The team observed that the assembly of Charging Pump B by the maintenance technicians was performed according to procedure. The team verified that torque requirements were met.

The team concluded that work was performed in an excellent manner by maintenance technicians and that procedures were followed as required. Maintenance technicians were competent and knowledgeable.

2.1.2 Unit 2 Diesel Generator B

The team observed preventive maintenance work task (Work Order 671011) to replace zinc anodes in the bottom end bell of the fuel oil heat exchanger. No problems were identified by the team during this maintenance activity.

The team also observed replacement of starting air system filter elements for Diesel Generator B according to Work Order 670976. The maintenance technicians performed the preventive maintenance activity in an excellent manner. However, during this activity, maintenance technicians identified that labelling for two filter elements did not match the identification of the filter elements on the preventive maintenance job task. A third filter element did not have any identification. The maintenance technicians stopped work on the three filter elements that had labelling discrepancies and verified the identification of the filter elements by reviewing drawings. The maintenance technicians also initiated a work order to replace the existing identification tags with new tags indicating the corrected identification.

The team questioned why these discrepancies had not been identified previously. The licensee stated that Work Request 870534 initiated on May 5, 1994, did identify labelling identification problems with the filter elements during a previous preventive maintenance task. However, nothing had been done to correct the problems. The team considered that this was an example of minor problems being identified and not being corrected.

2.1.3 Purification Ion Exchanger

The team observed maintenance technicians replace a gasket to a purification ion exchanger (1MCHND01B) in Unit 1. Work Order 677847 had been initiated because the ion exchanger was determined by the licensee to have a leak after being filled with resin and placed in standby. The team noted that radiation protection personnel continuously monitored the work area because of the possibility of airborne contamination. The maintenance technicians performed the job task as described by the instructions in the work order. Proper torque wrenches were used and were calibrated as required.

2.1.4 Containment Ventilation Purge Isolation Valve (Penetration 57), Unit 1

The team observed a local leak rate test performed on a containment ventilation purge isolation valve. Surveillance Test 73ST-9CL10, "Containment Ventilation Purge Isolation Valve (42") - Penetration 57," Revision 2. The team verified that test equipment was calibrated and that the air source to the penetration was filtered as required by procedure. The test set-up appeared appropriate. The engineer performing the test was knowledgeable of procedural requirements and was familiar with the site's corrective action process. The portions of the surveillance test observed by the team were performed according to procedure. No discrepancies were noted.

2.1.5 Bleeder Trip Valve, Unit 2

The team observed Bleeder Trip Valve 2JEDBTV0013 disassembly. The valve was a tilting disc check valve that functions to prevent back-flow in the extraction steam system immediately following a turbine trip (nonsafety-related). The licensee found during routine maintenance that the valve had a damaged shaft keyway. Engineering Evaluation Request 93-ED-013 was initiated to modify the keys and keyways. The team observed maintenance technicians disassemble the valve, remove the shaft, and inspect for damage. Procedures were followed during disassembly of the valve.

2.1.6 Atmospheric Dump Valve, Unit 2

The team observed the installation of atmospheric dump valve actuator for Valve SGA-HCV179 according to Work Order 00669001. Maintenance technicians verified that the actuator and accessories were properly positioned. The team verified that maintenance technicians were properly assembling the actuator by reviewing Procedure 31MT-9SG04, "Atmospheric Dump Valve Disassembly and Assembly," Revision 4. The team concluded that assembly of the valve actuator to the valve was performed properly.

2.2 Preventive Maintenance

The team had discussions with licensee representatives pertaining to the development and implementation of their preventive maintenance program and the development of the preventive maintenance basis program.

2.2.1 Preventive Maintenance

The team reviewed Quality Assurance Audit 93-013 and found that the licensee had identified about 500 preventive maintenance tasks which had not received technical review. The team requested the licensee's current backlog of technical reviews and found that 1104 preventive maintenance tasks had not received a technical review. Of these, 504 were non-quality, 84 were quality augmented, and 516 were quality. The team determined that the backlog of these reviews appeared to be getting larger.

The team reviewed records of preventive maintenance items since June 1993 for Unit 2 and found that 132 exceeded the 25 percent grace period. The team also found that there were no goals established to limit the number of preventive maintenance items that become overdue, however, overdue preventive items were tracked. While there was no regulatory requirement on the implementation of preventive maintenance tasks, the licensee's expectation was that no preventive maintenance items should become overdue.

2.2.2 Preventive Maintenance Task/Basis

The preventive maintenance basis program established the preventive maintenance task to be accomplished including the justification for any deviations from vendor manual recommendations. The team determined that this

program was a good enhancement to improve component reliability. However, the team identified some weaknesses in the justification of excluding some vendor recommendations as discussed in the following paragraphs.

The team reviewed the preventive maintenance tasks and basis for the charging pumps. The preventive maintenance basis listed some vendor recommendations, but not all. Those vendor recommendations that were not listed were justified in a section of the preventive maintenance basis. One vendor recommendation that was not included previously was the inspection and adjustment of the cross-head ball joints, and the torque check of the set screws. This preventive maintenance item was recommended by the vendor to be done every 6 months for the charging pumps. The preventive maintenance basis also referenced Condition Report/Disposition Request (CRDR) 230523 which documented a cracked center cross-head near the area of the set screws holding the cross-head to the plunger adapter. The condition report listed one apparent cause to be that the set-screws appeared to have backed out of position. Immediate corrective actions were to repair and replace defective parts. Additional corrective action was to include the vendor recommendations in the preventive maintenance task to inspect and adjust cross-head ball joints, and check the set-screws for proper torque. The team concluded that the corrective actions for this CRDR when initiated were narrow in that generic implications for Units 1 and 3 were not considered. However, preventive maintenance task which now includes adjustments of the cross-head ball joints and torque check of the set-screws have been performed on Units 1 and 3.

The team reviewed the justification for the preventive maintenance basis for initially omitting the requirement for inspection and adjustment of the cross-head ball joints and the torque check for the set-screws. The justification for excluding the checks stated, "Based on corrective maintenance history, inspection of gasket counter bores, connecting rod bearing inserts, and cross-head ball is not being performed as recommended by the vendor." The team concluded that the initial preventive maintenance basis justification was weak in that vendor recommendations were excluded without an adequate justification. Only after a charging pump failed were the vendor recommendations included.

The team reviewed the preventive maintenance task and basis for the auxiliary feedwater pumps. During review of the vendor manual,the team noted a technical bulletin (NSD-TB-91-02) which described potential problems with large motor split sleeve bearing anti-rotation pins. The vendor stated that sleeve bearing overheating suggested the need for additional guidance in the routine inspection and replacement of split sleeve bearing anti-rotation pins. The vendor-recommended specific bearing inspection criteria included measurements for installation. While the vendor recognized that bearing maintenance and replacement was within the skill-of-the-craft, they provided supplementary guidance to help preclude assembly error during maintenance activities.

The team reviewed Preventive Maintenance Basis 078173 and Preventive Maintenance Task 026317 and found that the inspection criteria of the anti-rotation pin as recommended by the vendor were not included. Licensee representatives indicated that an impact review was performed for the

technical bulletin which concluded that there was not any impact on departmental plant configuration documents. The impact review further concluded that preventive maintenance task examinations "should" catch any problems.

The team questioned the maintenance history with the anti-rotation pins and the licensee responded that Unit 3 had found a broken anti-rotation pin in Pump AFB-P01. No other deficiencies had been identified. The team reviewed the preventive maintenance task for these motors which indicated that the vendor's recommendations were not included because of the impact review statement's justification. The team concluded this justification was weak and may have contributed to one identified bearing problem. During the inspection, the licensee implemented steps to review the need to include these recommended checks in the preventive maintenance task.

In general, the preventive maintenance program was adequate. However, there were several areas which needed improvement such as the technical review of preventive maintenance tasks to reduce the backlog and priority to reduce or preclude overdue preventive maintenance items. The impact review statements justification for not including inspection criteria for the anti-rotation pin for the auxiliary pump motors preventive maintenance basis, was weak. Initial corrective action for CRDR 230523 and Deficiency Work Order 00659206 was narrow in that the charging pumps in the other units were not inspected.

2.3 Material Condition

2.3.1 General Plant Walkdown

The team conducted plant walkdowns to assess the general condition of the plant. In Unit 2, the team toured the Low Pressure Safety Injection Pump B, Containment Spray Pump B, High Pressure Safety Injection Pump B, Essential Cooling Water Pump B, Charging Pump B, Diesel Generator B rooms, and the primary containment.

In general the plant was clean. The team observed numerous drip catches on components and systems, and some equipment oil leaks. The maintenance department had recently set goals to reduce the number of drip catches. The general appearance, and preservation of the buildings was fair. The diesel generators, however, needed work to eliminate lubricating and fuel oil leaks.

2.3.2 System Walk Downs

The team walked down the auxiliary feedwater system and the nonessential auxiliary feedwater system for Units 1, 2 and 3. The team observed some minor leaks on components in the auxiliary feedwater systems. Drip catches were also visible. Some components with leaks were tagged to identify that work requests had been initiated and some were not. The system engineer noted the observations made by the team.

The team reviewed the maintenance work history associated with the auxiliary feedwater and electro-hydraulic control systems and found that the systems had few significant problems. The team was informed by the system engineer that the reliability of the auxiliary feedwater and the electro-hydraulic control systems was very good. The team reviewed performance indicators, CRDRs, and corrective maintenance work orders for both systems and did not identify significant or repetitive problems.

The team walked down the spray pond and essential cooling water systems. The walkdown was performed with the system engineer who demonstrated proficient working knowledge of the systems. The team found the Spray Pond "B" Filter Pump 1MSPNP01B to have water dripping from the packing gland at a rate of approximately 64 drops per minute. The team questioned the acceptability of the leakage rate. According to Vendor Technical Manual W318-0001, a minimum packing leak rate of 30 drops per minute was required to ensure proper packing lubrication. Engineering determined that the current packing leakage rate of 64 drops per minute was not excessive.

During the walkdown of the essential cooling water system, the team noticed that Essential Chiller Valve 1PECBNV149 was leaking past its seat and end cap onto the floor. The system engineer checked the data base for outstanding corrective maintenance documents against the equipment identification number and found none. Work Request 878548 was generated to resolve the problem.

The team concluded that the material condition of the essential cooling water and spray pond systems was good. Good housekeeping and equipment labeling were observed.

The team walked down the Unit 2, Train A and B emergency diesel generators. In the Train B, the team walked down the starting air system, the fuel oil system, lubricating oil system, and the jacket water system. In both the Trains A and B fuel oil systems, the team noted that the pressure control valves on the discharge of the fuel oil pumps were leaking fuel oil. The licensee reviewed their work requests and work orders and determined that the work request for the Train B valve had been cancelled in error after a work order had been generated to replace the Train A pressure control valve. The system engineer generated another work request for the Train B valve. The licensee planned to replace the Trains A and B valves during the next outage. The team also noted that the Trains A and B fuel oil suction strainers and discharge filters had fuel oil leaks. The licensee stated that a work order had not been generated to repair these leaks. The licensee stated that this was a generic problem and that they were waiting for a solution from the owners group.

Overall for the emergency diesel generators, the team found that fuel oil leaks were excessive and that there were numerous lubricating oil leaks on both diesel engines. The number of leaks reflected a willingness to live with leaks. The team noted that Offsite Review Committee Meeting 94-02 minutes directed that all emergency diesel generator problems be compiled and assessed. At the time of the inspection, the licensee was in the process of performing a comprehensive review.

2.4 Problem Identification and Resolution

The team reviewed Maintenance Support Department self-assessment "Plant Material Condition," Report 431-00007, dated June 16, 1994. This self-assessment identified that plant material condition walkdowns were not performed on a scheduled interval and that the housekeeping in Unit 2 was unacceptable. During general plant walkdowns (Section 2.3) the team found that housekeeping in Unit 2 had been improved to acceptable. However, the team identified some system leaks (Section 2.3) where work requests had not been initiated to correct these leaks. The team concluded that the licensee's corrective actions to improve the effectiveness of plant and system walkdowns had not yet been fully effective. The team also noted that this self-assessment did not address equipment performance.

The team found that the licensee had identified for correction the reduction of the number of operator work arounds, the number of control room deficiencies, and the number of plant deficiencies that were causing control room annunciators. The team considered that the accumulation of these maintenance items reflected the historic willingness to accept problems. The recent emphasis to eliminate these items was a positive indication of problem identification, but the team could not assess the long-term effectiveness of the actions planned. The team noted that the number of control room annunciators in Units 1 and 3 was low.

The team reviewed maintenance department "Corrective Action Assessment," dated September 29, 1994. This assessment addressed the maintenance assessment program (MAP) and evaluated the effectiveness of past corrective actions. The team found that the assessment was self-critical, noting that there was ineffective followup by management to schedule corrective action implementation. In some cases, interim controls were not in place. The assessment indicated that maintenance had made improvements at identifying the cause of problems and what actions were needed to address these issues. Often, maintenance management was not as focused on nurturing these solutions through completion as expected by the program. The assessment judged that the maintenance assessment program was an effective tool to focus on human performance. The assessment noted that the number of observations in the maintenance assessment program was trending down. This trend was attributed to the reorganization of the maintenance department. Corrective actions as a result of this assessment were not formulated at the time of the inspection.

Based on the review of the self-assessments, the team concluded that maintenance department problem identification was good, with a good self-assessment capability. Problem resolution by the maintenance department could not be fully assessed since many of the issues were recently identified. Corrective actions to improve the walkdown of systems were not fully effective as the team was able to identify system discrepancies that did not have work request initiated.

3 ENGINEERING

3.1 Modification Process

The team reviewed the licensee's self-assessment of engineering, "Internal Systematic Assessment of Licensees Performance," performed February 14-18, 1994. This self-assessment listed a number of weaknesses associated with the design change process. Some of the weaknesses identified were: there was insufficient individual ownership in the area of modifications; there was too short a time frame allowed to develop the modification; there was insufficient communication between groups to support good planning; there was a lack of in-depth technical reviews to catch errors; and sometimes walkdowns were not done and users and installers were not consulted.

The team found that a new modification process had been initiated in mid-1994 which included steps to address the weaknesses identified above. The team reviewed Nuclear Administrative and Technical Manual Procedure 01AC-0EE10, "Plant Modifications," Revision 2, dated August 9,1994, and Design Engineering Desk Instruction DEDI-OVERVIEW, Revision 2, for plant modifications. Procedure 01AC-0EE10 provided the guidance for the authorization, design, document development, installation, testing, turnover, and closeout of modifications. The desk instruction described the process for performing plant modifications.

At the time of the inspection, only one modification had gone through the new process and had been completed. The team reviewed Design Modification CP-2-3-P-001, which was completed September 1, 1994, for Unit 3. The team concluded that the modification was well engineered and the 10 CFR 50.59 screening and evaluation were well done. The team noted that this was the pilot modification for the new design process.

The team discussed the new modification process with the engineers that had worked on the modification. The engineers were enthusiastic of the new process. The engineers stated that they had spent considerable time in the field with initial walkdowns and during the installation phase and liked being involved with the project from beginning to end.

Since only one modification had been completed, the team could not assess the new modification process.

3.2 10 CFR 50.59 Screenings and Evaluations

The team reviewed the licensee's self-assessment of engineering, "Internal Systematic Assessment of Licensees Performance," which was conducted from February 14-18, 1994. This self-assessment identified weaknesses in the licensee's 10 CFR 50.59 program. In addition, the team reviewed the licensee's self-assessment, "ISQE 10 CFR 50.59 Program Effectiveness Assessment 94-A-Z-04," which was conducted April 19-29, 1994. This self-assessment evaluated the 10 CFR 50.59 program by evaluating the 10 CFR 50.59 screenings and evaluations. The assessment determined that the screening process was deficient since about 30 percent of the screenings sampled were incorrectly screened as not requiring a 10 CFR 50.59 evaluation.

Request CRDR 94-Q056, dated August 23, 1994, was generated and assigned to the nuclear regulatory affairs group to address 10 CFR 50.59 program deficiencies, develop guidance, and to perform a root cause evaluation. In addition, CRDR 94-Q057, dated May 11, 1994, was generated to document the recommendations made for 10 CFR 50.59 program improvements. The root cause of poor 10 CFR 50.59 screenings was determined to be weakness in the implementation of the 10 CFR 50.59 program. The corrective actions included revising the 10 CFR 50.59 procedure and requiring requalification training.

The team reviewed the Nuclear Administrative and Technical Manual Procedure 93AC-ONS01, "10 CFR 50.59 Screenings and Evaluations," dated August 17, 1994. The procedure was revised to provide expectations concerning the broad perspective when performing evaluations, to clarify the requirements for performing a 10 CFR 50.59 screening/evaluation, and to provide the requirements for initial training and requalification. The team concluded that the revised procedure appeared adequate. The requalification training started on October 4, 1994, and was expected to be competed by mid-January 1995. The requalification training consisted of a 4-hour class followed by a test. The training included discussions of management expectations, good and bad examples of 10 CFR 50.59 screenings, updates from 10 CFR 50.59 industry experience, and provided a description of unreviewed safety questions.

Additional corrective actions, which were not completed at the time of the inspection, were the preparation of a computer users manual for the computer program used to access the Updated Safety Analysis Report and Technical Specifications. The licensee also planned to perform an assessment of the 10 CFR 50.59 screenings using a statistical sampling method.

The team concluded that the licensee's corrective actions to address the 10 CFR 50.59 weaknesses appeared good. The team was not able to assess the effectiveness of the actions because of the early stages of implementation.

3.3 Safety Valves

3.3.1 Pressurizer Safety Valves

The Technical Specification for the pressurizer safety valves specified a +/-1 percent setpoint tolerance. The team reviewed the pressurizer safety valve test data for the three units and found that out of 38 as-found set pressure tests for the valves on the three units, 20 had as-found setpoints greater than +1 percent and three had as-found setpoints less than -1 percent. Of these, three had as-found setpoints between +3 and +4 percent, two had as-found setpoints between -1 and -2 percent and one had an as-found setpoint of -2.5 percent. The licensee stated that licensee event reports had been written each time the valve setpoints had been out of Technical Specification tolerance and the safety analysis had been reviewed. In addition, the licensee stated that a Technical Specifications change had been requested and approved for a setpoint tolerance of +3/-1 percent. The licensee planned to incorporate the Technical Specification change by the end of 1994.

During the inspection, the team found that three out of the four pressurizer safety valves on Unit 3 were leaking. The team reviewed Operability

Determination 40DP-90P26, Revision 1, dated August 12, 1994. During the Unit 3 Refueling Outage R4, the valves were tested offsite and had as-found setpoints within tolerances. The valves were seat-leak tested but were not refurbished. During operation, three of the safety valves had indicated high tail piece temperatures. An engineering evaluation was performed which concluded that the safety valves could remain in place until the mid-cycle outage in November 1994. This determination was based on a Unit 1 safety valve which had leaked but once removed and tested, the as-found setpoint had been within tolerance. In addition, the evaluation had concluded that no operational leakage rates were specified, therefore, no immediate actions were required. The licensee was monitoring the reactor coolant system leakage which was trending up slightly. At the time of the inspection, the identified reactor coolant system leakage was approximately 0.2 gpm. In addition, the licensee was trending and recording reactor drain tank pressure, level, temperature, and reactor coolant system pressure to identify any adverse trends. Also, the operators were made aware of the possibility for increased leakage into the reactor drain tank or a safety valve opening in response to system characteristics. The licensee planned to remove the four safety valves during the November outage for refurbishment.

The team concluded that changing the setpoint tolerance for the pressurizer safety valves would help to eliminate licensee event reports, since most of the test results fell within the new tolerance. The team concluded that the engineering evaluation for the seat leakage problem was adequate. The team considered that the licensee's corrective actions taken to date were appropriate to address pressurizer safety valve problems.

3.3.2 Main Steam Safety Valves

The Technical Specifications for the main steam safety valves specified a +/-1 percent setpoint tolerance. The team reviewed the safety valve data for the three units and found that out of 280 as-found setpoint tests, 116 tests had as-found setpoints greater than +1 percent, and 27 tests had as-found setpoints less than -1 percent. Of these, 15 tests had as-found setpoints greater than +3 percent and two tests had as-found setpoints less than -3 percent. The licensee stated that a Technical Specifications change had been requested and approved which would change the tolerance to +/-3 percent.

During the inspection, the team noted that two main steam safety valves in Unit 1 were gagged. The gagged valves were on different steam generators. The licensee justified gagging the valves because their Technical Specifications allowed two safety valves to be inoperable as long as the Unit was operated at reduced power. The licensee was operating Unit 1 at 98 percent power to comply with the Technical Specifications.

The team concluded that the licensee's action to address main steam safety valve tolerance problems and the justification for the gagged valves were appropriate.

3.4 Impact Review Process

In 1989, the licensee prepared Corrective Action Request (CAR) 89-0076 which identified problems where the impacted organization was not notified during the implementation of a design change package. Request CAR 93-0055, dated April 9, 1993, was initiated because there had been numerous deficiency documents that had identified impact review problems over the years. Corrective actions had been performed but they had not been effective in resolving the impact issue problems. Request CAR 93-0055 categorized the impact issue problem into nine categories. These included design change packages that were closed with procedures that had not been updated, there was not proper notification of changes, there was no clear definition of which departments were to be notified, and the temporary modification program was not in the impact process. The CAR listed a number of corrective actions to solve the problem. Request CRDR 94-Q078, dated June 16, 1994, was generated to replace CAR 93-0055. Additional corrective actions were added due to continued inadequate resolution of the impact process problems.

During the inspection, the team determined there was a very large backlog of uncompleted impact reviews. There were 35,868 electronic impacts for reference documents, 17,646 electronic impacts for equipment, and 811 paper impacts. The licensee stated that about 2000 of these items involved safety-related software or hardware. The number of uncompleted impact reviews was increasing.

The licensee also stated that because of administrative controls and computer locks, equipment was precluded from being declared operable with an open impact review, consequently, there was not an immediate safety concern.

During the inspection, the team was not able to assess the safety significance of the uncompleted impact reviews. After the inspection, the licensee presented to the NRC on November 15, 1994, (see Attachments 4 and 5) the results of additional evaluation of the impact review process. The licensee reviewed the outstanding impact reviews and did not find potential impacts that were not completed prior to the field completion of work. The licensee also reduced the total number of outstanding electronic impact reviews down to 32,000. The licensee planned additional measures to continue to reduce the number of outstanding impact reviews and to prevent the future build-up of open impact reviews. Based on the programmatic features to ensure that impact reviews were completed prior to returning equipment to service, and the results of the licensee's additional review, the NRC concluded that the outstanding impact reviews did not present a safety concern. The impact review process improvement by the licensee will be addressed in future NRC inspections and will be a followup item (528:529:530/9428-01).

3.5 Engineering Backlog

The team found that the licensee had categorized and developed a plan to address the modification backlog. At the end of July 1994, the licensee had identified a modification backlog of 2787 items. A modification review team

had been formed to review the backlog and categorize it. There were approximately 1100 modifications that will be cancelled by the end of 1995, approximately 1380 modification closeouts which will be completed in 1995, and 567 modifications that the modification review team recommended be implemented.

In other areas of outstanding engineering work, the team found that the licensee was just beginning to address about 800 outstanding output document change requests. The team also found that the number of design basis document open items had been significantly reduced in the last 6 months.

The team reviewed the licensee's temporary modification status report and determined that there were 46 temporary modifications installed in the plant. Eighteen were installed in Unit 1, 16 in Unit 2, and 12 in Unit 3. The team noted that some of the temporary modifications were old. Unit 1 had one from 1985, three from 1988, and two from 1989. Both Units 2 and 3 had two modifications each installed in 1988 and two each in 1989. The team found that the licensee had identified the need to eliminate older temporary modifications and had established reduction goals.

The team considered that the backlog of engineering work, although substantial, was understood, and was receiving priority for reduction.

3.6 Emergency Diesel Generators

Request CRDR 1-4-0103, dated March 3, 1994, was generated due to the Unit 1, Train A emergency diesel generator tripping on high jacket water temperature during cooldown. The reason for the trip was determined to be leakage through a temperature sensing valve. Prior to the trip, maintenance had worked on the valve, reinstalled, and calibrated it without performing a leak test. The root cause was determined to be inadequate work instructions. The corrective action was determined to be revision of the calibration procedures for similar components to ensure maintenance or calibration did not cause leaks again. The procedure revision completion due date was November 1994. The team considered the resolution of the CRDR and the root cause analysis to be good, although the corrective action implementation had not been completed.

Request CRDR 2-4-0085, dated February 17, 1994, was generated due to the Unit 2, Train B emergency diesel generator tripping during cooldown. The reason for the trip was determined to be back-seat leakage through a 3/8 inch pneumatic check valve. The evaluation indicated that there had been numerous emergency diesel generator cooldown trips due to control air problems over the past few years. The valve manufacturer had made a design change in 1989 which included a harder o-ring seat. The harder seat apparently interfered with the valve back-seat capability. The team found delayed corrective actions for this CRDR. One of the corrective actions was to investigate changing out the valves with a different design or changing the seats. This action was to be completed in August 1994. However, the new due date was October 26, 1994.

Request CRDR 2-4-0204, dated June 1, 1994, was generated due to the Unit 2, Train B emergency diesel generator tripping on incomplete sequence during the cooldown cycle. Fiber optic boards were identified as a cause for the

cooldown trips. The boards were all replaced with refurbished boards and engineering was to issue special instructions for periodic inspection of the boards. The team concluded that the engineering evaluation was well done and that the corrective actions addressed the cause.

Request CRDR 2-3-0301, dated April 29, 1993, was generated to identify three separate problems with the starting air system. One of the problems was a large quantity of grease found in the check valves which was evaluated in Engineering Evaluation Request EER-DG-038, dated October 1992. The emergency diesel generator had failed to start during a test in March 1992 due to the sticky operation of a control air check valve. The root cause was listed as contaminated oil from the air start compressors. A design modification was to change the compressor and dryer and add a filter. The completion dates for the modification were 1994 for Units 2 and 3 and 1995 for Unit 1. At the time of the inspection, only Unit 3 had the modification installed. Unit 1 was scheduled for 1995 and Unit 2 for 1997. The short-term corrective action was to replace the control air check valves with a like-for-like replacement. This action was completed. In addition, in 1992 the system engineer initiated a request for a design change to remove the valves since they were determined to not be necessary. That change had not been implemented. The team considered this an example of protracted implementation of corrective action to permanently correct the causes of known problems.

3.7 Motor-Operated Valve Torque Switches

Request CRDR 94-0381 was issued on June 8, 1994, requesting an operability evaluation for Motor-Operated Valve 3JSIAUV0655 which failed to close. Valve 3JSIAUV0655 had been declared inoperable on June 6, 1994. On June 7, the licensee found that the close torque switch contact bar was flipped on its side and that the retaining brackets were bent. To prevent reoccurrence of the failure, the torque switch contact bar compression springs were replaced with heavier springs.

The team reviewed the operability evaluation. During the time Valve 3JSIAUV0655 was inoperable, the licensee evaluated that redundant Valve 3JSICUV0653 was operable and could have been closed to provide the manual containment isolation function for Penetration 27. Because the valve failed in the full open position, the shutdown cooling function was not adversely affected.

The team also reviewed the equipment root cause of failure analysis entitled, "Failure of 1JSIAUV0672 and 3JSIAUV0655 to Close on Control Room Demand," Revision 1, dated July 8, 1994. The licensee considered the torque switch problems (roll pin failures, torque switch chatter and contact mispositioning) to have generic impact and planned to issue a voluntary licensee event report.

Susceptible motor-operated valves were identified in Units 1, 2, and 3 and the licensee evaluated the scheduling of torque switch spring replacement based on risk. At the time of the inspection, the licensee had replaced the torque switch contact springs in susceptible Unit 3 valves and high priority valves.

The team concluded that the licensee operability evaluation provided an adequate basis for considering the affected system operable. The root cause analyses performed adequately identified the probable cause. The corrective actions appeared correct to prevent recurrence of the failures.

3.8 In-Service Testing

The team reviewed CRDRs 93-0025 and 93-0516 which identified 19 safety-related manual valves in the spent fuel pool cooling and essential cooling water systems that were not included in the ASME Section XI in-service testing program.

Request CRDR 93-0025 identified 11 manual valves with possible safety functions and requested an evaluation to determine if they should be included in the in-service testing program. The licensee concluded that 6 of the 11 manual valves had a safety function that required the valves to open to supply flow to the charging pumps for emergency boration; therefore, it was recommended that these 6 valves be added to the in-service testing program. The remaining valves were determined not to perform any active safety function and were not required to be tested, but should be added to the in-service testing program as an enhancement, as opposed to a regulatory requirement.

Request CRDR 93-0516 reported that during the validation of the spent fuel pool cooling and essential cooling water system design bases, eight additional valves were identified as performing a safety function and not included in the ASME in-service testing program. These were not part of CRDR 93-0025. The evaluation concluded that the subject valves were not required to be included in the in-service testing program because the analyses in the updated safety analysis report did not take credit for the spent fuel pool cooling to shut down the reactor, keep it shut down, or to mitigate the consequences of an accident.

The team reviewed the results of the testing of the six valves that were added to the in-service testing program. The valves were exercised to the full-open position and then to the full-closed position. The valves successfully demonstrated their ability to operate through the full range of motion, thus, satisfying the acceptance criteria.

The remaining 13 manual valves were added to the augmented in-service testing program to be tested during the 12 week in-service testing schedule. The licensee reviewed all manual valves installed in the spent fuel pool cooling and essential cooling water systems and determined that no other valves were required to be added to the in-service testing program.

The team concluded that the licensee had taken appropriate actions to assure that manual valves having an active safety function were properly tested or were added to an augmented in-service testing program for future testing.

3.9 Weld Failures

The team reviewed Technical Quality Engineering Assessment 93-01, dated February 8, 1993. This assessment evaluated the overall effectiveness of the licensee's welding program. Regarding weld failure data, the assessment stated that, "in determining the size or number of weld failures, it was found that several hundred failures had occurred over the last five years." The team found, at the time of the inspection, that the licensee had not performed followup or review of the stated weld failures. The licensee performed an assessment during the inspection and determined there were no adverse trends related to the current welding program, and the weld failures did not compromise plant safety.

The team reviewed the licensee's actions taken to support their conclusion that several hundred weld failures were not a safety concern. The licensee re-created the weld failure data from engineering evaluation requests, material nonconformance reports, CRDRs, and work orders. The licensee found that the total number of weld failures for Unit 1 was 147, for Unit 2 was 33, and for Unit 3 was 50. Taking Unit 1 as the worst case condition for their assessment, the licensee determined that of the 147, 34 weld failures were safety-related. The 34 weld failures were further reduced to 10 pressure boundary piping welds and 24 structural welds.

The team reviewed the description of each of the 34 weld failure conditions to determine the safety significance and corrective actions taken. The following was a representative sample of the type weld failures identified:

- Eight cracks were discovered on the trip latch stopping bar welds on 4.16 kV Non-Class 1E switchgear breakers. The licensee's conclusion was that these cracks were not safety significant and operability of the circuit breaker was not affected. The weld defects were attributed to the vendor manufacturing process.

- Weld cracks were found on the top and bottom of the front of Bistable Control Panel 1-J-SBB-C01, and on the top front of Bistable Control Panel 1-J-SBA-C01. A Mode 4 restraint was issued and repair work was verified complete within 5 days.

- A pinhole leak was discovered in a pipe weld upstream of Valve 1-P-SPA-V037 located in the essential cooling water system. The leak was on the drain nozzle of the outlet side of Heat Exchanger 1MEWAE01. The flange and weld was cut out and replaced in accordance with ASME Section III, Class 3 requirements.

- While performing in-Service inspection visual examinations on Hanger SG-042-H-011, a 1-inch crack was found on the stiffener plate fillet weld. In-service inspection visual examinations on Hanger SG-039-H-031 identified two cracked fillet welds on the structural steel. The cracks were determined to be not safety significant since the weld defect did not affect component operability. The defective welds were reworked to the original design.

- A pinhole leak was discovered in a pipe weld on inlet flange to Valve 1-PSA-V096. Nozzle N6 of Essential Cooling Water Heat Exchanger 1MEWAE01. The weld was repaired in accordance with ASME III. Class 3. requirements.

- A cracked tack weld between the yoke and bonnet was discovered on Valve 1-J-SIA-UV0617. The weld was ground out and rewelded.

- During the performance of Work Order 540736. in support of Automatic Dump Valve 185 disassembly. it was discovered that the valve positioner bracket had a cracked weld. A Mode 4 restraint was issued and a root cause failure CRDR 1-2-0211 was written. The broken bracket was replaced. The CRDR concluded that inadequate/undersized weld was the apparent cause of the failed bracket. A walkdown of all 12 automatic dump valves did not reveal additional inadequate welds.

- A cracked weld on a stop pin was found in Damper 1-M-HJB-M03. The conclusion was the stop pin was not welded in accordance with design requirements. The stop pin was rewelded and re-coated.

To summarize. the 10 pressure boundary weld failures were: welded tube plugs (4). valve leakoff line (1). pipe/flange welds (2). diesel generator lube oil plug (1). and pipe support corroded welds (2). The 24 structural weld failures were hanger welds (2). cabinet welds (2). damper pin stops (2). valve reach rod (1). limit switch bracket (1). diesel generator gusset fabrication aid (1). valve positioner bracket (1). breaker trip latches (8). diesel generator jerk pump shrouds (2). and valve locking tack welds (4).

The team found that for each specific weld failure. the licensee corrected the condition and that none of the weld failures were a root cause for equipment or system failure. No trends were evident from the data reviewed that would represent a safety concern.

4 RADIOLOGICAL CONTROLS

4.1 Staffing

The radiation protection organization consisted of approximately 168 staffing positions. This was down from approximately 236 positions in 1989. Since that time. there had been gradual downsizing through attrition. Other than the attrition. turnover during the previous year was low. Approximately 16 contractors were used to supplement the permanent staff during routine operations. The contractors were spread throughout the organization. The Radiation Protection Director stated that. typically. contractors had not been used. except during outages. However. they were employed at the time of the inspection in case there were future reductions in staff.

4.2 Audits and Appraisals

The team reviewed the latest audit of the radiation protection organization by the quality assurance group. The audit was performed July 19-29. 1994. Two technical specialists were included on the team. It identified weaknesses in

the radiation protection program, but concluded, "the program elements evaluated were effectively established to ensure regulatory requirements are met." Weaknesses identified included radiation protection technicians exhibiting weak work standards, radiation protection supervisors approving less than acceptable work, and radiation workers exhibiting poor performance. Responses to the findings by the radiation protection organization were timely and addressed the issues. CRDRs were written to ensure corrective actions.

Condition reports assigned to radiation protection for action met procedural requirements. There were no qualification requirements for individuals performing root cause analyses. Licensee representatives stated that the plan to improve the effectiveness of the corrective action program included an action to establish and implement a qualification standard for personnel who perform CRDR root cause evaluations.

The radiation protection organization reviewed CRDRs for trends. Additionally, radiation protection personnel met every Friday with quality assurance personnel to discuss CRDRs involving radiation protection and to discuss corrective actions. The licensee identified adverse trends in the areas of control of radioactive material within the radiological controlled area, control of radioactive material outside the radiological controlled area, performance of radiation surveys, and performance by radiation workers. In three out of four of these areas, the adverse trends were followed by self-assessments. Through these self-assessments and others, the radiation protection organization demonstrated the ability to be self-critical. The assessments contained good suggestions for improvements; however, the implementation of the suggestions for improvement was not always formally done. Some supervisors used an action item tracking system and some did not. Implementation depended on the initiative of the individual supervisor.

As part of the review of management controls, the team examined the number of entries made by selected radiation protection managers and supervisors into the radiological controlled area during the previous 6 months. The team found that many supervisors and managers toured the radiological controlled area frequently and maintained a high degree of visibility while others did not. The director toured a unit, on the average of less than once per week. Some supervisors entered the radiological controlled area less than twice per week. The ALARA [as low as reasonably achievable] supervisor averaged less than one entry per month.

4.3 Exposure Controls

The team toured the radiological controlled areas and the Unit 2 containment building. The team observed area postings and determined that they were appropriate. Locked high radiation areas were properly controlled. The team noted the good practice of posting radiation survey information at the entrance to rooms. Examples observed provided current information.

The team attended a prejob briefing presented by radiation protection prior to nozzle dam removal from a steam generator. There was a good exchange of information between the work group and radiation protection personnel

concerning the work. Radiation protection personnel properly addressed the radiation safety issues and workers indicated that they had a good understanding of the radiological working conditions.

From discussions with radiation protection personnel, the team determined that the licensee's source term reduction program was in an early stage of implementation. Elements of the program had been initiated including identification of stellite components, trial use of micropore filters, evaluation of temporary shielding, and the flushing of hot spots.

4.4 Surveying and Controls of Radioactive Materials and Contamination

The team noted that housekeeping in the radiological controlled area was generally good, but noted water on the floor of the 52 foot elevation. The water appeared to have come from nearby fire hoses in two locations. Radiation protection personnel tested the water and determined that it was not contaminated.

The percentages of the radiological controlled areas which were contaminated were maintained typically below 2 percent. Personnel contaminations were relatively low. There were 31 personnel contamination events which resulted in exposures greater than 100 millirems.

During tours, the team noted examples of boxes and packing material in the radiological controlled area, contrary to good radioactive waste reduction practices. The licensee had identified adverse trends in events related to both the control of radioactive materials and radiation surveys.

The team reviewed the licensee's survey records of items released from the radiological controlled area. In the vehicle, equipment, and material release logs for Units 1 and 2, the team identified that some log entries lacked the signatures of technicians performing the release surveys and the verifications that the items were below the release limit. In Unit 1 on September 23, 1994, at 1416; September 30, at 1009, 1044, and 1540; and October 6, at 0944 and 0945; there were no initials in the "activity" column and no initials in the "surveyed by" column. In Unit 2, on October 6, 1994, entries made October 5, 1994, at 1400 and 1405 had no initials under the "activity" column and no signature under "surveyed by" column. Entries on October 5, for 1042, 1115, and 1600 did not have initials in the "activity" column.

Procedure 75RP-9RP09, "Vehicle, Equipment, and Material Release," Revision 9, Section 3.2.2, stated that hand carried items, other than tools or test equipment may be frisked by that individual for release from that radiological controls area. The action bases added that since tools and test equipment had a high possibility of becoming contaminated, surveys for release of these items should be performed by radiation protection personnel. Appendix C of the procedure required that radiation protection personnel acknowledge by their signatures in the release log that they surveyed the items being removed from the radiological controlled area, and that they indicate the activity of the contamination found on the items.

The failure to indicate all information on the vehicle, equipment, and material release log was a violation of the licensee's procedure. The licensee promptly reviewed the occurrences and initiated corrective actions. The team reviewed the results of the licensee's assessment and corrective actions and concluded that the criteria specified in Section VII.B.1 of Appendix C to 10 CFR Part 2 were met. Consequently, this violation is not being cited.

There were also inconsistencies, from unit to unit, in the level of detail used to describe the items released. The level of detail, in one case, made it easier to locate the items which might not have been appropriately surveyed.

After reviewing portable instrument calibration procedures and facilities and interviewing responsible personnel, the team determined that portable radiation instrumentation was calibrated in accordance with industry standards (ANSI N323). Instruments observed in use were properly calibrated and response tested.

4.5 Radiation Exposure

The team discussed the person-rem goal for Unit 2 midcycle outage and the licensee's performance with radiation protection personnel. After 19 of 28 scheduled days, the licensee had accrued 25.32 person-rems and believed that the outage work would be completed substantially under its "target" of 61.6 person-rems. The team questioned if the goal was challenging. Licensee representatives stated that the target was reasonable, based on historical data. They further stated that their good performance was achieved through the use of additional temporary shielding, reconfiguration of the steam generator platforms, and the use telemetric dose monitoring devices. These changes were implemented after similar work was performed in the other units. Licensee representatives stated that they had continually lowered the dose accrued for certain work, such as on steam generators, through the applications of lessons learned.

A summary of the licensee's past person-rem totals are listed below:

	1989	1990	1991	1992	1993
Unit 1	365	160	98	329	265
Unit 2	46	315	265	20	282
Unit 3	247	21	239	176	64
Average/Unit	219	165	201	175	204
U.S. PWR Average	296	291	223	219	*

*Unavailable at this time

5 STEAM GENERATOR EXAMINATIONS

The team reviewed the steam generator eddy current test data acquisition, resolution, and evaluation program and found that the procedures were good.

The team observed the quality assurance organization oversight of the eddy current testing activities. The quality assurance organization verified that the correct plugs were inserted into the correct tubes. Even though Conam Nuclear, Inc., verified by two methods the correct location, the quality assurance organization independently verified that the plug was inserted into the correct location. The team determined that the quality assurance staff performed these checks in an independent manner. After the plugs were verified, the Conam Nuclear, Inc., contractors rolled the plugs into the tubes. After being rolled, the quality assurance personnel located and verified again that the correct tube had been plugged. At least four independent checks had been performed on each tube that had been plugged and rolled.

The team determined that the quality assurance organization performed an excellent verification check prior to the plug being rolled in the tube, and after the plug had been rolled.

6 LICENSEE CONTROL SYSTEMS

6.1 Operations

The team interviewed licensed control room operators on all the units to determine how the reporting of deficiencies and the associated corrective action process was working. In general, most control room operators responded that the process of reporting deficiencies, issuing procedure change requests, and work requests worked well. In addition, the operators reported that support from operations management was excellent. One issue mentioned by the operators was that there were several instances in which maintenance personnel were in the wrong unit for assigned maintenance activity. In each case, the error was caught before any work occurred. The team verified that CRDRs had been initiated documenting these near misses.

The team found that corrective actions were, in one case, not effectively implemented. The Volume Control Tank Makeup Level Controller CHN-210 did not always work properly in that the controller did not stop dilution to the volume control tank when required. As a result, operators would manually oversee the controller to ensure that it secured at the proper amount. This operator work-around was identified in 1986, but had not been resolved. The licensee planned to fix the controllers during upcoming outages.

6.2 Corrective Actions

Request CRDR 94-Q017, initiated by the nuclear assurance department, January 20, 1994, identified repetitive occurrences that indicated that the licensee did not consistently analyze and correct problems as necessary to prevent recurrence. The team reviewed the licensee's analysis of CRDR 94-Q017 which was contained in a report entitled, "Programmatic Root Cause Assessment

of Corrective Action Effectiveness," dated May, 1994." For this assessment, the licensee randomly sampled 10 percent of Category 4 CRDRs (17) and 11 additional Category 4 CRDRs. The licensee's assessment did not address Category 1 and 2 CRDRs which used the formal incident investigation team and engineering root cause of failure analysis processes because the licensee had determined that these processes were strengths from past analysis. The report identified the root cause was that the station did not fully understand or fully embrace root cause culture. The team concluded that the cause identified by the licensee was reasonable to explain the concerns identified in CRDR 94-Q017.

The team reviewed the planned and implemented corrective actions. In August 1994, the licensee formed a strategic analysis group to screen all CRDRs and to determine the significance of the conditions. If the group was unsure, the CRDR could be assessed as potentially significant. All significant and potentially significant CRDRs were then reviewed by plant management. To assist the group in the determination of significance, the licensee developed new guidelines for significant conditions adverse to quality and conditions adverse to quality. The licensee implemented the requirement that root cause analyses would be performed only by people trained in the process. The licensee planned additional corrective action to address the weaknesses in the effectiveness of corrective actions, including the development of a corrective action program mission and additional training for plant personnel. The team noted that the issue of improving the effectiveness of corrective actions was receiving priority from senior station management. The team concluded that the corrective action taken and planned by the licensee addressed the identified root cause. The effectiveness of the actions in improving corrective actions could not be assessed because many of the actions had not yet been implemented.

In response to the programmatic root cause assessment of corrective action effectiveness report, the maintenance department performed a followup corrective action review (Section 2.4). The team concluded that the performance assessments performed by the maintenance department were consistent with those identified by CRDR 94-Q017.

The team's independent review of selected equipment problems and CRDRs also found some examples of protracted implementation of corrective actions and narrow corrective actions (Sections 2.2.2, 3.7, and 5.2). The team considered that these examples were consistent with the broader issues identified by the licensee in CRDR 94-Q017 and were being addressed by the licensee.

The team found that historically, some issues, such as drip catches and operator work arounds, had not received priority, but were now receiving priority. Others, such as impact reviews, had not received the correct priority and attention necessary for effective resolution.

Overall, the team found that Palo Verde had a good self-assessment capability. Performance issues were almost always identified, and usually being addressed. The team found that management attention and priority had been recently directed to many issues. Programmatic weaknesses in the effectiveness of corrective actions were recognized and were being addressed, however, the effectiveness of the corrective actions to address these weaknesses could not be assessed since they were early in implementation stages.

ATTACHMENT 1

1 PERSONS CONTACTED

1.1 Arizona Power System

P. Brandjes, Department Leader, Maintenance Support
P. Crawley, Director, Nuclear Fuel Manager
J. Gaffney, Manager, Radiation Protection
D. Garchow, Director, Engineering
R. Hazelwood, Nuclear Regulatory Affairs
J. Hesser, Director, Engineering and Project
A. Krainik, Department Leader, Nuclear Regulatory Affairs
D. Leech, Section Leader, Nuclear Assurance
J. Levine, Vice President, Nuclear Production
D. Mauldin, Director, Maintenance
P. Myers, Administrative Technician
G. Overbeck, Assistant to the Vice President
C. Seaman, Director, Nuclear Assurance
E. Simpson, Vice President, Nuclear Support
J. Steward, Manager, Radiation Protection
W. Stewart, Executive Vice President
M. Suea, Director, Radiation Protection

1.3 NRC

T. Gwynn, Director, Division of Reactor Safety
L. Tran, Project Manager
W. Ang, Chief, Plant Support Branch
K. Johnston, Senior Resident Inspector

The above personnel attended the exit meeting. In addition to the personnel listed above, the team contacted other personnel during this inspection.

2 EXIT MEETING

An exit meeting was conducted on October 7, 1994. During this meeting, the team summarized the scope and conclusions of the inspection. The licensee acknowledged the conclusions presented at the exit meeting. The licensee stated that some of the information associated with the steam generators was proprietary, but that information has not been included in this report.

ATTACHMENT 2

Inspection Finding Index

Inspection Followup Item 528;529;530/9428-01 was opened (Section 3.4).

ATTACHMENT 3

List of Documents Reviewed

Maintenance

Preventive Maintenance Basis Task

- 081689, "Centrifugal Pump (W/ST)"
- 078211, "480V Motor/Westinghouse (1E-Over 100 HP)"
- 078173, "480V Motor/Westinghouse"
- 081671, "Positive Displacement Pumps"

Preventive Maintenance Task

- 026317

Procedures

- 81DP-0D13, "Deficiency (DF) Work Order Design Changes," Revision 6
- 30DP-9MP08, "Preventive Maintenance Basis Development," Revision 4
- 30DP-9WP02, "Work Document Development And Control," Revision 10
- 30AC-9ZZ04, "Housekeeping," Revision 6.02
- 31MT-9CH01, "Charging Pump Disassembly and Assembly," Revision 3
- 30DAP-9MP02, "Fastener Tightening/Preload," Revision 01.08
- 31MT-9MP03, "Valve Packing Installation," Revision 6
- 31MT-9SG04, "Atmospheric Dump Valve Disassembly And Assembly," Revision 4
- 39AC-9MP02, "Preventive Maintenance," Revision 04.01
- 30DP-9MP09, "Preventive Maintenance Processes And Activities," Revision 2

Work Order

00636203	00627525	00673393	00678402
00669001	00677847	00641233	

Licensee Assessments/Audit Reports

- Assessment Report 94-431-00001, "Adequacy of CRDR Evaluations"
- Audit Report 93-013, "Maintenance"

Piping & Instrumentation Drawing

- 02-M-AFP-001, Revision 17

Engineering Evaluation Request

- EER 93-PV-029

Vendor Impact Review Package

- VDP A4572

Engineering

- ERCFA, "Failure of 1JSIAUV0672 and 3JSIAUV0665 to Close on Control Room Demand," dated June 6, 1994.
- 90AC-0IP04, "Condition Reporting," Revision 4.
- 73DP-0ZZ03, "System Engineering," Revision 2.
- 01PR-0AP02, "PVNGS Priority System," Revision 00.01
- ISE Assessment 93-04, "Generic Letter 89-013 Corrective Actions."
- ISE Assessment 94-A-ZZ-003, "Operating Experience Program Effectiveness Assessment."
- TQE Assessment 93-01, "PVNGS Welding Program Assessment."
- ISQE Assessment 94-01, "Design Control Assessment."
- ISQE Assessment 94-A-ZZ-04, "10 CFR 50.59 Program Effectiveness Assessment."
- Spray Pond System Annual Report of December 31, 1993.
- Design Basis Manual (DBM) Title, "Essential Cooling Water System," Revision 1.
- System Description Manual (SDM) Title, "Essential Cooling Water System," Revision 7.
- SDM Title, "Essential Spray Pond System," Revision 12.
- Drawing 02-M-SPP-001, "P&I Diagram Essential Spray Pond System," Revision 20.
- Drawing 02-M-EWP-001, "P&I Diagram Essential Cooling Water System," Revision 12.

Radiological Controls

Procedures:

- 90AC-0IP04, "Condition Reporting," Revision 4
- 75RP-9RP09, "Vehicle, Equipment and Material Release," Revision 9
- 75RP-9EQ20, "Calibration of Portable Gamma and Beta/Gamma Dose Rate Instruments," Revision 1

Logs:

- Vehicle, Equipment and Material Release Log

Quality Assurance Audits:

- Audit Report 94-008, "Radiation Protection"

Self-assessments:

- "Rad Worker Knowledge in the Field"
- "TEDE ALARA Policy"
- "RP Technician's Knowledge of the Revised Regulations and Associated PVNGS Program Requirements"
- "The Temporary Shielding Process"
- "Revised 10CFR20 Self-Assessment of Dosimetry Records"

General

- Quality Audits and Monitoring Department, Audit Report 93-013, "Maintenance" December 3, 1993
- Maintenance Support Department "Adequacy of CRDR Evaluations by Site Maintenance 94-431-00001" January 12, 1994
- "M&TE Series Program Assessment," Report 431-00002-RBP/EAS, January, 1994
- Maintenance Support Department Monthly Update, August 1994
- Administrative Procedure 90AC-0IP04, "Condition Reporting" Revision 4, dated August 5, 1994
- Maintenance Support Department "Corrective Action Effectiveness" 94-431-00008 dated September 29, 1994
- Maintenance Support Department "Retest," Report 431-00003-RBP/EAS, dated March 29, 1994

- Maintenance Support Department "Plant Material Condition." Report 431-00007, dated June 16, 1994
- Maintenance Support Department "Control of Overtime," 94-431-00006, dated July 21, 1994
- Administrative Procedure 73AC-0RA01, "Failure Data Trending and Nuclear Plant Reliability Data System," Revision 2, dated March 18, 1994
- Corrective Action Tracking system Month-End Report dated August 31, 1994
- Audit Report 93-006, "Corrective Action," dated October 1, 1993
- Audit Report 94-004, "Corrective Action," dated June 16, 1994
- Audit Report 93-003, "Design and Modification Control," dated April 14, 1993

ATTACHMENT 4

1 ATTENDEES AT NOVEMBER 15, 1994 WORKING MEETING

1.1 Arizona Power System

R. Hazelwood, Nuclear Regulatory Affairs
J. Hesser, Director, Engineering and Projects
D. Leech, Section Leader, Nuclear Assurance
W. Lui, Senior Engineer, Engineering
F. Swirbul, Section Leader, Engineering
S. Ryan, Section Leader, Maintenance

1.2 El Palo Electric

F. Gowens, Site Representative, EPE

1.3 NRC

E. Collins, Team Leader, Region IV
T. Gwynn, Director, Division of Reactor Safety, Region IV
T. Westerman, Chief, Engineering Branch, Region IV

Purpose Of Impact Program

- Identify And Notify Potentially Impacted Departments Of Changes To Design Output Information.
- Potentially Impacted Departments Review And Incorporate Changes To Plant Configuration Documents, As Necessary.

Definitions

- Design Output Information
  - Drawings (P&IDs, Loops, Elementaries)
  - Supplier Documents (Tech Manuals, Vendor Drawings)
  - Equipment Data Base

Definitions

- Plant Configuration Document
  - Electronic Work Documents On SIMS (Station Information Management Systems)
  - Training Documents
  - E-Plan Documents
  - Procedures

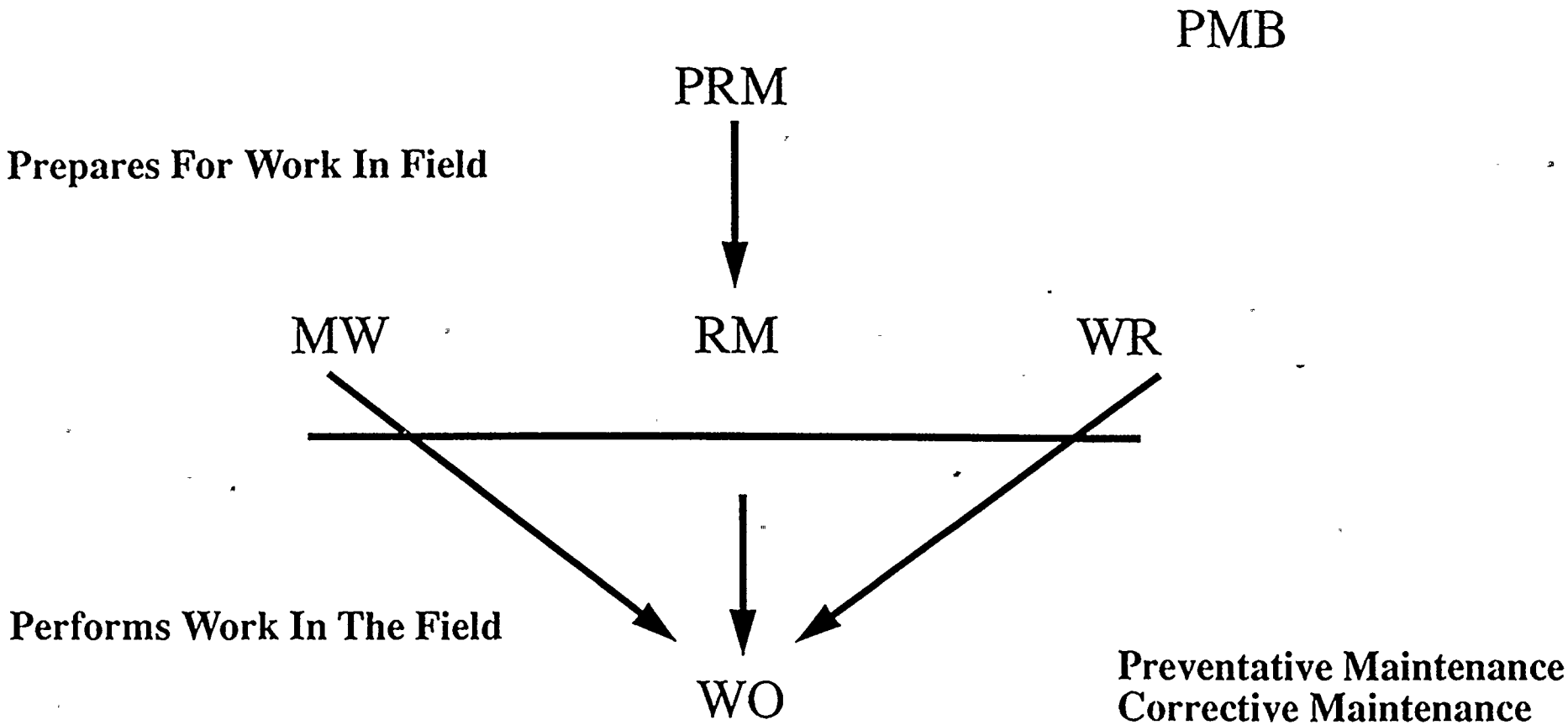
Potential Impact Generation

- Electronic Process
  - SIMS Electronic Work Documents
  - Electronic Flags Created If Potential For Impact Exists
- Paper Process
  - Training Documents
  - E-Plan Documents
  - Procedures
  - ETC.

SIMS Electronic Work Documents

- Work Order (WO)
- Work Request (WR)
- Model Work Instruction (MW)
- Repetitive Maintenance (RM)
- Pending Repetitive Maintenance (PRM)
- Preventative Maintenance Basis (PMB)

SIMS Electronic Work Documents



Work Process For A Typical WO

Work Planning And Preparation

↓

Work Performed

↓

Testing

↓

Field Complete

(All Electronic Flags Must Be Acknowledged And Impacts Completed)

↓

Operable/Functional

Before Statused Field Complete All Electronic Flags Must Be Acknowledged And All Impacts Completed

Existing Electronic Flags

- Electronic Flags For Potential Impacts Recently Reduced From 54,000 To 32,000

Current Status

32,000	Total Outstanding Electronic Flags For Potential Impacts Against All Work Documents (WO, WR, MW, RM, PRM, PMB)
5,900	Outstanding Electronic Flags For Potential Impacts Against WO's (Only Document Performing Work In Field)
2,300	Outstanding Electronic Flags For Potential Impacts Against WO's On PVNGS Defined Maintenance Rule Systems and Palo Verde Defined Critical Systems
700	WO's With These Flags Against Them
<50	WO's Currently Being Worked In Field, And Even Less With An Actual Impact

Can't Field Complete A WO Without Acknowledging Electronic Flags And Completing Impact

No Electronic Flags And Related Potential Impacts Found To Date That Were Not Completed Prior To Field Completion Of Work

Reasons For And Effects Of Creation Of Electronic Impact Process

- Electronic Flags Must Be Acknowledged And Impacts Completed Before Work In The Field Is Completed
- Positive Assignment And Tracking Of Potential Impacts
- Ability To Review On Going Work Documents For Potential Impacts
- Potential Impacts Conservatively Identified And Generated

PVNGS Impact Process Efforts

- Reduction Of Electronic Flags
- Prevention Of Future Build-Up
- Long Term Plans

Reduction Of Electronic Flags

- Additional Resources
- Prioritization
- 90 Day Target

Prevention Of Future Build-Up

- Planned Software Change Completed
- Training On-Going For Engineers
- Impact Process Ties With Re-Engineered Design Process Strengthened
- Enhanced Ownership

Long Term Plans

- Continuous Process Monitoring
- Palo Verde Lessons Learned
- Best Practice Plant Bench Marking
- Implement Improvement As Applicable
- Self Assessment of Impact Process

Nuclear Assurance Division (NAD)

Current Involvement:

- NAD Top Ten List
- Independent Sample Review Of Acknowledged Electronic Flags
  - Assure Correctly Acknowledged
  - Assess Safety Significance
- Participation On The Impact Process Teams
  - One Representative On Each Team
  - Oversight Capacity

Nuclear Assurance Division (NAD)

Future Involvement:

- Real Time Assessment To Determine Adequacy Of Completed Corrective Actions
- Continued Participation On The Impact Process Teams
- Participate In Engineering's Self-Assessment To Evaluate Effectiveness Of Corrective Action

Summary

- Process Ensures Electronic Flags And Therefore Potential Impacts Are Addressed
- No Indicators Found To Date Of Completed Electronic Flags And Related Potential Impacts That Caused A Problem
- 22,000 Recently Closed With No Unresolved Impacts Identified