APPENDIX

U. S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-482/90-37 Operating License: NPF-42

Docket: STN 50-482

Licensee: Wolf Creek Nuclear Operating Corporation
P. O. Box 411
Burlington, Kansas 66839

Facility Name: Wolf Creek Nuclear Generating Station (WCNGS)

Inspection At: WCNGS, Coffey County, Burlington, Kansas

Inspection Conducted: December 17-21, 1990

Inspectors: _____ 1/23/91
R. E. Vickrey, Reactor Inspector, Date
Operational Programs Section, Division
of Reactor Safety, Region IV

_____ 1/23/91
H. F. Bundy, Reactor Inspector Date
Test Programs Section, Division
of Reactor Safety, Region IV

_____ 1/17/91
J. E. Whittemore, Reactor Inspector Date
Operational Programs Section, Division
of Reactor Safety, Region IV

Approved By: _____ 1/23/91
J. E. Gagliardo, Chief, Operational Date
Programs Section, Division of
Reactor Safety, Region IV

Inspection Summary

Inspection Conducted December 17-21, 1990 (Report 50-482/90-37)

Areas Inspected: A routine, announced, followup inspection of Wolf Creek Nuclear Generating Station (WCNGS) was conducted to evaluate the licensee's corrective actions related to the areas of weakness noted during the Maintenance Team Inspection (MTI) conducted September 19 through October 7, 1988 (NRC Inspection Report 50-482/88-27). Additional inspection was performed in the areas of emergency diesel generator reliability, post-maintenance testing, and instrument air system quality.

Results: Within the scope of this inspection no violations or deviations were identified. The inspection identified weaknesses in the licensee's evaluation and tracking of significant inspection findings. Potential weak areas were also found in the diesel generator reliability improvement program and the licensee's ability to assess qualitatively the condition of the instrument air system.

DETAILS

1. PERSONS CONTACTED

WCNOC Personnel

*J. A. Bailey, Vice President, Nuclear Operations
*F. T. Rhodes, Vice President, Engineering and Technical Services
*C. E. Parry, Director, Quality
J. F. Deddens, Outage Manager
T. J. Garrett, Manager, Safety Analysis
*R. W. Holloway, Manager, Maintenance and Modification
*W. M. Lindsay, Manager, Quality Assurance
*W. B. Norton, Manager, Technical Support
J. Pippin, Manager, Nuclear Plant Engineering
E. Schmotzer, Manager, Procurement and Material Services
*M. G. Williams, Plant Support
*J. A. Zell, Manager, Training
*C. Sprout, Section Manager, NP-WC
*R. L. Buffum, Supervisor, Technical Training
*A. B. Clason, Supervisor, Maintenance Engineering
*H. K. Churnoff, Supervisor Licensing
*O. A. Korbelik, Outage Supervisor
M. H. Megehee, Supervisor, Compliance
*D. Naylor, Supervisor, Operations Support
R. A. Olson, Supervisor, Expediting and Traffic
*R. L. Sims, Supervisor, Equipment Engineering
*L. Stevens, Supervisor, Engineering
*H. Stubby, Supervisor, Technical Training
*W. J. Walt[illegible], Supervisor, Technical Training
*S. Wideman, Senior Engineering Specialist
R. Blecha, Maintenance Engineering
K. B. Buechle, Safety Services
A. L. Hawley, Maintenance Engineering
R. Rally, Maintenance

NRC Personnel

*H. F. Bundy, Reactor Inspector, RIV
*L. L. Gundrum, Resident Inspector
*M. E. Skow, Senior Resident Inspector
*R. B. Vickrey, Reactor Inspector, RIV
*J. E. Whittemore, Reactor Inspector, RIV

* Denotes those personnel attending the exit interview.

2. FOLLOWUP ON PREVIOUSLY IDENTIFIED WEAKNESSES (92701)

The inspectors reviewed the current status of and actions taken by the licensee to correct the weaknesses identified in NRC Inspection Report 50-482/88-27. One violation, one deviation, and five inspector followup items resulting from the MTI have been closed out in other NRC inspection reports. Thus, the primary focus for this inspection was to review and assess the actions taken to address the nine weak areas noted in the Executive Summary of the MTI report. The inspectors also followed up in the areas of post-maintenance testing, diesel generator reliability enhancement, safety-related check valve in-service testing, and instrument air system air quality. The inspectors observed that although licensee actions in response to the identified weaknesses had not been tracked, extensive actions had been taken in response to most of the identified weaknesses through individual manager initiative. It was difficult for the inspectors to determine what actions had been taken and the current status of the weaknesses because the parties responsible for actions had not been identified. The results of this review are discussed for each identified weakness below. The documents referenced in each discussion are identified by reference number and are listed in the Attachment.

2.1 Trend Analysis Could Be Improved to Show Quality of Maintenance Activities (Weakness - Page 1 of NRC Inspection Report 50-482/88-27)

Although the inspectors identified a number of improvements in the trend analysis programs, no evidence of a coordinated licensee response to this weakness could be found. The inspectors observed that a comprehensive review had not been performed by the licensee to coordinate the various trending programs and to assure that all useful data was being trended. For example, no evidence was found that trending of log data had been considered. Action requirements for the various reports were weak in that a failure rate threshold for initiating action had not been established.

It appeared that failure data found in corrective work requests (CWRs) were being appropriately trended and that appropriate actions were being taken in response to identified trends (Document 12). A computer program was used to identify components with three or more failures in a calendar year and to list the work requests associated with these failures. Designated personnel reviewed these computer "hits" and discussed proposed actions at the management meeting held every Friday. Actions considered at the Friday meeting included generation of hardware failure analysis reports and long-term corrective action plans. The inspectors noted that there were 19 "hits" from the week prior to the inspection. Maintenance management reported that they were experiencing difficulty getting meaningful data on rework items and were considering lengthening the rework window to get more meaningful data.

Quality Assurance (QA) was continuing to trend various parameters in accordance with Document 18 and was issuing quarterly reports. The inspector reviewed the latest report with the QA Manager. Among the items trended were CWRs, quality program violations and deviations, programmatic deficiency reports, and NRC items. This report had broad distribution. However, it was not clear how the information was being used by the addressees. QA had the authority to request improvement on corrective actions based on data in the report; however, there were not examples noted wherein QA had exercised this authority.

The compliance department was processing data reportable to the NRC and industry organizations. Documents 13 to 17 are examples of reports which were generated by the compliance department. Selected components were being tracked for time out-of-service (e.g., ECCS). However, it was not clear how this data was being used. For example, there did not appear to be established action levels for high failure rates identified in the component failure analysis report (Document 16).

2.2 Licensee Management's Visibility in the Plant Could Be Improved (Weakness - Page II of NRC Inspection Report 50-482/88-27)

The inspectors did not review entry data for vital area doors. However, the managers interviewed indicated that they tour in the plant on a regular basis. Also, it was noted that monthly area safety inspections were being performed by supervisors and managers (Documents 20 and 21). These inspections would be expected to improve management visibility.

2.3 The Licensee Had Not Established A Formal, Comprehensive Program of Root Cause Analysis (Weakness - Page 13 of NRC Inspection Report 50-482/88-27)

Based on an interview with the Supervisor, Corporate Policy and Procedures, the inspector found that a formal program for root cause analysis (Document 19) had been implemented. Appropriate personnel had been scheduled for training, and the training was being conducted in accordance with a schedule. Implementing procedures included Documents 1, 2, and 25. Issuance of hardware failure analysis reports (HFARs) had recently been implemented, and an activity report (Document 3) was issued monthly. To evaluate the benefits being derived from the program, the inspectors reviewed selected HFARs (Documents 4 to 11). It was apparent that plant performance benefits were being derived from actions taken pursuant to report recommendations. It was noteworthy that one of the recommendations of HFAR MA 90-011 was routine thermography surveys of certain electrical panels in accordance with the newly established program. The inspectors noted that there was inadequate justification documented for the conclusions in some of the reports. This is discussed in paragraph 3.2 of this report. It was observed that the licensee did not evaluate hardware failures for input to plant design specifications.

2.4 Predictive Maintenance Program Did Not Have Adequate Resources (Weakness - Page 15 of NRC Inspection Report 50-482/88-27)

There appeared to be adequate resources assigned to support implementation of the predictive maintenance programs. Two employees were assigned full time to the programs and one other full time position was authorized. In the interim two employees were assigned to the program on a part time basis. The vibration analysis program was well established and producing useful information. Equipment had been identified for the oil analysis program and source samples had been analyzed. Equipment had also been identified for the thermography program, and part of the first cycle had been completed. Both mechanical and electrical components were included in the thermography program.

The predictive maintenance laboratory appeared to be adequately sized and equipped. The inspector reviewed a recent predictive maintenance, biweekly report (Document 24). It covered all three techniques and appropriate corrective actions for identified problems. One of the successes of the thermography program was the identification of a stem and disk separation on a valve.

The inspector found that trending and predictive maintenance activities were being conducted by the electrical and instrumentation and control (I&C) engineering groups through formal review of work package results. In the review of these activities the inspector found them to be quite comprehensive but not controlled by formal instructions or requirements. The lack of standardization and a central point of contact made it impossible to evaluate whether trending was being used in all appropriate areas of maintenance. This observation was brought to the attention of the licensee.

2.5 Probabilistic Risk Assessment (PRA) Techniques Were Not Being Used (Weakness - Page 17 of NRC Inspection Report 50-482/88-27)

The manager of nuclear safety analysis had been assigned responsibility for PRA based analyses. An individual plant examination (IPE), which was being prepared by a contractor, had been under development since May 1989, was scheduled for completion by the end of 1991. Training and implementation of the results of the IPE was scheduled for 1992. Selected personnel in training, licensing, maintenance, engineering, and emergency planning groups were slated to receive training for using the IPE. Three staff engineers had been assigned to work on the development of the IPE. They were provided on the job and classroom training covering areas such as fault and event tree development, human reliability assessment, and containment response. A personal, computer-based program and procedure was being developed for using the IPE, and information was routinely being exchanged with a sister plant, which was also developing an IPE.

The above actions appeared to constitute a comprehensive and aggressive program for using PRA techniques.

2.6 Adequate Goals Did Not Exist for Controlling Work Request Backlog (Weakness - Page 25 of NRC Inspection Report 50-482/88-27)

Beginning in October 1990, charts were being issued monthly which displayed the status for outage required and nonoutage required work requests. The inspectors reviewed this data (Document 31) and determined that the backlog was not unusually high in the electrical and I&C areas. Although the backlog appeared to be undesirably high in the mechanical area, priorities had been established and appropriate actions were being taken.

At the end of November 1990, the overall, nonoutage backlog was 1796 items, which included those packages in preparation and 812 items actively being worked. The total corrective maintenance backlog was 965, of which 173 mechanical maintenance work requests were on hold for parts and another 104 were on engineering hold. The total outage-required backlog was 1071 of which 445 were related to corrective maintenance. Of the 1071 items, 421 were in package preparation.

Selected management personnel had a goal for 1990 to reduce backlog by 10 percent. Goals were still being established for 1991.

High priority (2 and 3) work requests were being addressed at the morning planning meeting. These were included on the "Three Day and Four Day Plans" (Documents 28 an 29). High priority based on parts and engineering, plus other high priority categories, were grouped in these plans. In addition, a Work Support Plan (Document 27) was issued and discussed with appropriate managers weekly. It included the ten oldest work requests sorted by "holds for engineering," "procurement," and all other reasons categories. It highlighted the fact that some work requests dated back to 1985. Engineering and maintenance management appeared to be addressing the issues in the old work requests. Scheduling meetings were held twice a week, and because the problem work requests had been identified and were discussed weekly, management was optimistic that the average age of these lists would be greatly reduced. An assessment program had been implemented and the reasons for delays in processing work requests were analyzed once a month.

Another category of work which was being tracked was temporary modifications. The inspector noted that 33 temporary modifications were installed as of December 1990. This number was down from 76 on January 1, 1990. Three were over 2 years old. It appeared that management was making a concerted effort to reduce the number of temporary modifications.

In summary, although the backlog appeared to be high in the mechanical area, it was being managed to identify the problem areas, and aggressive backlog reduction efforts were in progress.

2.7 Management Support of the On-The-Job Training Program for Maintenance Personnel Was Found to be Lacking (Weakness - Page 11 in NRC Inspection Report 50-382/88-27)

The inspector evaluated the licensee's efforts towards addressing the concern that the on-the-job (OJT) training program for maintenance personnel appeared to be lacking management support. The reason for this noted weakness was that OJT requirements were not being scheduled and monitored to assure that individual craftsmen were receiving the OJT within the time frame specified by the program.

The inspector determined that the maintenance craftsman training program was fully implemented in accordance with "Guidelines for Training and Qualification of Maintenance Personnel" as a basis document. The training department was in the process of preparing the "Accreditation Self-Evaluation Report." Maintenance training's input draft was completed awaiting final management approval. This program ensured that all preliminary and fundamental training was completed before OJT was initiated.

The inspector reviewed training administrative procedures that were changed to ensure management oversight and support of OJT training and certification requirements. Procedures ADM 08-205, ADM 08-214, and ADM 08-221 had been changed to enhance timely completion of the OJT modules. The list of modules

was broken up into two groups to reflect that the completion of all modules was not necessary to complete the apprenticeship program. Some of the modules were performed so infrequently that it was deemed unnecessary to hold up promotion to journeyman pending the completion of the infrequently performed modules. However, a journeyman could not be assigned to a task that had been designated as a non-mandatory module until he or she had completed the module under the tutelage of a designated training and qualification instructor craftsman. Procedural requirements had been put into place to require a quarterly audit of the data base containing individual maintenance personnel training records by the OJT maintenance training coordinator. The audit results were reported to management.

The inspector reviewed the OJT status for electrical and I&C maintenance personnel. Within the electrical maintenance group OJT program, all but one person had completed 100 percent of the mandatory OJT modules and had been advanced to level IV mechanic status. The I&C group OJT progress was maintained on a monthly status report for individuals. The report tracked each individual's status for each month of the previous 12 months. Completion status was based on the individuals assigned crew and tasks of that crew. The November 1990 status report indicated that over half of the I&C personnel had completed more than 90 percent of the tasks for their assigned crew. Review of the data for the last 12 months indicated that steady progress had been made on the completion of the assigned tasks for these individuals.

2.8 Quality Control (QC) Inspectors Did Not Have Immediate Stop Work Authority (Weakness - Page 3 of NRC Inspection Report 50-382/88-27)

The inspector interviewed the QC manager and reviewed Documents 22 and 23. Only the QC manager had stop work authority. The QC inspector could stop further processing of work at his discretion, but it was necessary for the QC inspector to request that the QC manager invoke his stop work authority. This procedure appeared consistent with industry practices and gave the QC inspector a vehicle for preventing unacceptable work from being performed prior to resolution of identified deficiencies.

2.9 Unnecessary Delays Were Noted in Processing Material Requests (MRs) (Weakness - Page 33 of NRC Inspection Report 50-382/82-27)

It appeared that there were few unnecessary delays in processing material requests. Material requisition problems were being discussed daily, using the Three and Four Day Plans, and weekly, through the work support plans. Commitments for procuring essential materials were obtained at these meetings. Of all open work requests, only seven with no forecast for next action were related to parts.

The inspector discussed recent initiatives to improve the procurement process with engineering and procurement management and noted that several improvements had recently been completed or were in progress. The procurement engineering

group, which reported to engineering, was established in 1989. This group had six positions which were filled in 1990 and also included several consultants who were used on an interim basis. Design authorization was being provided to procurement engineers as they completed their training which eliminated one step in the procurement process.

A status book of MRs was published monthly. Computer and other enhancements to the requisition system were being developed. Among these enhancements were the following:

- Computer transfer of information from the purchase requisition to purchase order.
- Reevaluating maximum and minimum spare part quantities. (This process was approximately two thirds complete.)
- Implementation of a tracking system to link material to work request which will automatically release a hold on work requests when materials arrive.
- Ability to flag an existing requisition for a specific work request and automatically elevate the priority of the requisition.
- Automatic system identification of the failure to meet the processing time goals.

The procurement department had statistics for the month of November on the average time to process a MR. The average time from receipt of the MR to delivery of the material was approximately 26 days. This number appeared reasonable. It appeared that the licensee's procedures for expediting priority MRs together with completion of the system enhancements discussed above should eliminate unnecessary delays in processing MRs.

3. DIESEL GENERATORS (DG) RELIABILITY IMPROVEMENT PROGRAM

The inspector walked down the facility DG rooms, reviewed records, and interviewed cognizant personnel to assess the status of the licensee's effort to improve the reliability of the DGs.

3.1 Walkdown - Material Condition

There were numerous small lubricating and fuel oil leaks on both DG sets, mainly from instrument tubing fittings. There were leaks on both DG governor base plates and on the "B" generator outboard bearing. The floor around the base of the diesel engine was wet from oil leakage in hard-to-reach areas under and behind piping and components. Licensee knowledge of the existence of most leaks was documented by the presence of a work request tag hanging near the identified leak. There were work request tags placed locally to indicate that the generator outboard bearings on both units were leaking. Discussions with licensee personnel led to the conclusion that these identified external leaks

were on the diesel engine bearing at the generator end of the engine and not the generator bearing. The inspector discovered the presence of a significant leak on the outboard generator bearing on the "B" DG set. The leak on the generator out board journal bearing had not been documented by a work request. This leak was communicated to the DG maintenance engineer, who stated he would initiate a work request.

The general appearance of the DG rooms was poor as a result of excessive oil leakage. As was noted in NRC Inspection Report 50-482/88-27, there were no facilities for collection of fluid leakage, (e.g., drip pans), and the licensee had resorted to placing paper absorbent towels in order to absorb leakage. The use of the paper towels did not appear to mitigate any risk of fire, since it added combustible material.

The DG switchboard diagram box, mounted on the side of switchboards, contained a variety of items. The items found in the boxes included trash, tools, consumable parts, and the manual over-ride tool for the main air start valves (for use if electrical air start valves are inoperable). There was a two drawer locker in each DG room labeled "Operations Emergency Use Only Locker." The locker in "A" DG room contained a variety of maintenance related equipment as did the one unlocked drawer of the locker in the "B" DG room. In followup of these findings the licensee demonstrated that the locked drawer contained the inventory of emergency equipment required by STN GP-009 Revision 12 and that no emergency equipment was required in the "A" DG room locker. Operations personnel stated that the storage location of the manual over-ride tool was common knowledge. The inspector informed licensee management personnel of the conditions observed.

The inspector noted three work request tags on the "B" DG that had been in place since 1988. Two of the tags documented deficient pipe supports (Tag Nos. 33871 and 36938) and the other documented leaking instrument line fittings on the diesel engine fuel oil filters (No. 47509).

3.2 Records and Interviews

Various records were reviewed, and key personnel were interviewed to assess the licensee's effort to enhance DG reliability. The inspector assessed the status of the licensee's stated intention to improve DG reliability by eliminating fuel and lubricating oil leakage and making hardware changes to minimize vibration induced tubing failure.

The licensee stated that there was in place an undertaking to replace all existing Parker-Hannifin tubing fittings with Swagelock fittings. The Swagelock fittings were thought to be superior and should eliminate most of the leakage coming from the presently installed fittings. Further effort were to be undertaken to reroute some of the tubing that was subject to vibration and contact with other tubing or equipment. Some piping and tubing will have supports added or modified to eliminate fatigue failure as a result of vibration. There was no indication that any progress had been made toward this overall goal. The licensee offered the following reasons why this effort had been delayed: (1) Procurement of material needed to affect improvement had been delayed, and

(2) Nuclear Plant Engineering (NPE) had been slow to evaluate and disposition the request for the changes. Interviews with key licensee personnel revealed that no specific schedule had been promulgated or priority assigned to the tasks to be accomplished to achieve the stated goals of fitting replacement, support modification, and tubing rerouting. The effort for this reliability enhancement program appeared to be fragmented and piecemeal.

The inspector reviewed HFAR No. 04181-89 and the special report sent to the NRC, No. 89-002, concerning the "B" DG jacket cooling water pump seal failure of September 20, 1989. These reports assessed the root cause of the failure to be caused by corrosion scale loosened by cleaning the jacket water expansion tank. Subsequent plugging of the surge line resulted in running the pump without adequate suction head pressure and particulate corrosion products in the pumped fluid, causing back-to-back pump seal failures. The excessive corrosion in the expansion tank was attributed to fuel oil in the expansion tank at the air/water interface (system high point). The reports reflected that the licensee believed that fuel leakage into the cooling water resulted from failure of a metal-to-metal, sealed joint on the fuel injection nozzle tips. The particular fuel injector nozzle was designed to support the dual purpose design of the engine to run on diesel fuel or natural gas. Natural gas operation of the engine would require fuel injector cooling and necessitated the metal-to-metal joint between the nozzle tip and the well. This application was not used at Wolf Creek.

The reports did not indicate any effort by the licensee to assess the failure of the injector sealing surfaces. Licensee personnel interviewed stated that the diesel engine vendor was contacted by telephone to inquire about the failure. A possible modified injector without the provision for cooling was discussed, but there was no documentation to support that effort. No other users of the equipment had been contacted concerning common failures. Although the licensee reported that their immediate corrective action (finding and replacing the nozzle tip of the leaking injector) solved the problem, there continued to be an odor of fuel oil in the vicinity of the expansion tank vent. Furthermore, recent samples of the expansion tank indicated a greenish sludge on the liquid surface, which was thought to be microbiological in origin. It was the licensee's opinion that this particular microorganism feeds on hydrocarbons (fuel oil). The initial action taken based on this discovery was to send a sample for analysis to the corrosion inhibitor vendor. The analysis results were inconclusive, and the licensee was contemplating what further action to take. The inspectors did not believe that aggressive action was being taken to ensure that the organism growth was not occurring elsewhere in the system or otherwise to resolve this new problem.

Corrective action for the initial seal failures was to replace the seal, flush the expansion tank, and bleed water through the jacket water cooler and intercooler heat exchanger vents to eliminate of any corrosion product material that may have settled in "low spots." The failure analysis report did not consider the possibility of contamination within the entire jacket water cooling system. Consequently, recommended corrective action did not include analyzing and possibly flushing the entire cooling system, to preclude possible

future seal failures. Maintenance department personnel stated to the inspector that the entire system was flushed, but they were unable to produce documentation to substantiate this claim. In summary, the root cause analysis of the pump seal failure was weak in that the failure that allowed fuel oil intrusion into the engine cooling water was not considered. Weak or inadequate immediate and long-term corrective action may have resulted from the weak analysis.

In summary, the licensee's effort to improve the reliability of the emergency DGs did not appear to have explicit goals and direction.

4. POST-MAINTENANCE TESTING

NRC Inspection Report 50-482/90-09 documented concerns in the area of post-maintenance testing. Maintenance Department Letter MA 90-0052 provided guidance for post-maintenance testing. The licensee had prepared a draft, Procedure ADM 08-240, Post-Maintenance Testing to address this area, but there was no scheduled date for finalization and implementation of the procedure.

The inspector reviewed three recently completed work packages that involved extensive repair or overhaul of safety related equipment to determine the extent of the post-maintenance testing performed on the equipment. They also interviewed maintenance engineering personnel to assess the licensee's philosophy of post-maintenance testing. The inspector determined that there were two weaknesses in the area of the post-maintenance testing conducted by the licensee.

- Records reviewed indicated that post-maintenance testing requirements and acceptance criteria were determined by the cognizant maintenance engineer. There were no formal provisions for either peer or supervisory review or approval of requirements or acceptance criteria prior to testing. Based on interviews, there was no indication that review was conducted informally. There were no procedural requirements for post-test engineering review. Post-test review was enforced procedurally, but reviews were conducted by on-shift operations department personnel, and the emphasis was on meeting Technical Specification operability requirements for safety-related systems and equipment.

- Records review and personnel interviews indicate that nearly all post-maintenance testing was performed to satisfy requirements of the existing Technical Specification system or component operability surveillance tests (STs). This means that test acceptance criteria effectively become the minimum data points required for operability. Maintenance Department Letter MA 90-0052 encouraged the consideration of codes, regulatory commitments, and design basis as well as surveillance tests (STs) for determining test requirements. However, it appeared to be a routine practice to use STs as a basis for post-maintenance testing; this did not necessarily assure that a system's or component's performance met its

design requirements. The use of acceptance criteria that require meeting minimum data points does not lend itself to trending the performance of safety-related equipment or to predict possibly degraded performance or impending failure.

5. INSTRUMENT AIR SYSTEM TESTING

The inspector reviewed the licensee's response to Generic Letter (GL) 88-14, Instrument Air Supply System Problems Affecting Safety-Related Equipment, and the closure package for Inspector Followup Item (IFI) 50-482/88-27, inclusion of instrument air (IA) sampling in the preventive maintenance program. The inspector determined that the licensee had initiated a program to obtain periodic air samples as required by Generic Letter 88-14. Procedure STN KA-001 was in place requiring sampling and analysis for oil, moisture, and particulate matter in the instrument air stream, on a quarterly basis.

The inspector reviewed the STN procedure and test sample results. Test methodology required that the sample for analysis of oil and particulates be collected in sample media supplied by an contractor laboratory and sent off-site for analysis testing. The analysis for moisture in the IA system was performed onsite using the dew point test method. The inspector determined the existence of the following weaknesses with this particular surveillance program:

- The licensee's response to GL 88-14 stated that the sampling and analysis surveillance program would be in effect by March 31, 1989. QA records did not support the performance of any testing prior to November 1989.

- Procedure STN KA-001 for obtaining a sample for oil and particulate analysis was vague and did not provide detailed methodology for obtaining a representative sample.

- The procedure stated in the initial conditions section that the instrument air system must be in a "normal configuration". Normal configuration was not further defined by the procedure. Conditions within the system could depend on the particular air compressor(s) in-service. One of the system compressors was a rotary screw type (Sullair) that was radically different in design than the remaining compressors which were of the piston type. It is possible that the rotary screw design is more likely to carry over oil into the instrument air system than the traditional piston design. However, maintenance records did not provide information on oil consumption of the unit.

- The procedure stated that the limit for oil in the airstream was to be less than 0.01 mg per cubic meter. The oil test results were not reported as a concentration specified by the procedure; they were reported as weight only. Oil concentration results have been routinely reported as being less than 20 micrograms (ug). It had not been determined how the licensee determined concentration of oil from the raw analysis results.

- Licensee personnel stated in interviews that they had doubts the analysis would detect the synthetic lubricant used in the Sullair (rotary) compressor.

- Sample blank tests of clean air results have been reported as being less than 30 ug of oil (three times the limit) with no explanation.

- The procedure stated that acceptance criteria for 1A system particulate is a minimum of 98 percent retention of particles 0.9 microns or larger. The off-site laboratory analysis reported the number of fibers/100 fields, and there was no indication that a ratio was calculated or reported indicating performance of a filtering device as implied in the procedure limit.

- The procedure for not meeting acceptance test criteria was to forward the test results to NPE for evaluation. The only corrective action documented since the program had been initiated had been to resample and reanalyze. The procedure did not require evaluation of air compressor or filtering equipment performance and there was no indication that evaluation of performance had been considered when high concentrations of oil have been detected.

- The procedural specification for dewpoint was -40 -(-35), but stated as -40 + 5 degrees Fahrenheit in the procedure. A sample analyzed on June 5, 1990 resulted in a dewpoint of -2.5 degrees. There was no apparent corrective action taken for this out of specification condition.

In summary, there appeared to be flaws in the surveillance procedure, laboratory analysis, and the interpretation of results for instrument air. The inspectors concluded that meaningful data had not been obtained and that out-of-specification results were not being acted upon. Since the extent of the problems in this area were not completely understood, this will be designated as an inspector followup item (482/9037-01) pending a followup inspection.

6. CHECK VALVE IN-SERVICE TESTING

(Open) Violation (482/9005-01) - This violation was for failure to take adequate corrective action in the closure of a previous violation (482/8827-04) for not including safety-related check valves in the in-service testing list.

The inspector reviewed the licensee's records for Violation 482/8827-04 and the proposed closure package for Violation 482/9005-01. Both of these violations resulted from the licensee's failure to include safety-related, compressed air check valves in the in-service testing (IST) program. The closure records for Violation 482/8827-04 contained interoffice correspondence letters WO 89-0179 and NP 89-0423 stating that a review of six systems had been undertaken to determine system components applicability to Regulatory Guide 1.26 for inclusion into the IST program. Subsequent Violation 482/9005-01 specified that the licensee had failed to identify air check valves to the main steam isolation valves (MSIVs) and Feedwater Isolation Valves (FWIVs) for inclusion in the surveillance program. MSIVs and FWIVs were one of the six systems that had

been reviewed for the closure of Violation 482/8827-04. The inspector observed that the other five previously reviewed systems had not been addressed in the proposed closure package for Violation 482/9005-01, even though the second violation resulted from an inadequate review. This item remains open pending completion of licensee corrective action.

7. OTHER MAINTENANCE OBSERVATIONS

7.1 Work On In-Service Equipment

The inspectors reviewed the work request procedure (Document 26). It had been revised to require that all work on in-service equipment be performed in accordance with a procedure. This policy was implemented in September 1990. The backlog of work caused by this policy change had essentially been completed.

7.2 Control of Troubleshooting Activities

Three previous procedures on troubleshooting had been deleted and incorporated into the work request procedure (Document 26). It required that the shift supervisor be informed and concurrence be received from the control room operator prior to troubleshooting. The procedure appeared to preclude maintenance activities which would surprise control room personnel.

9. EXIT INTERVIEW (30703)

The inspectors met with the licensee representatives (denoted in paragraph 1) on December 21, 1990. The inspectors summarized the inspection purpose, scope, and findings. The licensee acknowledged the comments and did not identify any specific proprietary information to the inspectors.

ATTACHMENT

DOCUMENTS REVIEWED

1. Maintenance and Modifications Information Bulletin No. 30, "Root Cause Analysis," dated November 18, 1988

2. Policy KGP-1212, Revision 1, PCN 1, "Hardware Failure Analysis Program"

3. Hardware Failure Analysis Tracking Log, dated December 18, 1990

4. Hardware Failure Analysis Report (HFAR) 04181-89, "Jacket Water Pump PKJ06B Seal Failure," approved July 25, 1990

5. HFAR 1655-89, "Pin Hole Leak in Fire Protection system 125 PSIG Water Header," approved November 13, 1989

6. HFAR 04386-89, "Jacket Water PKJ06A Seal Failure," approved July 5, 1990

7. HFAR 04423-89, "Abnormal Operation of CVCS Positive Displacement Pump," approved August 6, 1990

8. HFAR MA 90-001, "Failure of Radwaste Crane Grab Assembly," approved October 3, 1990

9. HFAR MA 90-002, "ITT Barton Hydramotor Actuators Failed to Stroke or Stroked Too Slowly," approved August 10, 1990

10. HFAR MA 90-004, "Recurring Seat Leakage of Crosby Relief Valves," approved October 11, 1990

11. HFAR MA 90-011, "Excessive Tripping of Overload Relay," approved December 4, 1990

12. CWR Failure Trending Report (MA 90-0326), Week of December 5, 1990 to December 11, 1990

13. Listing by Type, "1089 Licensee Event Reports," dated April 27, 1990

14. Listing by Type, "1990 Licensee Event Reports," dated December 3, 1990

15. Letter PS 90-0566, WCNOC to INPO, "Quarterly Plant Performance Data for Third Quarter 1990," dated October 19, 1990

16. Report NPR C01AA, "Nuclear Plant Reliability Data System Component Failure Analysis Report," dated December 20, 1990

17. WCNOC Comparative Performance Indicator Summary, dated October 10, 1990

18. Quality Policy (QP) 16.6, Revision 4, "Quality Trend Analysis"

19. Operative Policy II.6, Revision 0, "Root Cause Determination"

20. Memorandum SS 90-0116, Quality Director to Distribution, "Area Safety Inspections by Supervisors and Managers, July 27, 1990 through December 21, 1990," dated June 19, 1990

21. Memorandum SS 90-0211, Shift Supervisor to General Safety Committee, "Supervisors Safety Inspection - October 26, 1990," dated November 8, 1990

22. Quality Control Procedure (QCP) 12.4, Revision 3, "AC Inspections"

23. QP 1.1, Revision 0, "Quality Department Organization and Responsibilities"

24. Memorandum MA 90-0321, "WCNOC Bi-Weekly Predictive maintenance Report," dated December 5, 1990

25. Procedure KGP-1210, Revision 4, "Programmatic Deficiency Reporting"

26. Administrative procedure 01-057, Revision 21, "Work Request"

27. WCNOC Work Support Plan, dated December 5, 1990

28. Four Day Plan, dated December 20, 1990

29. Three Day Plan, dated December 17, 1990

30. Report, "Open Work Requests (Sorted by Number)," dated December 9, 1990

31. Work Request Status Charts, dated November 1990

32. Closure Package for NOV 50-482/8827-04

33. Proposed Closure Package for NOV 50-482/9006-01

34. NRC Inspection Report 50-482/90-09

35. Surveillance Test Procedure STN KA-001

36. Administrative Procedure 08-205, Training and Requalification Program

37. Administrative Procedure 08-221, On-The-Job Training Program

38. Administrative Procedure 08-814, Instrument and Control On-The-Job Training Program