APPENDIX B

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 50-482/94-02

License: NPF-42

Licensee: Wolf Creek Nuclear Operating Corporation
P.O. Box 411
Burlington, Kansas

Facility Name: Wolf Creek Generating Station

Inspection At: Burlington, Kansas

Inspection Conducted: February 14-24, 1994

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William B. Jones, Acting Team Leader, Division of Reactor Safety — Date

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EXECUTIVE SUMMARY

WOLF CREEK
SALP CLOSEOUT INSPECTION

On February 14-18, 1994, a team of seven NRC inspectors and on February 19-24, 1994, a team of four NRC inspectors performed a systematic assessment of licensee performance (SALP) closeout inspection at the Wolf Creek Generating Station. The purpose of this inspection was to evaluate operational activities and the implementation of supporting programs to ascertain that the facility was being operated in a safe manner. This included evaluation of the processes for identifying, resolving, and preventing problems. The team reviewed the areas of operations, maintenance, radiation protection, engineering and technical support, industry technical information program, management oversight and safety assessment.

The team did not identify any safety significant findings that would affect continued plant operation. For those items identified by the team that involved potential equipment and/or component operability concerns, the licensee quickly evaluated the concerns and took immediate actions to correct the issues.

Several strengths were noted in the area of plant operations. Control room activities were conducted in a professional manner. The shift turnovers and midshift reviews were comprehensive. Communications between the control room staff and also with the nuclear system operators were very good. This included communicating actions taken in response to unexpected alarms and notifying the other operators when they left the at-the-controls area. The nuclear system operators were effective in communicating their actions taken in response to local control panel alarms. Good use of the alarm response procedures was noted.

Equipment clearance orders and locked valves were well controlled. An observation was made that management's expectations were not met for documenting the reason locked valves were manipulated.

The licensee's implementation of the work control process was good. Equipment deficiencies were found to have been identified in the work control process, appropriately prioritized, and scheduled for work. The deficiencies reviewed did not adversely affect routine operation of the plant. However, a concern was identified that operators had worked outside the work control process to reposition a valve limit switch. A separate concern was identified that operations personnel had not utilized available technical support personnel to evaluate a deficiency which affected the containment hydrogen monitor system operability.

The auxiliary feedwater system and the safety-related air handling systems were well maintained. The system engineers were found to be cognizant of their assigned system and demonstrated a strong sense of ownership. The use of the individual plant examination in measuring the importance of systems and components was identified as a strength.

Management involvement in routine plant activities was noted. This included management initiatives in the operations, maintenance and engineering areas. Additional licensed and technical support personnel were assigned to each operating crew, the maintenance process utilized an integrated planning and scheduling approach for initiating work activities, and system engineering personnel were proactively involved in plant operations.

The overall radiological program was well implemented. The licensee demonstrated the ability to appropriately respond to a potentially complex contamination event. Management support for the radiation protection program was generally very good as demonstrated by the implementation of corrective actions resulting from their self assessments. However, the failure to ensure hot water was available to properly decontaminate personnel following the contamination event and the decline of management's presence in the plant in 1994 indicated the need for a heightened management involvement in daily radiation protection related activities.

A lack of a questioning attitude was noted within the safety services organization. This was identified as a result of the licensee's failure to promptly address concerns with the heat stress program and its implementation.

The engineering organization had established a strong base to support plant operations. The system engineering organization was staffed by professional individuals who demonstrated a commendable sense of ownership for their systems. System engineering management's expectations were well understood by the staff; however, management had not consistently provided the necessary means to effectively meet those expectations. The process for reviewing operational experience information was well established with the exception of programmatic controls for documenting NRC Bulletins and Generic Letters.

The corrective action process has shown improved acceptance and use within the licensee's organization. This was demonstrated by the increasing number of performance improvement requests that had been initiated by a diverse group of individuals. A growing confidence among the licensee's staff that performance improvement requests had been appropriately reviewed and corrective actions taken was noted.

Management involvement in overseeing the corrective action process had also improved. The morning management meeting was effectively utilized to review potentially significant performance improvement requests and provided early management involvement in assessing and resolving concerns. The timeliness in addressing significant performance improvement requests had decreased noticeably. However, some weaknesses were identified in the scope of the corrective actions taken.

The quality assurance organization was generally effective in identifying performance and program concerns. The performance improvement request process was well utilized to identify and followup on quality assurance organization identified deficiencies. However, an example was identified where the required management attention to resolve a long standing problem with drawing discrepancies was not provided until the team became involved.

The self assessment activities conducted in 1993 provided a comprehensive review of personnel performance, program weaknesses and system deficiencies. The maintenance self assessment provided an excellent overview of program implementation concerns and personnel performance issues. Previous assessments and corrective actions initiated during the management action plan and performance enhancement program were addressed in the assessments.

The team, however, identified that the resolution of the self assessment issues was mixed. It was found that the status and responsibilities for implementing the assessment items were not consistently identified. Maintenance management and supervisors had also not been aggressive in overseeing work activities in the plant to ensure personnel performance concerns had been adequately addressed. The use of formal and informal processes to track performance issues did not ensure that potentially significant concerns were promptly addressed. A similar concern was identified for the handling of the licensee's incident investigation team assessment of the radiological contamination event.

DETAILS

1 INTRODUCTION

A team of NRC personnel performed an integrated inspection of plant operational activities and the implementation of supporting programs. This inspection included control room observations, conduct of operational activities, engineered safety feature system walkdowns, and an evaluation of the implementation of maintenance process controls, engineering support, feedback of operational events, radiation protection practices, and corrective action program implementation. A review of the licensee's self-assessment activities was also performed. The team used a performance-based approach in evaluating the effectiveness of the licensee's programs. The inspection was conducted in accordance with the guidance of draft Inspection Procedure 40500, "Effectiveness of License Controls in Identifying, Resolving, and Preventing Problems" and issued Procedures 71710, "Safety System Walkdown," 83750, "Occupational Radiation Exposure," 84750, "Radioactive Waste Treatment, and Effluent and Environmental Monitoring," and 92702, "Followup on Corrective Actions for Violations."

The inspection included a review of hardware and personnel performance-related problems and the effectiveness of the licensee's process to identify and correct deficiencies. The team utilized documentation reviews, personnel interviews, and direct observations to evaluate the licensee's programs.

2 PLANT OPERATIONS

The team observed plant operations in the main control room and in the plant on a routine basis. Several tours were also conducted with plant personnel. The plant tours included a review of equipment deficiencies and the implementation of procedural requirements for controlling locked valves and clearance orders. System walkdowns were also performed for the auxiliary feedwater system and the safety-related ventilation systems.

2.1 Operations Staffing

The team observed plant operator activities during routine operations. It was noted that appropriate licensed and nonlicensed personnel were on shift to perform the required surveillances and oversee plant operation. It was also noted that the licensee had recently enhanced the onshift operations staff to include an additional licensed operator and a shift engineer. The addition of these personnel to the shift compliment had resulted in part from the licensee's Performance Assessment of Operations dated August 25, 1993. This assessment had identified concerns with the previous onshift staffing level. It was found that although the onshift staffing levels had met the Technical Specification requirements, the onshift operations staffing was marginal with respect to technical personnel. The team found that management's expectations for the shift engineers were being developed. However, these individuals were actively pursuing their building certifications as nonlicensed operators and were scheduled to enter into the licensed operator training program.

2.2 <u>Conduct of Operations</u>

2.2.1 Control Room Observations

The team observed that licensed operator activities in the control room were conducted in a professional manner. The operators maintained the expected oversight of the main control boards and promptly responded to alarms. It was noted that the operators clearly communicated their actions with regard to annunciator response and control board switch manipulations. Unexpected alarms were addressed with the supervising operator (SO). The team conducted several control board walkdowns with the onshift operators. In each case, the operators were found to be fully cognizant of the plant status.

The team observed four consecutive shift turnovers. In each case, the plant status and planned evolutions were thoroughly discussed. Shift turnovers were found to be complete and professional. Each watchstander performed an individual turnover with their counterpart. After the oncoming crew had relieved their counterpart individually, a comprehensive crew briefing was conducted by the SO. Each crew member was encouraged to contribute to the information exchange. The nuclear system operators (NSOs) conducted their shift turnovers outside the main control room. This helped to minimize the congestion and distractions within the main control room. The NSOs' attendance at the crew briefing provided for an effective review of planned activities.

The licensee had recently implemented a midshift meeting in the control room. This meeting was conducted by the shift supervisor (SS) and the SO and included the operators and the NSOs. The purpose of this meeting was to update the operating crew on any special information or activities and provide individuals with the opportunity to update the crew on events and activities in their respective areas. The team found that this meeting provided an effective means of statusing work activities and ensured that ongoing work activities were appropriately addressed.

2.2.2 Nuclear System Operator Performance Observations

The team accompanied an NSO for each of the station watches. It was found that the NSOs were familiar with the plant equipment that they were responsible for operating. In each case the required equipment and facility inspections were well performed and the results of the inspections were properly documented in their logs.

Communications between the NSOs and the control room staff were well conducted with repeat back statements appropriately utilized. It was observed that the NSO response to local alarms was very good. In each case observed, the NSO reported to the control room the results of their observation and any action taken.

2.2.3 Control of Locked Valves

The team reviewed the locked valve log and conducted walkdowns of selected safety-related and nonsafety-related valves which were required to be locked. In all cases the valves were found to be appropriately locked in accordance with the locked valve log. However, it was noted that the reason valves had been previously manipulated was not consistently documented in the locked valve log. The team reviewed the established procedural guidance for manipulating locked valves with the SO. It was found that the operators who had authorized the valve manipulations should have documented the reason for the valve manipulation in the log book. Based on this finding, the SS initiated a change to Procedure ADM 02-102, "Control of Locked Component Status," Revision 27 to clarify this guidance.

2.2.4 Clearance Orders

The team reviewed Procedure AP 04A-001, "Clearance Orders," Revision 0, dated January 12, 1994. This procedure superseded the previous clearance order procedure and had been developed to address NRC and licensee-identified weaknesses with the clearance order process. The team's followup to a previous violation associated with the clearance order program is documented in Section 8.1 of this report.

Prior to invoking of Procedure AP 04A-001, the licensee had experienced several problems with the implementation of the clearance order program. In order to address these problems, the licensee chartered Incident Investigation Team (IIT) 93-02 on March 30, 1993, to evaluate human performance and programmatic issues associated with the clearance order program and to recommend improvements to the program. The IIT subsequently identified six recommendations to licensee management to improve the program.

The team reviewed the IIT Report and the recommendations. The team found the report provided a critical self assessment of the clearance order program and the IIT recommendations were found to be appropriate. The IIT recommendations which were incorporated into the new clearance order procedure included requiring walkdowns of the work boundary, identifying which personnel could operate equipment, and enhancing the human factors considerations.

To assess the clearance program implementation effectiveness the team conducted walkdowns of selected clearance orders. In each case the clearance orders were properly implemented and verified. Adequate personnel protection was provided by the clearance boundary for the work activity.

2.3 Plant Tours

The team conducted several tours of the facility which included the main control room, radiologically controlled areas, safety-related equipment rooms, the turbine building and the protected area.

2.3.1 Control Room

The team conducted extensive walkdowns of the control room panels. It was noted that there were numerous work request (WR) tags associated with equipment and their controls located on the control board. Of these deficiencies, several were associated with valve position indication problems. During the inspection, the licensee identified that a limit switch associated with a steam dump valve had been repositioned in the field. This apparently had been performed without the use of an authorized WR.

The team reviewed the event with licensee management. It was determined that an operator had repositioned the limit switch to provide valve position indication in the control room but the cause for the deficient condition was not corrected. The WR which had been previously initiated to correct the condition remained open. The licensee initiated a performance improvement request (PIR) to address the performance of the work activity without an authorized WR.

The team conducted a complete review of all WR tags located in the control room. The team reviewed the conditions and licensee actions for two fire protection system alarm conditions and two fire protection system trouble lights on the KC-008 fire alarm panel. This panel is located in back of the SO's desk in the control room. The associated WR tags indicated the alarm conditions had existed back to July of 1992. It was found that the two alarms and one of the trouble lights were associated with post indicator valves on a main fire header and a feeder line. These valves had been previously buried in underground vaults as part of a design modification to clear a security perimeter exclusion area. Subsequent valve trouble indications and alarms became very frequent. The licensee determined that the exposure to intermittent flooding in the underground vaults had resulted in the tamper switches actuating. The licensee has issued a plant modification request to remove the tamper switches, lockwire the valves in position and enter them into the locked valve control program. However, this plant modification has not been implemented. A review of the second trouble light was determined to be for the security building area. The team was informed by the licensee that the security building fire protection system was being completely reworked. None of the fire protection system alarms or trouble lights were safety-related or safety significant.

The team found that the overall impact of the equipment deficiencies had a minimal impact on plant operations. However, several of the equipment deficiencies have existed for an extended period of time. The team was concerned with an operating crew's willingness to bypass the work control process to temporarily correct a deficient condition.

2.3.2 Equipment Areas and Operating Spaces

The overall material condition of the plant appeared to be very good and WR tags appropriately identified deficient equipment conditions. Areas where poor material conditions had been identified as documented in NRC Inspection Report 482/93-21 had been corrected. The team assessed the impact equipment deficiencies had on operational activities outside the control room. It was operate plant equipment. This was determined to be an overall strength in operation of the plant.

The team did, however, identify a few material deficiencies which had not been identified by the licensee. The purpose of this review was to evaluate the deficiencies for potential equipment operability concerns. One example involved cracks in the fire barrier material on the bottom of both tendon surveillance access hatches, as viewed from the 2047 foot 6 inch level. These hatches formed a fire barrier penetration seal for the ceiling and the floor of the fire area above it. The material coating the underside of the hatches was determined to be Albi-Duraspray and, together with the hatch plate and Thermo-Lag covering installed on the top of the hatches, constituted a 3-hour rated penetration seal as accepted in the safety evaluation report. The team informed the licensee's fire protection specialist, who then issued a WR to have the condition inspected. Subsequently, the team was informed that the inspection confirmed that the coating material was cracked. The team was also informed that these hatch covers were already included in the impairment report for other Thermo-Lag installations, that they were considered inoperable, and that they were covered by the roving fire watch. The team noted that the fire barrier penetrations seals were added to the impairment as a specific item to be corrected prior to declaring them operable.

A second example was identified during a tour of the 125 volt safety-related Battery NK-011 room on February 15, 1994. The team noticed that a pipe support located above the batteries was not properly fastened. The support, which restrained a 1 1/2 inch galvanized pipe, consisted of a pipe clamp with a 1/2 inch threaded rod on each side. The rods were connected to a section of unistrut mounted over the battery. The team noted that the unistrut connecting spring nuts were not properly engaged. The spring nuts were skewed to the unistrut which did not provide the required tension on the threaded support rod. The licensee initiated WR 01014-94 to correct the installation.

On February 16, 1994, the team noted that a WR tag had been attached to the support. The team then toured the adjacent battery room and observed a similar installation in which one of the spring nuts was parallel to the unistrut and was not supporting the pipe. When the second instance was communicated to the licensee, PIR 94-0333 was initiated to evaluate the extent of the problem. The licensee performed walkdowns of similar installations and identified four additional spring nut alignment problems. The licensee initiated WRs for each of the identified problems and completed the corrective maintenance tasks during the inspection. An engineering evaluation of the as-found conditions determined that operability of the safety-related batteries would not have been effected if the struts had come loose. The team found the determination to be appropriate. The licensee has identified the location of each similar strut and verified that additional concerns did not exist.

The team found that in each of the above instances, the licensee's response to the identified deficiencies was appropriate.

2.4 Operations Problem Identification and Resolution

The team reviewed the corrective action process with the operations staff. This included conditions which would require the initiation of WRs and/or PIRs. The operators interviewed were found to be familiar with, and not reluctant to utilize the WR or PIR processes. Several of the operators stated that they had recently utilized the PIR process to resolve problems with personnel performance or procedure concerns. A review of the WR and PIR processes are documented in Sections 3 and 6, respectively, of this inspection report.

The team's review of open PIRs indicated that the operators were initiating PIRs for both personnel performance problems and program deficiencies. The team also noted that good support was generally provided to the operations department to assess potential concerns and plant problems. However, an example was noted where a work activity associated with the containment hydrogen monitors was not adequately addressed. A work activity on a hydrogen monitor identified the associated heat trace to be inoperable. A work activity on the second train was initiated, which rendered it inoperable. At the time, the SS did not identify this condition and the applicable Technical Specification action statement was not entered. Later, a system engineer identified that both hydrogen monitors had been inoperable concurrently. The team verified that the Technical Specification action statement time limitations had not been exceeded.

A review of this event identified that the SS had not requested technical support in evaluating the operability of the hydrogen monitors, although both the shift engineer and system engineer were available. It was also found that an PIR had not been promptly initiated. This event indicated a weakness in the licensee's utilization of technical personnel to support operability determinations and the need for continued management oversight to ensure the PIR process is effectively utilized.

2.5 Engineered Safety Features System Walkdowns

2.5.1 Auxiliary Feedwater System

The team conducted a detailed review of the auxiliary feedwater system using insights gained from the available probabilistic risk analysis studies. The material condition and operational readiness of the system's structure and components was verified. The inspection included: the auxiliary feedwater system line-up and it's supporting systems such as steam supply, electrical supply, room cooling, seismic supports, and normal and emergency lighting.

2.5.1.1 General Area Condition

Housekeeping around the auxiliary feedwater system components was found to be very good. Associated structures and components were properly labeled. The team did identify that some essential service water system piping insulation was damaged in an auxiliary feedwater pump room. The damage appeared to have occurred because of personnel stepping on the insulation. The team noted that the damage was confined to a small area and no other indications that personnel had been walking on equipment were identified. The licensee initiated WRs 968-94 and 969-94 to repair the insulation and to replace some insulation that was missing on the same piping. It appeared that the insulation had not been replaced after having been removed to permit the installation of special piping instrumentation.

2.5.1.2 Surveillance and Post Modification Tests

The team reviewed the surveillance test procedures and the test results for this system. It was found that each valve had been properly accounted for in the system check list, inservice testing program and piping and instrumentation diagrams (P&ID). Permanently installed instrumentation used for surveillance testing had been calibrated in accordance with approved procedures. Post maintenance and post modification testing was limited to the ASME pressure testing and standard surveillance testing.

The team verified that there had not been any recent special tests performed. A review of the inservice test pump and valve data indicated that the equipment was operating as expected. One test anomaly was noted for the auxiliary feedwater pump turbine. The test anomaly consisted of a nuisance alarm which occurred when system flow was achieved, but turbine speed was less than rated. In addition there was a problem with reading of the turbine speed gauge. The licensee had initiated PIRs 94-0244 and 93-1559 to correct these test performance problems. The team assessed the licensee's actions to decrease the turbine speed to a value lower than the established 3800 revolutions per minute. The licensee's initial reviews appeared to be appropriate.

2.5.1.3 System Configuration

The P&IDs were found by the team to reflect the current configuration of the system and its components. The team verified that there were no temporary modifications to the system. A review of the modification history indicated that eight modifications had been performed on the auxiliary feedwater system and that five modifications were planned. Each of these modifications maintained the auxiliary feedwater system within its' design basis.

Several minor modifications had been accomplished with change packages. Fifty-four change packages had been completed and 51 remained open. A review of the open modifications and change packages was conducted with the system engineer. The modification and change package backlog was appropriately prioritized and appeared to be well managed. The team noted that the most significant modification involved the replacement of butterfly valves associated with the essential service water system (AL HV 0030 - AL HV 0033). These valves were identified by the licensee as having excessive seat leakage. The team noted that the leaking valves presented an operational nuisance following surveillance testing; however, the leaking valves did not represent a system operational concern.

2.5.1.4 Equipment and Industry Information History

The team reviewed the auxiliary feedwater system maintenance history with the system engineer. It was found that the system engineer maintained a comprehensive narrative history for this system. This narrative also included industry technical information such as service letters, NRC Notices and Bulletins, and other third party documents which had been provided to the system engineer by the Industry and Technical Information Program Coordinator. The team requested a computer printout of the industry and technical information files for the components that were significant in the probabilistic risk analysis. This included technical information for the turbine driven pump and its steam supply valve. Twelve reports were found, all of which had been appropriately dispositioned and closed. The team also obtained a computer printout of opened and closed PIRs associated with this system. It was found that the system engineer was cognizant of those PIRs assigned to engineering; however, this was not true of four open PIRs assigned to other organizations. The licensee has initiated measures to ensure that the responsible system engineer is provided with the status of all open PIRs.

2.5.1.5 Open Maintenance Requests

The team reviewed all open WRs for the auxiliary feedwater system. This review also included WRs completed within the last two years. The team noted that there were 24 open preventive WRs and 29 open corrective WRs. It was found that the open corrective WRs had been properly prioritized and did not appear to be repetitive.

2.5.1.6 Licensee Assessment of Auxiliary Feedwater System

The licensee has performed two assessments of the auxiliary feedwater system within the last year. The quality assurance organization performed Surveillance 53359S-2030 of the auxiliary feedwater system in April 1993. The surveillance identified some minor procedure revisions which did not affect equipment operability. A recent hardware failure trending report was also completed which identified repetitive failures of the essential service water interface valves, AL HV 0030 through AL HV 0036. The licensee initiated corrective actions to address the assessment findings.

2.5.1.7 Probabilistic Risk Analysis Data

The team noted that the system history data supported the assumptions used in the Individual Plant Examination for Wolf Creek. The data suggested that the assumption used for the turbine driven pump reliability was conservative. The team found that an Engineering Evaluation Request (94-SA-01) had been issued regarding a recommendation in the Individual Plant Examination. The recommendation was to install switching which would permit the main feedwater isolation signal to be cleared to permit the main feedwater system to be used as a nonsafety-related back up the auxiliary feedwater system. The team also found that the Individual Plant Examination data has been used to develop measures of importance for systems and components. It was determined that the system engineer and quality assurance personnel were knowledgeable of this data.

2.5.2 Ventilation System Walkdown

An inspection was conducted of selected safety-related air handling systems in order to assess the effectiveness of the licensee's controls over system configuration, maintenance, and issues resolution. The following components were inspected: control room air conditioning system, class 1E electrical equipment air conditioning units, control room pressurization system, control room filtration system, and the access control ventilating system.

2.5.2.1 System Configurations

Walkdown of the selected components was performed to identify the condition of instrumentation, dampers, fans, motors, filters and associated essential service water (ESW) components. The labeling of components and the marking of damper positions to balance air flow was very good. All required locking devices were in position and logged in the control room. The associated P&IDs were accurate and up-to-date. The general condition of fans, bellows, gaskets, bearings, filters, and ductwork seams was good. Nonconforming items were generally found to be identified with WR tags. The number of outstanding WRs was appropriately managed and did not represent an operability concern. The team did note that a common problem had been identified with regard to wall thinning of piping transition pieces in the essential service water line of the air conditioning condenser units. It was found that the licensee has formulated a Service Water Assessment Team to investigate the cause of this and other wall thinning occurrences. To date, the cause and resulting corrective action for the thinning phenomena have not been resolved. The licensee has scheduled to replace the affected transition pieces during the next refueling outage.

One minor deficiency was identified which did not have a WR tag attached. This item was the Access Control Fan Coil Unit 03 Chill Water Temperature Control Valve GK-TV108, which was leaking and had rust buildup around the valve stem. It was also noted that two WR tags on Air Conditioning Unit SGK05B were greater than three years old. WR 53701, dated July 27, 1990, identified a leak in an oil pressure sensing line. WR 5432, dated November 12, 1990, identified worn and loose gasket material on the control panel doors. The team reviewed the reason for the WRs not having been previously completed. It was found that the licensee had not been able to implement these WRs as a result of an inability to procure copper capillary tubing and closed cell foam gasket material. It was subsequently found that a modification request has been initiated to change out the capillary tubing. The gasket material arrived during the conduct of the inspection and has been scheduled to be replaced. The team concluded that the two WRs represent relatively simple tasks which the licensee has not been able to accomplish in a timely manner.

2.5.2.2 Procedural Adequacy

The team reviewed the following procedures associated with the ventilation systems: SYS GK-121, Revision 10, "Control Building HVAC Startup;" SYS GK-122, Revision 5, "Manual Control Room Ventilation System CRVIS Line-up;" and SYS GK-200, Rev. 1, "Inoperable Class 1E A/C Unit." In each case, the team found the procedures were technically adequate and were compatible with in-plant labels and system P&IDs.

2.5.2.3 System Engineer Support

The team conducted interviews with the system engineer assigned responsibility for the safety-related air handling systems. These discussions focused on the system engineer's technical knowledge of the systems and on the system's work and performance history. The system engineer displayed good ownership and was aware of all outstanding WRs, design modifications, and PIRs. His knowledge also included the historical aspects of work and modifications completed and the basis for those activities. The responsibilities of the system engineer were verified to include weekly system walkdowns and monthly review of all activities planned for his systems. Interactions with the maintenance and integrated plant scheduling (IPS) groups were also discussed. The system engineer's workload was not excessive and was being managed in a manner consistent with assuring he could provide the necessary oversight of his systems

2.5.2.4 Preventive Maintenance

The team reviewed the preventive maintenance (PM) activities performed on these systems. The scope of these PMs was compared to vendor recommendations and design specification requirements. The team found that the established PM program appropriately addressed the requirements and recommendations in the design basis documents and vendor manuals. PM activities reviewed included lubrication, periodic inspections, thermography, connection tightening, set point testing, and hydrostatic testing. The implementation of the PM program was also evaluated by selecting individual components identified in the field, and then reviewing the historical PM data. Both motor actuated dampers and static dampers were selected. The governing procedure, MPE VD-001, Rev. 2, "M627A Ventilation Damper Maintenance," was reviewed for technical adequacy by comparison with the requirements of Specification No. 10466-M-627A, "Technical Specification for Dampers for the Standardized Nuclear Unit Power Plant System." This procedure was found to periodically verify the design specification design and periodic testing requirements. Historical data reviewed verified proper implementation of the procedure requirements for periodic service and testing at the required frequency.

2.6 Management Oversight of Plant Operations

The team noted that the licensee had recently implemented measures to improve oversight of plant operations and provide feedback to plant personnel on management's expectations. These measures included the implementation of a monthly onshift manager to assess plant operations, establishing an operator top-5 priority list, implementing a twice daily meeting between the SS and plant personnel to discuss plant activities, and focussing the morning meeting on emerging plant issues.

The team found that the onshift manager was spending approximately 1 week of each month overseeing plant operational activities and providing feedback to plant personnel on how management's expectations were and were not met. The team reviewed several of the onshift managers' findings for the last two months. The team found that the findings were comprehensive and addressed both programmatic and personnel performance issues.

The initiation of the operators' top-5 maintenance issues has proven to be effective in addressing operational problems that could distract the operators from their routine activities. The effectiveness of this program was noted in the absence of operational activities which could not be readily performed because of degraded equipment.

The implementation of the SS meeting and the focus of the morning meeting on emerging plant issues has provided the licensee with the ability to better inform the control room of planned and emerging work activities, while providing the forum for management to review emerging plant issues.

2.7 Conclusions

Control room activities were conducted in a professional manner. Communication between the SS, SO, and reactor operators was very good. This included communicating actions taken in response to unexpected alarms and notifying the other operators when they left the at-the-controls area. Good use of the alarm response procedures was noted. The shift turnovers and midshift reviews were comprehensive. The plant status, including planned evolutions, were appropriately reviewed. The NSOs were effective in communicating their actions taken in response to local control panel alarms.

A concern was identified that technical support personnel was not appropriately utilized in evaluating system operability issues.

Equipment clearance orders and locked valves were well controlled. An observation was made that management's expectations were not met for documenting the reason locked valves were manipulated.

The auxiliary feedwater system and the safety-related air handling systems were well maintained. The system engineers were found to be cognizant of their assigned system and demonstrated a strong sense of ownership. The use of individual plant examination in measuring the importance of systems and components was identified as a strength.

The team noted that the licensee was generally effective in identifying equipment deficiencies and ensuring appropriate corrective actions were taken. Routine plant operations did not appear to be adversely impacted by equipment deficiencies. However, an example was identified where the operations staff manipulated a valve limit switch to resolve a control room valve position indication problem without utilizing the WR process.

Management involvement in routine plant activities was noted. The operations staff acceptance of the PIR process, which resulted in the identification of personnel performance and programmatic concerns, had improved. However, the process implementation still required management oversight to ensure concerns were promptly identified in a PIR. The example noted involved the failure of the SS to promptly initiate a PIR for not entering the applicable Technical

Specification action statement with both hydrogen analyzers inoperable concurrently.

3 MAINTENANCE

The team performed a review of the activities associated with the maintenance of plant systems, equipment and components.

3.1 <u>Work Control Process</u>

The team evaluated the licensee's programs to control work activities during normal operations and plant outages. The evaluation included the identification, prioritization and scheduling of work activities.

3.1.1 Work Control Plan

The licensee utilized the WR process to implement all maintenance and modification activities. The WR process was controlled by Administrative Procedure ADM 01-057, "Work Request," Revision 28, dated December 16, 1993. The team noted that numerous changes were incorporated into the procedure during the latest revision and that three additional procedure changes had been attached since the issuance of Revision 28. The team determined that the changes better identified management's expectations for the conduct of maintenance work activities. The team also found the use of a computerized WR log to be a work control process improvement.

3.1.2 Work Control Plan Implementation

The team noted that ADM 01-057 contained detailed instructions on completing the WR form. Following the identification of a problem, the WR form was delivered to the control room for the SS's review. The SS made the initial determination of the priority of the involved work in addition to the determination of equipment operability and the reportability of the identified condition. The SS was also required to authorize the involved work after the equipment had been taken out of service and to acknowledge the completion of the work activity. The team reviewed the SS's workload and found that a significant amount of the SS's time during the day shift was occupied with addressing work control related activities. However, the team noted that the interface with the work organizations was well controlled and did not provide a distraction to control room operations.

The team reviewed recent maintenance trends including PIRs related to work control. It was found that the licensee initiated five PIRs (94-0292 - -0296) on February 10, 1994, for work control issues in the mechanical maintenance, instrumentation and controls, electrical maintenance, mechanical support, and maintenance modifications areas. The licensee initiated the PIRs because of a trend in the performance indicators that showed 32 percent of the PIRs written in the maintenance area were work control issues. The team reviewed the referenced PIR files and noted that most of the listed problems involved personnel performance concerns. The team considered the licensee's ability to assess adverse trends as an indication of the improved corrective action process and an overall acceptance of the PIR process by maintenance personnel.

3.1.3 Work Scheduling

The team reviewed improvements the licensee has implemented for scheduling of work activities. The licensee had established an IPS group to coordinate the work of the various organizations. The scheduling activities were controlled in accordance with Administrative Procedure ADM 01-027, "Work Scheduling During Power Operations," Revision 8, dated May 14, 1993, and AP 30-100, "Refueling Outage Planning and Implementation," Revision 0, dated February 3, 1994. The IPS group used a 13-week rolling schedule to plan work on a system basis. The weekly work plan was reviewed on a daily basis by representatives of the operations, maintenance, and engineering organizations to account for emergent work and to adjust priorities, if needed. Records reviewed by the team showed that the trends for some performance indicators were improving because of better work scheduling. One example involved the improved availability of the auxiliary feedwater system; however, other safety system unavailability remained appreciably above the established goals.

3.1.4 Work Request Review

The team reviewed the maintenance backlog with the maintenance and IPS managers. It was found that the total work backlog was approximately 4300 items with 870 being hardware related. The licensee recognized this as an excessive backlog which was uniquely difficult to manage and has established a backlog goal of 710 open hardware related WRs by the end of August 1994. The licensee demonstrated that they were fully cognizant of the backlog size. This has been included as a "Management's Top-5 Concern" and was an item reviewed weekly by management. At the time of the inspection a revision to the work control process was in place to stream line the conduct of maintenance activities when the affected system or component was not safety-related and would not have an adverse impact on plant operations.

The team conducted walkdowns of several safety-related and two nonsafety-related systems to assess the impact the maintenance backlog had on these systems. The systems included residual heat removal, chemical and volume control, high pressure coolant injection, containment spray, component cooling water and fuel pool cooling. The team found that the equipment deficiencies had generally been identified in the backlog. During the walkdowns, the team noted that there were numerous valve packing, body to bonnet, and pump shaft seal leaks. An example was the residual heat removal system. It was also noted that many of the WR tags were only a few months old; however, based on the amount of boric acid present, the leaks appeared to have been present for a significant time, prior to being documented on a WR. This indicated that continued management oversight was needed in this area to ensure that equipment deficiencies were promptly identified.

The team observed that there were a significant number of WR tags on components which were greater than three years old. Approximately 20 examples, many involving safety-related breakers, were reviewed to determine if suitable operability determinations had been made and if they were scheduled for work.

The IPS manager explained that WR age was now considered for WR priority. For the examples identified, they had either been placed on a backlog work list for expeditious processing, or they were listed as outage work. WRs were considered backlog only if it fell outside the priority versus age criteria established by the licensee. The licensee's goals were to have no documentation discrepancy work request more than 24 months old and no non-outage WR impacting equipment more than 3 years old. The team found that appropriate operability determinations had been made . All work requests older than three years had received a work priority based on age. The licensee indicated its intention was to reduce the backlog to zero within two years. The team noted that the outage WR backlog was also one of management's top five concerns.

3.1.5 Maintenance Work Observations

On February 16, 1994, the team inspected the diesel engine driven Fire Water Pump 1FP001PB. Two surveillance tests were completed on the electrical system for the engine earlier in the day. The team reviewed the work instructions contained in Procedure STN FP-412, "Fire Pump (Diesel) Battery And Electrical Termination Check," Revision 2, and inspected the engine to evaluate the completed work.

The team noted that the electrical connections to the diesel engine starter solenoids were dirty and oily. The team questioned how the connections had been verified "tight and not degraded," in accordance with the procedure given their physical condition. The licensee then performed an additional inspection of the engine and initiated WR 01057-94 to clean the start solenoids and associated electrical connections. The licensee also initiated PIR 94-0345 to evaluate the acceptability of the level of housekeeping at the engine. The team found the conduct of this work activity to be marginally acceptable based on the diesel engine being able to operate as designed; however, it was determined that the personnel performance aspect of this work activity did not meet managements' established expectations.

The team reviewed how management's expectations were disseminated to the maintenance craft and how they were verified as being properly implemented. It was identified that the onshift manager observed some selected work activities; however, maintenance management and supervisors were not aggressively involved with observing craft performance in the field. It had been the responsibility of craft peer personnel to reinforce management expectations.

3.2 <u>Conclusions</u>

The team noted there have been several management initiatives in this area within the previous year which have been directed at improving the conduct of maintenance activities through improved planning and scheduling. These initiatives have resulted in improved equipment availability for some equipment and a decrease in the maintenance backlog.

The licensee had been effective in addressing maintenance personnel acceptance of the PIR process as indicated by the increase in craft personnel identifying personnel performance problems. The licensee's ability to trend personnel performance issues and the establishment and monitoring of goals for reducing the maintenance backlog were determined to be positive attributes for improving the maintenance process. However, the team noted that an aggressive approach to reduce personnel performance problems was not evident in managements' oversight of work activities.

4 ENGINEERING

The team reviewed the onsite engineering organization for organizational structure, interfaces, and support for plant operations. The licensee's operational feedback process was reviewed to determine its overall effectiveness in assessing information obtained from outside the licensee's organization.

4.1 System Engineering

The team found the system engineering organization and staffing were basically the same as observed during NRC Inspection 50-482/93-04. The team found that system engineering had become better integrated into routine plant activities. However, as identified in Section 2.4 of this report, technical personnel support was not consistently utilized in evaluating system operating concerns. Discussions with the system engineers and observations of plant activities demonstrated that the engineers maintain a strong sense of system ownership and knowledge of their system's design and operational problems. Communications between system engineers and other departments was seen as a strength with the systems engineers providing timely support of emergent operating problems. The system engineers indicated that the weakest link of communication had been between themselves and their counterparts in the design engineering organizations. The licensee indicated that ongoing changes to the engineering organization, processes, and the relocation of design engineering personnel to the site should improve communications within engineering.

The team noted that system engineering performed an independent review of emerging WRs. These WRs were reviewed each morning of the subsequent work day. The process consisted of an initial screening by system engineering supervisors and, if deemed appropriate, a more detailed evaluation by the cognizant system engineering. These reviews were intended to serve as an independent check of the initial equipment operability determinations made by operations personnel. While the team was on site, an event occurred as described in Section 2.4 of this report where both containment hydrogen monitor trains had been inoperable, concurrently, during the conduct of a maintenance activity. The system engineering's WR review identified that the associated heat tracing for one train was inoperable, which rendered that train inoperable, while the second train had been removed from service for maintenance. The control room was promptly notified of this event.

The team found the engineering managers had established goals and expectations for the system engineering organization. The major focus of these goals and expectations was to make the system engineers more proactive in identifying system performance problems by trending system and equipment performance histories. Discussions with individual system engineers revealed that while these goals and expectations had been established, the programmatic tools to implement those expectations had not been provided. An example involved management expectations that repetitive hardware failures be identified and corrected; however, equipment and component WR history trends could not be readily established.

4.2 Control of Engineering Contractors

Inspection Report 50-482/93-04 documented that the technical oversight and contract administration related to a large number of engineering projects, which had been contracted to outside engineering firms, were being handled by a small licensee project staff. The team determined that the status of the support engineering group related to contracted projects had continued to change as a result of ongoing changes within the licensee's engineering organization. The group consisted of four supervising (senior) engineers who oversaw approximately 30 projects in various stages of study, design, or implementation. The approach for overseeing contracted projects remained that the contractors were required to follow licensee procedures, including periodic meetings with appropriate engineering and operations personnel. Technical oversight was provided by the assigned supervising engineer, with additional support provided by the licensee's design engineering organization. Contractor performance was determined by factors such as the success of the modification and the need for field changes. Incentive for the contractors was related to market forces and their desire to secure future contracts from the licensee. The ratio of projects to an assigned engineer had improved and the process related to contractors had been better established. However, the team did not perform reviews of contract engineering products to obtain a first hand assessment of the success of the process.

4.3 Operational Experience Feedback

This part of the inspection was conducted to evaluate the licensee's effectiveness in assessing, providing feedback to the different organizations and initiating corrective actions for operational event information obtained from outside the licensee's organization.

4.3.1 Program

The licensee's operational experience feedback process, which reviewed information from external sources, was called the Industry Technical Information Program (ITIP). Responsibility for implementing this program was assigned to the Nuclear Safety Engineering (NSE) Group. Administrative control was provided in Procedure KGP-1311, "Industry Technical Information Program." The licensee utilized the PIR process to document and evaluate onsite operational experiences.

4.3.2 Implementation

The team reviewed a report of ITIPs generated from identified source documents provided by the licensee. This report was compared to known industry experience reports and was determined to be comprehensive. The licensee's ITIP report identified external sources such as peer utility licensee event reports, special reports, NRC Information Notices, Electrical Power Research Institute (EPRI) Reports, Westinghouse Infograms and Nuclear Safety Advisory letters, and other third party documents.

The team selected several ITIP files and confirmed that an initial screening for applicability had been performed. The team verified that ITIP, applicable to Wolf Creek, had been reviewed in a timely manner, and the appropriate corrective action document was initiated (PIR or corrective WR) and properly prioritized for resolution. The corrective action document was then assigned to the responsible organization(s) for further evaluation. These activities were performed within the NSE organization by experienced personnel. Recommended corrective actions resulting from both the initial review and the responsible organization evaluations were both appropriate and comprehensive. The ITIP issue was then effectively tracked to completion. Followup effectiveness audits, performed by NSE, were conducted on a regular schedule. These reviews were self critical and resulted in program improvements.

The team noted that NRC Bulletins and Generic Letters had not been included in the ITIP process. Through discussions with NSE personnel, the team determined that since Bulletins and Generic Letters generally require a response to the NRC, the licensee had chosen to handle these communications through the Licensing Organization.

The team interviewed the supervisor of licensing and was informed that responses to regulatory agencies were administratively controlled by Procedure KGP-1261, "Communications With Regulatory Agencies (NRC and KDHE)," Revision 2. A review of Procedure KGP-1261 revealed that it only discussed the development of the responses and did not specifically address the handling of Bulletins and Generic Letters in the context of external operations experience. The team determined that the licensee had not documented its reviews consistent with the ITIP process for Bulletins and Generic Letters. Instead, the documentation consisted of requests to responsible organizations to review, evaluate and submit recommended response information, the organizations' subsequent responses, and the coordinated responses to the NRC.

The team followed up on licensee actions taken in response to several bulletins and generic letters that appeared to require some immediate action from the licensee. One example reviewed was Bulletin 92-01, "Failure of Thermo-Lag 330 Fire Barrier System." It was determined, through discussions with fire protection personnel and review of the Fire Watch Log, that fire watches were established the same day that the bulletin was received by the licensee. The team verified that an appropriate response to system, equipment, and operational concerns for other Bulletins and Generic Letters had been performed. However, the team concluded that the process for handling Bulletins and Generic Letters was, a weakness in the operational experience feedback program. This was based on the process not having been adequately proceduralized. It did not provide for systematic identification or coordinated tracking of corrective actions, and effectiveness followup reviews were not performed.

4.4 Conclusions

The system engineering program had established a strong base to support plant operations. The organization was staffed by professional individuals who demonstrated ownership for their systems. Management's expectations were well understood by the staff; however, management had not consistently provided the necessary tools to effectively meet those expectations.

The licensee's ITIP provided a comprehensive review of industry operational events. However, the programmatic controls initiated for NRC Bulletins and Generic Letters were identified as a weakness in the overall operational experience feedback process.

5 RADIOLOGICAL PROTECTION

The team reviewed the licensee's radiological exposure controls, including its initial response to a contamination event. Radiation worker practices were also observed. The adequacy of the licensee's IIT for a contamination event and a heat distress occurrence was assessed.

5.1 Radiological Program Implementation

5.1.1 Exposure Controls

The radiation protection organization's response to the personnel contamination event in the radwaste holdup tank (RHUT) on February 8, 1994, was good. Radiation protection personnel identified that contamination had spread to a clean area, analyzed the situation, and took prompt action to evaluate the extent of the problem and contain it. Workers were found to have been contaminated and personnel decontamination procedures were initiated. However, the lack of hot water in the decontamination showers prevented radiation protection personnel from complying strictly with the personnel decontamination Procedure RPP 02-310, which required the use of warm water. (PIR 94-0271 was initiated to address this concern.) The radiation protection technicians were successful in decontaminating the workers and assessing their internal exposures. Final dose assessments utilizing whole body counting results agreed closely with preliminary dose estimates based on air sampling results. Radiation doses to individuals did not exceed NRC or licensee allowable limits. The highest calculated committed effective dose equivalent was 58 millirems. The highest recorded deep dose equivalent was 373 millirems (by pocket ion chamber).

The team's review of records confirmed that workers involved in the incident were qualified to wear respirators and were trained to enter confined spaces. Workers received the ALARA prejob briefings required by the radiation work permit. However, radiation protection personnel later noted that they were not as aggressive as they might have been in setting the radiation work permit requirements for the RHUT bladder removal activity. Radiation protection personnel had allowed the contractor to dictate certain aspects of the job, such as the sequence for removing of the old bladder. The responsible supervisor stated that this aspect would be evaluated to identify ways the process could be improved.

5.1.2 Radiation Worker Practices

During the team's observation of work in the radiologically controlled area, minor inconsistencies between worker practices and training instructions were noted. It was noted that radiation workers wearing protective clothing, including the health physics technician providing coverage for the job, did not strictly follow the dress out instructions provided in radiation worker training for placement of the pocket ion chambers. The team observed that the workers wore the pocket ion chambers inside their protective clothing; thus, making it difficult to check their radiation received dose every 30 minutes as set forth in Procedure AP 38-001, "Radiation Worker Guidelines." The protective clothing removal instructions posted in the plant and the instructions listed in Step 6.6.1 of Procedure AP 38-001 were inconsistent with information furnished in the radiation worker training class and training handouts. It was found that the posted instructions did not include the removal of the pocket ion chambers when exiting a contaminated area. However, the radiation worker training and training handout (page 43 of GT 12 452 00, Revision 9) did provide the correct instructions as established by management.

The team observed that while removing protective clothing, one worker inadvertently took off a protective clothing bootie and stepped in his street shoe in the contaminated area. The team member and the ALARA coordinator observed this incident and reported it to the health physics technician standing nearby. The shoe was surveyed and released from the contaminated area. The individual was counseled on his responsibility to promptly identify any action or events which could result in the spread of contamination into clean area. The team did not consider the individual's initial response to be appropriate, in that he did not request assistance until prompted by the ALARA coordinator and the team member.

5.2 Management Oversight

The inspectors reviewed self assessments performed to evaluate various aspects of the radiation protection program. It was found that actions had been initiated by the radiation protection group to address the identified weaknesses.

The team interviewed quality assurance personnel and reviewed lists of quality assurance surveillances. The team determined that the surveillances performed of radiation protection activities had provided management with a meaningful assessment of the organization's performance.

The team also reviewed selected PIRs related to radiation protection issues. It was determined that the issues were properly addressed and correct actions initiated.

The team noted that radiation protection management had not been aggressive in observing radiation protection activities during early 1994. Radiation protection management tours of the radiologically controlled area had been previously identified by NRC inspectors as a positive means by which radiation protection management remained aware of plant conditions. However, the team noted that no tours were conducted in January 1994. The licensee indicated that this had resulted from the tour schedule not having been established in time.

5.3 Incident Investigation Team Review

On February 8, 1994, an incident occurred which resulted in 13 personnel contaminations and one case of heat stress. Workers were replacing a bladder in an RHUT when radioactive contamination became airborne and spread through the immediate area. Coincidentally, one worker who had been inside the RHUT became ill and was subsequently diagnosed by a physician as suffering heat "distress" (the term used by the physician to describe a mild case of heat stress).

The licensee initiated an IIT on February 9, 1994, to review the event. The team consisted of personnel from operations, maintenance, health physics, system engineering, and the safety services department. The IIT's assignment was to review the cause for the personnel contaminations and the heat stress occurrence and recommend corrective actions to prevent recurrence.

Although heat stress presented a greater immediate health risk to workers, it appeared that this issue was not aggressively reviewed. Evidence of this included:

- A memo from the acting IIT leader to the vice president of plant operations, dated February 14, 1994, stating that tank diaphragm replacement work should not resume until certain actions were taken. All recommended actions involved measures to prevent or deal with additional personnel contaminations. None addressed prevention of heat stress.

- Although members of the IIT understood that the purpose of the team was to examine both personnel contamination and the heat stress issues, the final report issued by the team did not explicitly address the root cause of the heat distress event. Section IV of the IIT report, entitled, "Root Cause," identified that an air pressure differential between the radwaste building in which the work was being performed and the adjoining auxiliary building was the root cause of the airborne radioactivity and subsequent personnel contaminations. However, it did not address a cause for the heat distress event. (PIR 94-0336 was subsequently initiated to address this concern.)

The team noted that the IIT report did provide recommendations for dealing with potential heat stress situations. The IIT report noted that no temperatures were taken in the area prior to the commencement of work and stated that the use of heat stress measuring devices "should be considered." The team, however, identified that the IIT's review of the event did not identify that the applicable procedure had not been followed. Procedure ADM 01-090, "Guidelines for Heat Stress Control," stated in Section 3.4, "The supervisor/foreman/ safety representative is responsible for the safety of the personnel in his job. He is responsible for...obtaining temperature measurements and calculation stay times...from Safety Services." Section 4.2

of the procedure stated, "If the supervisor/foreman/department safety representative feels the work area does *not* [emphasis added] meet the criteria of a hot environment, he may determine the wetbulb globe temperature of the area by contacting Safety Services..." Therefore, the procedure required that the worst case be assumed and that the work supervisor prove otherwise. The team interviewed the work supervisor and determined that he had not requested that Safety Services make temperature measurements. He acted on intuition and concluded that the work environment was not severe enough to cause heat stress. The physician's diagnosis indicated otherwise.

The team found that the guidance supplied to supervisors in Procedure ADM 01-090, "Guidelines for Heat Stress Control," did not provide specific guidance to supervisors as to when the procedure should be implemented. This was verified during an interview with the responsible supervisor. This individual also failed to demonstrate a good understanding of the heat stress program. (PIR 94-0334 was initiated to address this concern.)

The team also noted:

- Procedure ADM 01-090 was inadequate to address the existing working conditions in the RHUT. The procedure did not provide guidance for establishing stay times for workers wearing plastic protective clothing and/or full face respirators, as were the workers on the RHUT job. (PIR 94-0335 was initiated to address this concern.)

- Procedure ADM 01-090 had not been reviewed since September 5, 1991. (PIR 94-0358 was initiated to address the review cycle for this procedure.)

- The wetbulb thermometer required by Procedure ADM 01-090 had not been calibrated by the licensee. Section 3.3 of the Reuter-Stokes RSS-213 Instruction Manual states, in part, "Field calibration should be performed at least once per year." (PIR 94-0347 was initiated to address this concern.)

The licensee's prompt initiation of the IIT to evaluate this event was appropriate; however, the team concluded that the IIT was only partially successful in completing its assignment. Although the analysis of the personnel contamination event was thorough; the evaluation of the heat stress event was incomplete. Licensee representatives stated, in a telephone conversation with the team member on February 28, 1994, that they had determined that not all the members of the IIT had been trained in root cause analysis.

The licensee's overall implementation of corrective actions was poor for this event. The team noted on February 16, 1994, that work supervisors were prepared to continue work in the same environment, before the findings of the IIT were formalized. The team also noted that the IIT recommendation had not been included in the PIR process to ensure they were properly identified and corrective actions taken. (PIR 94-0336 was initiated to address this concern, as well as the one discussed above.)

In a telephone conversation on February 29, 1994, licensee representatives stated that PIR 94-0390 was initiated and would encompass the (referenced) PIRs written in response to various problems associated with the RHUT work activity which began on February 8. Additionally, licensee representatives informed the team that an assessment of the safety services program will be performed, and that various other departments would participate in the assessment.

5.4 Conclusions

The radiological program was well implemented. The licensee demonstrated the ability to appropriately respond to a potentially complex contamination event. Management support for the radiation protection program was good as demonstrated by the implementation of corrective actions resulting from their self assessments. However, management was not aggressive in ensuring their expectations were being met by the workers and radiation protection staff. Also, the failure to ensure hot water was available to properly decontaminate personnel indicated the need for a heightened awareness of systems needed to support the radiological protection program.

The IIT assessment of the radiological contamination event was mixed. The IIT appropriately addressed the radiological aspects of the event; however, the heat stress concerns were essentially disregarded. Management did not demonstrate a questioning attitude in assuring that the scope of the IIT had been met, and the corrective action process was not utilized to identify the IIT findings.

A lack of a questioning attitude was also noted for the safety services organization as demonstrated by inadequate procedural guidance provided for evaluating heat stress conditions, and for its failure to resolve concerns with the RHUT activity prior to authorizing the individuals to reenter the tank.

6 CORRECTIVE ACTION PROGRAM

The inspection of this area included the PIR process, the quality assurance audit program, and the oversight programs. The inspection included a review of the program procedures and its implementation. The team also reviewed a representative sample of PIRs initiated in late 1993 and 1994. The licensee's evaluations and corrective actions were reviewed for adequacy and timeliness.

6.1 Review of Performance Improvement Request Program

6.1.1 Procedures

The licensee's process for personnel to identify problems, concerns, and improvement items was the PIR program. This program was initially limited to non-hardware issues such as personnel, procedure or programmatic concerns. Procedure KGP-1210, "Performance Improvement Requests," Revision 9, dated September 30, 1993, expanded the PIR program to include those hardware issues previously addressed by the Hardware Failure Analysis Program.

6.1.2 Implementation

The team found that PIRs were initiated and dispositioned in accordance with Procedure KGP-1210. The recently initiated PIR Review Group performed initial PIR screening and assigned the PIR priority, significance, and organization responsibility. The PIR Review Group was located within the NSE Organization.

The team reviewed trends related to the initiation of PIRs and held discussions with various licensee personnel about the process. The team concluded that the PIR process had generally been accepted by licensee personnel as a viable means to report problems and concerns. The licensee provided PIR trend information which included the number of PIRs initiated in the fourth quarters of 1992 and 1993. During the fourth quarter of 1992, 143 PIRs were initiated by approximately 100 individuals. During the fourth quarter of 1993, 668 PIRs were initiated by over 350 different individuals. Although the fourth quarter of 1993 included a sharp rise in the initiation of PIRs, following licensee management meetings with personnel to discuss the PIR process, the number of PIRs initiated has been on a steadily increasing trend during late 1993 and early 1994. Licensee personnel were interviewed regarding their willingness to initiate PIRs and their expectations for corrective action following its initiation. All personnel interviewed stated that they were willing to initiate a PIR and were confident that actions would be at least considered. The team considered the acceptance and improved utilization of the PIR process to be a significant improvement from the somewhat reluctant attitudes which had been noted during past inspections.

Upon initiation of a PIR by licensee personnel, the NSE had the responsibility to screen each PIR to ensure operability and reportability considerations were addressed, assign the PIR its significance and priority, and assign a responsible manager to disposition the PIR. During the review of specific PIRs, the team determined that the initial screening and assignment of responsibilities had been performed promptly and in accordance with the licensee's procedure. Assignment of the responsible manager was sometimes assisted by discussions of PIRs, which occurred routinely at the licensee's morning management meeting. Discussion of PIRs in this forum was considered to be another recent improvement in the overall PIR process.

The assignment of PIR significance determined the level of root cause evaluation and the subsequent corrective action effectiveness review which was performed. The licensee's Procedure KGP-1210 provides the criteria which is utilized to determine whether or not to classify a PIR as significant. Recognizing that many of the significant PIR criteria included judgement on the part of the evaluator, the PIRs reviewed were determined to be reasonably classified in regards to significance.

Following assignment to and acceptance by a responsible manager, the PIR was evaluated to determine if it should be evaluated further or closed in process. If closed in process, justification and feedback to the initiator was required. If evaluated, the root cause of the problem was assessed and a corrective action defined. For significant PIRs, a determination of root cause was required to be performed and documented. The PIRs evaluated were found to have had adequate root cause evaluations and corrective actions defined. A concern was identified by the team that some root cause evaluations were narrow in scope. At the time of the inspection the team considered the significance of this concern to be mitigated by ongoing self assessment activities, and program improvement efforts. The team concluded that those efforts should capture the generic issues not addressed by individual PIRs.

The team found that PIR evaluations and root causes had been performed in a timely manner. It should be noted that licensee management had established a goal to close significant PIRs within 60 days of initiation. The monthly management report tracked the status of significant PIRs and indicated that they had been evaluated within the established schedules. Licensee trending and other self assessments have shown that PIRs are being dispositioned in a more timely manner.

Corrective actions taken as a result of PIRs were responsive to, as a minimum, the specific issue identified by the PIR. As discussed above, the actions were sometimes narrow in scope, but other licensee initiatives were ongoing, which encompassed the potential generic concerns. The team found that counselling of the involved personnel and inclusion of PIRs in required reading files was a common corrective action. The licensee was relying on PIR trending information to capture patterns which would indicate that programmatic or institutional problems exist. For specific occurrences of personnel error, this type of corrective action may be appropriate; however, the team expressed some reservations regarding the ability of trending information to capture all of the programmatic or generic issues.

The team considered the performance of effectiveness followup reviews for significant PIRS to be a programmatic strength. However, the team identified that some of the followup reviews lacked the necessary depth to ensure that a problem would not recur. Examples of good effectiveness followups were considered to include PIRs 92-0710, "Vault Cover Labeling," and 93-0500, "Clearance Orders," which involved field inspections and review of records to determine that required changes to equipment and practices had been implemented. PIR 93-0657, "Diesel Fire Pump Clearance Order Problem," was considered to be weaker example of effectiveness followup given that the review depended heavily on searches for similar PIRs during a relatively short interval of time. The effectiveness followup review for PIR 93-0228, "Failure to Perform As-found LLRT," did identify that the corrective actions taken were narrowly focused; however, the team did not observe this type of response to many of the effectiveness followup reviews which were assessed.

The use of PIR trending, as well as the trending of other performance parameters improved significantly. Several recent PIRs had been initiated, as a result of possible adverse trends in various categories of event causes, organizations involved, or other parameters being recorded and trended by the Plant Trending and Evaluation group. The PIRs initiated as a result of observed trends had not been dispositioned at the time of the inspection and the team was, therefore, unable to assess the licensee's corrective actions related to trend related PIRs.

Another recent change in the licensee's process was the investigation of hardware issues using PIRs instead of the previous hardware failure analysis program. This change had only been recently implemented at the time of the inspection. The licensee stated that a goal had been established to reduce the time required to determine root causes of repetitive hardware problems. The team observed that of the several repetitive hardware problems reported under the PIR process, most had not been classified as significant. For those that had been classified as significant, the classification was based on the importance of the equipment, and not for the ineffectiveness of past corrective actions. The licensee stated that case specific determinations of significance provided the investigator with the ability to decide the required level of root cause analysis to be performed and documented. The team concluded that the use of PIRs to investigate hardware failures had not been utilized long enough to evaluate its effectiveness; however, the team was concerned that the adequacy of previous corrective actions for hardware related PIRs had not been evaluated.

6.2 Quality Assurance Finding Resolution

The team reviewed the results of six audits and six surveillances. These activities resulted in the identification of 33 PIRs and 1 recommendation for improvement (RFI). The team noted that recent RFIs were being issued as PIRs. The team also reviewed two self-assessments; the monthly management report for January 1994; and, the quality assurance summaries of plant performance for the last three quarters.

The team determined that the audits and surveillances performed were comprehensive. The report findings were well documented and identified several substantive findings. These findings were appropriately identified in PIRs and, in most instances, suitable and timely corrective actions had been implemented. The team also found that timely effectiveness followup reviews had been completed by the quality assurance organization. The team noted that there was a substantial decrease in the processing time for quality assurance initiated PIRs during 1993. For example, the average time for a responding organization to close a PIR had decreased from 83 to 61 days. There was only one instance identified by the team where the corrective actions for a QA identified finding were not completed or reported by the due date during the fourth quarter of 1993. The corrective actions applicable to that finding were subsequently completed.

The team observed that the effectiveness followup reviews performed by QA for non-significant PIRs were sometimes shallow. In each instance, the review addressed the specifics of the issue. However, some reviews did not adequately address ancillary issues raised by the proposed corrective actions. For instance PIR 93-1203 addressed tagging issues associated with the locked valve list. The evaluation noted that drawings (P&IDs) did not always correctly indicate locked valves and went on to state that engineering was aware of this and eventually will correct the drawings. This statement was not challenged during the effectiveness followup. Procedure ADM 02-102, "Control of Locked Component Status," Revision 27, Section 5.0, requires that drawings (P&IDs) be revised to reflect changes to locked valves, breakers, or component lists. Steps 5.1 and 5.2 of this procedure specify that the system engineer or the manager of system design, depending on the reason for locking the valve, should be contacted to revise the P&IDs when changes to the locked valve list are made.

Through interviews, the team determined that engineering had attempted to correctly indicate on the drawings (P&IDs) all valves specified in the Procedure ADM 02-102 locked valve list. However, there were other valves indicated as locked on the drawings which were not in the Procedure ADM 02-102 locked valve list. The team determined that engineering had not established measures to correct the drawings (P&IDs). The status of Valves EG-V089 and BL-V005 identified during the audit had not been corrected on Drawings M-12EG03(Q), Revision 00, and M-12BL01(Q), Revision 04, respectively. The team determined that the drawings had not been updated to correctly indicate the locked valve status in certain instances. The team identified the failure to revise the P&IDs as a violation of Criterion V, "Instructions, Procedures, and Drawings," of Appendix B to 10 CFR Part 50 and the licensee's Procedure ADM 02-102 (482/9402-01).

The team noted that, although the proposed corrective actions in response to issues identified in recent audits and surveillances appeared appropriate, several issues related to previous audits and surveillances for which the corrective actions had been ineffective. Examples are as follows:

- Work request tags not pulled after work completion (PIR 93-1179, Audit K402; and PIR 92-0644)

- Tools left in electrical cabinets (PIR 93-0922, Surveillance S-2061; and Audit K312, URI 91-007)

- Acceptance of Services (PIR 93-1164, Surveillance S-2064; Audits K-369 and -400; and Surveillances S-1845, -1947, and -1964

The team found that the quality assurance organization was aware of these and similar recurring issues and had implemented additional corrective actions. The repetitive concerns that had been highlighted were also reviewed in summary reports to management. The team also noted that the quality assurance summaries of plant performance provided a critical assessment of plant operations. The summaries were primarily based on the results of surveillances and audits. The results of the audits and surveillances were clearly stated.

6.3 Review of Oversight Programs

6.3.1 Nuclear Safety Review Committee

The team attended the nuclear safety review committee (NSRC) meeting which was conducted on February 17, 1994. The team found that the NSRC was addressing current performance issues, including followup actions to licensee self assessment activities. The NSRC members were found to be cognizant of plant events and the subcommittees had been providing updates on requested actions.

This included followup reviews to operational self assessment activities and the corrective action program.

The team reviewed the outstanding action items. These items were addressed during the meeting and the oldest item (fuse control) was closed out. The team noted that the NSRC maintained a focus on their oversight responsibility. Questions by the NSRC members were based on a good understanding of recent and long term plant concerns and organizational responsibilities.

6.3.2 Independent Safety Engineering Group

The independent safety engineering group (ISEG) function, as specified in the Technical Specifications, was found to be an integral part of the NSE group with specific individuals identified as ISEG members. The team reviewed the resumes of the ISEG members and found that they had diverse experiences which uniquely qualified them to meet their ISEG responsibilities. The team found that the ISEG surveillances and audits were being appropriately scheduled and completed. The activities covered included operations, maintenance, plant systems, housekeeping. The team noted that the ISEG findings were comprehensive and followup actions were identified on PIRs.

6.4 <u>Conclusions</u>

The corrective action process has shown improved acceptance within the licensee's organization. This was demonstrated by the increasing number of PIRs that had been initiated by a diverse group of individuals. A growing confidence was noted among the licensee's staff that PIRs were being appropriately reviewed and corrective actions implemented. The timeliness in addressing significant PIRs had improved.

The PIR screening process and assignment of priority and organization responsibility was being effectively implemented. The morning management meeting was effectively utilized to review potential significant PIRs and provided early management involvement in assessing and resolving the concern.

Appropriate corrective actions were generally taken; however, the scope was often found to be narrow. The team did identify that effectiveness followup reviews were generally well performed for significant PIRs and appropriately considered the adequacy of corrective actions taken to prevent recurrence.

The quality assurance organization was generally effective in identifying performance and program weaknesses. The PIR process was well utilized to identify and followup on quality assurance organization identified deficiencies. However, an example was identified where the required management attention to resolve a long standing problem with drawing discrepancies was not provided until the team became involved.

The team found that the NSRC charter was effectively implemented and provided the required independent oversight of operational activities.

7 SELF ASSESSMENT ACTIVITIES

The team reviewed selected licensee organization and system self assessments, which were performed during 1993.

7.1 Organization Self Assessments

The team reviewed licensee self assessments which were conducted for operations, maintenance, radiological protection, engineering, quality assurance and the corrective action process. The team found that the self assessments provided a critical review of operational activities and support for plant operations. Many of the findings were identified in the later part of 1993, and the corrective actions had not been fully realized. Activities associated with the management action plan and the performance enhancement plan were identified in the self assessments.

The team found that the overall effectiveness and tracking of identified concerns and improvement items differed between the organizations. The maintenance self assessment provided an extremely self critical review of the organization's performance and its effectiveness in supporting plant operations. The assessment exceeded the scope of previous NRC findings and third party assessments and identified what could have developed into potentially significant concerns. One example was the self assessment performed for on-the-job training which identified that the training modules were not equipment specific, operational experience was not fed back into the process, and on-the-job training prerequisites were not clearly identified.

The concerns and improvement items identified in the assessments were tracked through formal and informal processes. The PIR process was utilized for many of the items; however, the status and responsibility for implementing many of the actions was being developed at the time of the inspection.

7.2 System Self Assessment

The team reviewed the spent fuel pool pump system self assessment conducted in February 1993. The assessment provided a comprehensive review of equipment problems and identified several potential maintenance training and procedural deficiencies. The team identified that PIRs had not been initiated for the findings and corrective actions had not been taken for each deficiency.

The team was able to determine that a maintenance training deficiency for aligning pumps had been addressed in late 1993. However, the remaining issues were not addressed until the team reviewed the assessment report. These concerns included control of purchasing replacement bearings, predictive maintenance techniques, and management involvement in establishing training and qualification criterion. The team verified that these deficiencies did not directly impact equipment operability.

7.3 Conclusions

The self assessment activities conducted in 1993 provided a comprehensive review of personnel performance, program weaknesses and system deficiencies.

The maintenance self assessment provided an excellent overview of program implementation concerns and personnel performance issues. Previous assessments and corrective actions initiated during the management assessment plan and performance enhancement program were addressed in the assessments. However, the status and responsibilities for implementing the assessment items were not consistently identified. The failure to incorporate self assessment findings into the PIR process contributed to programmatic and performance issues that were not promptly addressed.

8 FOLLOWUP ON CORRECTIVE ACTIONS FOR VIOLATIONS (92702)

8.1 (Closed) Violation 482/9303-01: Inadequate Control and Coordination Of The Clearance Order Process

This violation identified two examples of inadequate control and coordination for the implementation of clearance orders. By letter dated May 14, 1993, the licensee committed to implement improvements to the clearance order program. The licensee committed to revise the Clearance Order Procedure ADM 02-100 to include a relief turnover summary form and to require improved communications and coordination. In addition, the licensee initiated two IITs: IIT 93-01 investigated the cause of personnel contamination that resulted from the first example of the violation, and ITT 93-02 investigated the clearance order process. IIT 93-02 and the licensee's action to address the Notice of Violation was discussed in Section 2.2.4 of this report.

The team verified that the licensee had completed the actions specified in the response to the Notice of Violation and that the licensee had implemented the enhancements discussed in the May 14, 1994, response.

8.2 (Closed) Violation 482/9321-03: Failure to Initiate Corrective Actions When Essential Service Water Valve EF-V046 Measurements Were Not Within Acceptance Criteria

The "A" instrument air compressor essential service water return Check Valve EF-V046, was found to have experienced numerous failures to pass inservice testing leak rate tests. Work requests were generated and performed which involved the disassembly of the check valve, cleaning internal components, and valve reassembly. While performing this activity on several occasions, workers entered measurements onto the work request which did not satisfy the stated acceptance criteria. Upon entering the values in the work request, the workers failed to perform the required actions stated in the work request, initiate a corrective work request, or contact the maintenance engineer.

The licensee revised the work packages related to EF-V046 in order to clarify the measurements to be taken and the actions to be taken if the measurements were not within the acceptance criteria. The team reviewed the package related to the disassembly of the valve following the last inspection and found that the required measurements were within the specified tolerances. The valve work activity included the installation of stainless steel internals. The installation of the stainless steel internals was intended to decrease the likelihood of the valve sticking in the open position as a result of the accumulation of corrosion products. Following the installation of the new valve internals, the valve performance improved; however, it had failed several subsequent inservice tests. The licensee has continued to evaluate the cause of the valve problem, as well as implemented other actions to compensate for the valve performance. The licensee has evaluated the effect of periodic exercising of the valve to prevent it from sticking open. It was found that the accumulation of corrosion products which result in the valve sticking open can be avoided if the valve does not remain fully open for extended periods of time. Specific operational controls were implemented to address the finding.

After review of the above specific changes to the WR packages and the licensee's overall effort to address the problems related to EF-V046, the team determined the licensee's disposition of this issue was acceptable.

8.3 (Closed) Violation 482/9321-05: Failure to Properly Position Essential Service Water Valve EF-V0263 as Required by Procedure

The operation of the essential service water warming water isolation valves was intended to prevent freezing of the inlet bays during cold weather, while not exceeding the design maximum inlet temperatures during warm weather. The operation of the valves was governed by Procedure STN GP-001, "Plant Winterization". One of the warming Isolation Valves, EF-V0263, was found one-half open, while the procedure required the valve to be closed. The licensee's investigation determined that WRs had been initiated to address the difficulty in the valves, but that the problem had not been adequately dispositioned by the WR program.

In response to the inspection findings, the licensee initiated PIRs 93-0941 and 93-0942. The issue and root cause determination for PIR 93-0941 was consistent with the previous inspection findings which included deficiencies in the knowledge and training of operators with regard to determining the position for the large butterfly valves. As corrective action, the licensee placed the completed PIR in the required reading for operations personnel and enhanced the requalification lesson plans related to determining valve position indication for various types of valves.

PIR 93-0942 addressed the failure of the work control program to repair the valve after problems had been identified. The failure to promptly repair the valve resulted from the closure of the WR which had been initiated to correct difficulty in positioning EF-V0263. The WR was closed, based on the assumption that the problem would be addressed by another open WR related to the warming isolation valves. To prevent recurrence, the licensee revised Procedure ADM 01-057 to require that any equipment deficiency information in a WR being closed because of the existence of a duplicate work request be transferred to the duplicate WR. The team considered the licensee's actions appropriate to preclude recurrence of this problem.

ATTACHMENT 1

1 PERSONS CONTACTED

R. Q. Dunlap, Regulatory Services
C. W. Fowler, Manager, Maintenance and Modifications
R. B. Flannigan, Manager, Nuclear Safety Engineering
D. E. Gerrelts, Manager, Instrumentation and Control
D. Jacobs, Supervisor, Mechanical Maintenance
W. M. Lindsay, Manager, Quality Assurance
R. L. Logsdon, Manager, Chemistry
P. M. Martin, Assistant Manager, Operations
O. L. Maynard, Vice President Plant Operations
T. S. Morrill, Manager, Quality Control
W. B. Norton, Manager, Nuclear Engineering
L. D. Ratzlaff, Supervisor, System Engineering
F. T. Rhodes, Vice President Engineering
C. E. Rich, Jr., Supervisor, Electrical Maintenance
T. L. Riley, Supervisor, Regulatory Compliance
E. W. Schmotzer, Manager, Purchasing and Material Services
R. L. Sims, Supervisor, Operations Support
B. B. Smith, Manager, Modifications
C. M. Sprout, Manager, System Engineering
S. M. Walgren, Shift Supervisor, Operations
J. D. Weeks, Assistant to Vice President Plant Operations
S. G. Wideman, Supervisor, Licensing
M. G. Williams, Manager, Plant Support

NRC Attendees

T. P. Gwynn, Director Division of Reactor Safety, Region IV
J. F. Ringwald, Resident Inspector
L. A. Yandell, Chief, Branch B, D'vision Reactor Projects, Region IV

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

2 EXIT MEETING

An exit meeting was conducted on February 24, 1994. During this meeting, the team members summarized the scope and findings of the report. The licensee acknowledged the inspection findings identified in this report. The licensee did not identify as proprietary any information provided to, or reviewed by, the inspectors.

ATTACHMENT 2

INSPECTION FINDINGS INDEX

- Violation 482/9402-01 was opened (Section 6.2).
- Violation 482/9303-01 was closed (Section 8.1)
- Violation 482/9321-03 was closed (Section 8.2).
- Violation 482/9321-05 was closed (Section 8.3).