

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket No.: 50-482  
License No.: NPF-42  
Report No.: 50-482/96-16  
Licensee: Wolf Creek Nuclear Operating Corporation  
Facility: Wolf Creek Generating Station  
Location: 1550 Oxen Lane, NE  
Burlington, Kansas  
Dates: September 9-13, 1996  
Inspectors: D. G. Passehl, Senior Resident Inspector, Callaway Nuclear Plant  
J. E. Whittemore, Reactor Inspector, Maintenance Branch  
Approved By: Dr. Dale A. Powers, Chief, Maintenance Branch  
Division of Reactor Safety  
Attachment: Partial List of Persons Contacted  
Inspection Procedure Used  
List of Procedures Reviewed

## EXECUTIVE SUMMARY

### Wolf Creek Generating Station NRC Inspection Report 50-482/96-16

This inspection reviewed the licensee's implementation of maintenance with respect to minor maintenance, troubleshooting, post-maintenance testing, incorporation of vendor technical information into the corrective and preventive maintenance processes, and the coordination and control of maintenance activities.

#### Operations

- Operators were adequately involved in the maintenance process as indicated by assignment of a senior licensed operator to the central work authority, operations representation at the daily morning meeting, and knowledge demonstrated by operators during interviews (O4.1).

#### Maintenance

- Post-maintenance testing performed on Motor-Driven Auxiliary Feedwater Pump A was properly developed and performed. The inspectors noted good support by plant operations, engineering and other maintenance personnel during this testing (M1.1).
- The use of up-to-date, revised vendor technical information to plan and implement corrective maintenance was adequate. However, the failure to evaluate vendor technical manual revisions for inclusion into the preventive maintenance program was identified as a weakness (M3.1).
- The procedures used by operations personnel to coordinate and control maintenance and post-maintenance testing addressed purpose, scope, definitions, and responsibilities adequately. Performance of post-maintenance testing met the licensee's program requirements (Section M3.2).
- The work controls procedure needed improvement to better define the scope or limitations of minor maintenance and troubleshooting. The observed classification, control, and documentation of minor maintenance and troubleshooting tasks reflected the vague scope descriptions and definitions contained in the procedural guidance. The delay observed in documentation of performance together with the vague guidance, created the potential to lose control of tasks in either process (M3.3).
- Individually, the majority of maintenance procedures adequately addressed administrative controls of maintenance, but a lack of integration of procedures for scheduling and controlling work was identified (M3.4).

- Examples were identified where the licensee had missed recommended reassessment of risk. Trained probabilistic risk assessment personnel were not actively involved in evaluating risk changes from equipment failures or weekly schedule changes (M4.1).
- Management expectation that craft personnel would know how to independently generate action requests was not achieved (M4.1).

## Report Details

### Summary of Plant Status

The facility was operated at or near full power during the inspection week.

## I. Operations

### **O4 Operator Knowledge and Performance**

#### **O4.1 Operators' Knowledge of Coordination and Control of Maintenance**

##### **a. Inspection Scope (62700)**

The inspectors conducted interviews and held discussions to assess the knowledge of operators regarding control and coordination of preventive, predictive, and scheduled and emergent corrective maintenance. In addition, the inspectors focused on operator knowledge of minor maintenance and maintenance troubleshooting requirements.

##### **b. Observations and Findings**

Operators were adequately involved in the maintenance process. Operator involvement was accomplished by assignment of a senior licensed operator to the central work authority. Duties of the central work authority were described in Procedure AP 29-001, "Central Work Authority," Revision 2. The central work authority was staffed under the manager of integrated plant scheduling, by personnel whose array of duties included directing the implementation of work.

The operator assigned to the central work authority had a clear definition of responsibility and was observed to be actively involved in maintenance coordination and control. This finding was supported by interviews with several plant operators, and by direct observation of the daily morning meeting. This arrangement allowed the on-shift operators to devote more attention to activities associated with running the plant.

The shift supervisor held a daily meeting at 7:30 a.m. with the central work authority and personnel from other departments to discuss the work scheduled for the day. During the meeting, scheduled activities, action plans, support needs, and other concerns of attendees were discussed. Problems were identified and appropriate resolutions were planned and implemented. The inspectors found the meeting to be a useful opportunity for discussing and planning for the day's events.

The inspectors interviewed several operators regarding coordination and control of maintenance. The operators were found to be knowledgeable of the various categories of maintenance processes, including minor maintenance and troubleshooting. All of the operators that were interviewed could adequately describe the process for initiating, authorizing, and coordinating maintenance.

The inspectors reviewed the licensee's process of tracking maintenance work on safety-related equipment. Control room operators maintained a log of inoperable equipment in an "Equipment Out Of Service Log." The inspectors selectively reviewed various entries to ensure proper documentation and did not identify any problems with the log or the licensee's methodology for recording equipment out of service.

c. Conclusions

The inspectors found operators to be adequately involved in the maintenance process. The inspectors reached this conclusion because a senior licensed operator was assigned to the central work authority, operations representation at the daily morning meeting, and the knowledge demonstrated by licensed operators during interviews.

II. Maintenance

**M1 Conduct of Maintenance**

**M1.1 Observation of Maintenance Activities**

a. Inspection Scope (62700)

During the inspection, the inspectors observed various elements of maintenance in progress to assess the integrated performance of individual elements of the licensee's maintenance process. These elements included coordination, control, testing, and documentation of unexpected or satisfactory conditions.

b. Observations and Findings

The inspectors observed a portion of the maintenance and most of the post-maintenance testing performed on Motor-Driven Auxiliary Feedwater Pump A. The maintenance consisted of pump bearing and packing replacement and was conducted with the unit on line. The inspectors observed a near continuous presence of the system engineer while work was being performed. The inspectors determined that the proposed testing specified by Work Package 112717 was appropriate. The testing that was performed correlated well to a matrix developed by the maintenance organization that specified post-maintenance test requirements and acceptance criteria for various components. The inspectors noted appropriate support by engineering, planning, and other maintenance personnel.

c. Conclusions

Post-maintenance testing performed on Motor-Driven Auxiliary Feedwater Pump A was properly identified and performed. There was good support that was provided by plant operations, engineering, and other maintenance personnel during this test.

**M3 Maintenance Procedures and Documentation**

**M3.1 Inclusion of Vendor Technical and Administrative Information into Corrective and Preventive Maintenance Procedures**

a. Inspection Scope (62700)

The inspectors reviewed appropriate licensee procedures and assessed the program for evaluating applicable vendor information for inclusion into the maintenance program. A sample of vendor information recently received by the licensee was followed through the licensee's process to determine if updated vendor information received by the licensee was being evaluated and identified for inclusion into the corrective and preventive maintenance programs and applicable procedures for specific equipment.

b. Observations and Findings

The inspectors noted that all information that arrived on site through telephone facsimile, electronic mail, and regular mail was screened for distribution by a process described in Procedure AI 15B-001, "Correspondence Screening," Revision 1. This process was conducted by holding a daily meeting where representatives from document services, nuclear safety engineering, vendor equipment technical information, material services, and regulatory compliance sorted and screened incoming material and directed the material to the proper place in the organization. The inspectors observed the sorting and screening meeting conducted on September 11, 1996, and noted that information received from equipment vendors was properly directed to the vendor equipment technical information program coordinator.

The licensee used Procedures AP 05-013, "Review of Vendor Technical Documents," Revision 1; and AI 05C-001, "VETIP (Vendor Equipment Technical Information Program) Process," Revision 0, to process, control, and distribute vendor technical information. The inspectors followed a sample of 10 technical information changes through the process and verified that the information was distributed correctly. The inspectors then verified that the latest information was available and used in the corrective maintenance planning process.

The inspectors also followed the changes through the preventive maintenance process. The inspectors determined that approved revisions to vendor drawings and design modifications were evaluated for inclusion into the preventive maintenance program. However, approved revisions to technical manuals for plant equipment were not being evaluated for applicability to the preventive maintenance program.

The licensee initiated Performance Improvement Request 96-2298 to address this inspection finding of vendor technical information not being evaluated for inclusion into the preventive maintenance program.

c. Conclusions

The use of up-to-date, revised vendor technical information to plan and implement corrective maintenance was adequate. However, the failure to evaluate vendor technical manual revisions for inclusion into the preventive maintenance program was identified as a weakness.

M3.2 Procedures for Maintenance Performance and Testing

a. Inspection Scope (62700)

The inspectors reviewed procedures used by operations personnel to coordinate and control maintenance and testing. The inspectors determined the adequacy of the procedures to achieve the desired results and also assessed operations personnel adherence to the procedure requirements.

b. Observations and Findings

Procedures used by operations personnel to coordinate and control maintenance included:

- AP 16C-001, "Action Requests," Revision 1;
- AP 16C-002, "Work Controls," Revision 3;
- AP 16E-002, "Post Maintenance Testing," Revision 0; and
- AP 22C-003, "Weekly Schedule Risk Assessment," Revision 0.

Many recent procedure changes reflected maintenance process programmatic improvements. To illustrate, the inspectors noted a recent beneficial change to the work controls procedure. Specifically, the procedure was revised to require



designation of team leaders or outage window managers on all safety-related systems that require major equipment removal from service. These individuals were responsible to ensure that all post-maintenance testing activities were accomplished prior to returning the systems to the operations department for unrestricted use.

Guidance for the licensee's post-maintenance testing program was contained in Procedure AP 16E-002, "Post-Maintenance Testing," Revision 0. Overall, the procedure adequately addressed purpose, scope, definitions, responsibilities, and the methods for identifying and coordinating post-maintenance testing. The inspectors conducted interviews of several senior licensed operators and found their knowledge of the requirements of the procedure to be adequate. The inspectors did not identify any instances where operators failed to adhere to procedure requirements

In addition, the inspectors reviewed approximately 20 completed work packages that identified post-maintenance criteria. The licensee's post-maintenance testing procedure stated that specific test requirements and acceptance criteria should be included in the work package when separate procedures were used to fulfill post-maintenance test requirements. All, except one, of the work packages met the licensee's program requirements. The inspectors found that this was not accomplished during review of Work Package 108554, Task 4. This work package required instrument and control personnel to perform two separate calibration procedures on Main Steam Dump Valve ABUV0044 as part of the post-maintenance test, and the test requirements were not part of the work package as recommended. The inspectors informed a licensee representative about this oversight.

c. Conclusions

Overall, the procedures used to coordinate and control maintenance activities and post-maintenance testing adequately addressed purpose, scope, definitions, responsibilities, and actual performance steps. Programmatic improvements had been made to many portions of the procedures. The knowledge level of several senior licensed operators regarding post-maintenance testing procedural requirements was adequate. The inspectors' review indicated that performance of post-maintenance testing met the licensee's program requirements.

M3.3 Minor Maintenance and Trouble Shooting Procedures, and Documentation

a. Inspection Scope (62700)

The inspectors reviewed the licensee's guidance for performing minor maintenance and troubleshooting that was contained in Procedure AP 16C-002, "Work



Controls," Revision 3. Subsequently, current minor maintenance and troubleshooting efforts were reviewed against the requirements. A sample of recent documents for both areas was reviewed to assess effectiveness of the guidance and the performance of minor maintenance and troubleshooting.

b. Observations and Findings

The scope of minor maintenance, as described in the work controls procedure, was not well defined. For example, the procedure discussed certain restrictions that were to be applied to minor maintenance on safety-related equipment and systems. However, the procedure did not state whether any restrictions would be applied for work on special scope equipment. The procedure defined special scope as a series of graded quality assurance programs that invoked additional quality controls on designated systems and equipment.

Additionally, the work controls procedure listed 13 conditions that were required to be met for work to be performed as minor maintenance. Some of the listed conditions were actually procedural requirements to be met while performing the work, such as notifying quality control of hold points, performing risk assessment, and obtaining and using material as specified by other procedures.

Further, restrictions to allow minor maintenance were subject to broad interpretation. Examples of unclear restrictions included detailed planning not required, minor planning acceptable, detailed post-maintenance testing sequence not needed, and work not complex.

The inspectors noted that the scope of troubleshooting, as defined in the work controls procedure, was not well defined. For example, the procedure defined the scope of troubleshooting by listing three normal characteristics of troubleshooting.

- Limited to determining the extent of the problem.
- Accomplish in one shift or less.
- May return component to as found condition or perform additional tasks to correct problem.

There were no other descriptions or limits that scoped or bounded troubleshooting activities.

The inspectors reviewed minor maintenance and troubleshooting activities in progress.

1. Abnormal Noise and Vibration of Spent Fuel Pool Cooling Pump B

On September 7, 1996, Action Request 17448 was submitted to report abnormal noise and vibration associated with the motor on Spent Fuel Pool Cooling Pump B. A work package summary task was implemented to perform minor maintenance. The specified minor maintenance action was to collect and analyze pump and motor vibration data to determine if a problem existed. Predictive maintenance personnel collected the data and compared it with previous or baseline data. The vibration data was analyzed and did not indicate a problem. Performance baseline conditions were not established when the data was collected, however, this did not appear to affect the licensee's conclusion that a problem did not exist.

The inspectors asked licensee scheduling personnel why the action taken to determine if a problem existed was characterized as minor maintenance and not troubleshooting. Personnel indicated that this was normal practice. The inspectors reviewed an updated task sheet near the end of the inspection and noted that the task had been reclassified as troubleshooting. However, latest information in the database, did not indicate that the troubleshooting action had been completed and the work package remained open.

2. Troubleshooting a Main Transformer Control Room Annunciator

The inspectors also observed the development and implementation of troubleshooting activities associated with a control room trouble alarm annunciator for a main transformer. On September 10, 1996, Action Request 17479 was initiated due to several spurious annunciator alarms received in the control room indicating trouble on Main Transformer A. In response to the action request, scheduling personnel initiated a work package summary task to troubleshoot the problem.

The inspectors obtained a copy of the work package task sheet and noted that it identified the problem, but did not specify any action to be performed. This was inconsistent with the troubleshooting procedure. Within one hour, the inspectors received updated information and observed that the task sheet's latest information indicated that the transformer oil level switch had been disconnected from the alarm circuitry. There were, however, several other sensors that input to the trouble alarm. The inspectors noted to licensee personnel what had occurred and that the updated documentation did not indicate what troubleshooting was planned or approved.

The inspectors also noted that an alarm had not actuated for at least seven hours prior to lifting the oil level switch lead. They verified that operations personnel monitored the oil level locally while the alarm lead was

disconnected, and noted that the alarm lead was reconnected prior to the end of the shift. The inspectors observed that the troubleshooting activity conducted for the spurious transformer trouble alarm had not determined the cause of the problem.

Despite these issues identified by the inspectors, the licensee's maintenance manager expressed confidence in the minor maintenance and troubleshooting program to adequately control both processes.

c. Conclusions

The inspectors determined that improvements were needed to the work controls procedure for defining the scope of minor maintenance and troubleshooting. The observed classification, control, and documentation of minor maintenance and troubleshooting tasks reflected the vague process boundaries and definitions in the procedural guidance. The inspectors believed that the delay observed in updating the status of work (e.g., spent fuel pool cooling pump), and the vague guidance, created a potential to erroneously classify work as minor maintenance or troubleshooting, and result in a loss of control of tasks in either process.

M3.4 Procedure Integration (62700)

a. Inspection Scope

The inspectors reviewed maintenance work control procedures to determine whether the procedures were appropriately integrated with existing plant programs, policies, and other procedures.

b. Observations and Findings

The licensee had implemented several procedures that addressed the initiation, coordination and control of maintenance. There were specific procedures that addressed: (1) work requests; (2) work controls; (3) control of maintenance; (4) central work authority; and, (5) action plans.

The procedures adequately addressed administrative controls of scheduling and maintenance at the facility. However, the inspectors noted several examples of a lack of integration of the procedures. Some of those examples are listed below.

- The procedure for work control addressed the control and performance of minor maintenance and troubleshooting processes. However, the procedure for control of maintenance did not address either process.

- Risk assessments were normally prepared for the weekly schedules in accordance with Procedure AP 22C-003, "Weekly Schedule Risk Assessment," Revision 0. However, other procedures did not trigger new assessments of risk for schedule changes due to equipment failures and the resulting different configurations.
- Elements of planning and approval of planning were contained in the procedures for work control and control of maintenance.

c. Conclusions

The majority of maintenance procedures adequately addressed the administrative control of maintenance. However, the inspectors found examples of a lack of integration of the procedures for scheduling and controlling work.

**M4 Maintenance Staff Knowledge and Performance**

**M4.1 Maintenance and Scheduling Staff Performance**

a. Inspection Scope (62700)

The inspectors reviewed work control policy and procedures in order to understand the licensee's work control and validation process. The inspectors assessed employee performance and knowledge in these areas during discussions with maintenance craft, administrative, and supervisory personnel.

b. Observations and Findings

1. Risk Assessment for Changing Conditions

During discussions with scheduling personnel, the inspectors determined that onsite probabilistic risk assessment personnel assessed the risk originally associated with initially developed 13 week work schedules. When changes to the weekly schedule were implemented, changes in risk were determined by scheduling personnel. However, the inspectors noted that personnel responsible for assessing risk associated with work schedule changes had not been formally trained in risk assessment. Although licensee risk assessment personnel had provided input to the development of the risk assessment procedure, they did not review or provide any oversight of the risk assessment effort by untrained personnel.

The inspectors obtained a list of safety and nonsafety-related functional failures experienced over the last six months. The inspectors then reviewed the weekly schedule risk assessments for the past six months. Four out of 13 equipment failures did not result in new assessments for potential changes in risk. The inspectors considered this to be significant and

informed the appropriate licensee personnel. As noted earlier, the procedure recommended reassessment for equipment failures, however, other procedures or processes did not trigger entry into the risk reassessment procedure.

Licensee Procedure AP 22C-003, "Weekly Schedule Risk Assessment," Revision 0, instructed that changes to the work schedule be assessed for any change in risk condition. An attachment to the procedure contained the guidance and provided the documentation for reassessment performed during the schedule week.

Licensee personnel initiated Performance Improvement Request 96-2317 to address the issues related to changes in risk assessment of the weekly schedule. Performance Improvement Request 96-2318 was initiated to address the lack of involvement by probabilistic risk assessment personnel in assessing risk conditions associated with changes to the weekly schedule.

2. Maintenance Craft Knowledge of How to Generate Action Requests

The inspectors discussed the process of initiating action requests with maintenance management personnel. One manager stated an expectation that maintenance craft would know how to generate an action requests when the personnel had questions or concerns on any piece of equipment in the plant. The inspectors questioned several maintenance craft personnel in the field found most did not know how to generate an action request. However, all of the personnel questioned stated that the responsible supervisor would have been contacted with the question or concern.

c. Conclusions

There were examples where responsible licensee personnel had missed recommended reassessment of risk due to equipment failures, and probabilistic risk assessment personnel were not actively involved in evaluating risk changes as a result of equipment failures or weekly schedule changes. Management expectations that craft personnel would know how to independently generate action requests was not achieved.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors discussed the progress of the inspection with licensee representatives on a daily basis and presented the inspection results to members of licensee management at the conclusion of the inspection on September 13, 1996. The licensee acknowledged the findings presented.

The inspectors did not review any proprietary material.

## ATTACHMENT

### PARTIAL LIST OF PERSONS CONTACTED

#### Licensee

D. Gerrelts, Superintendent, Instrument and Control, and Electrical Maintenance  
D. Giefer, Supervisor, Maintenance Planning  
K. Harvey, Manager, Document Services  
S. Hopkins, Supervisor, Maintenance Planning  
K. Howe, Coordinator, Vendor Technical Information Program  
R. Hubbard, Superintendent, Operations  
C. Jones, Superintendent, Maintenance Support  
P. Martin, Central Work Authority  
B. McKinney, Plant Manager  
D. Moore, Manager, Maintenance  
T. Morrill, Manager, Regulatory Services  
G. Lawson, Superintendent, Maintenance Planning  
D. Neufeld, Manager, Integrated Planning and Scheduling  
R. Raymer, Predictive Maintenance  
M. Williams, Assistant to Chief Operating Officer  
W. Wiseman, Supervisor, Preventive Maintenance Planning

#### NRC

J. Ringwald, Senior Resident Inspector

### INSPECTION PROCEDURE USED

IP 62700      Maintenance Implementation

### LIST OF PROCEDURES REVIEWED

AP 05-013      "Review of Vendor Technical Documents," Revision 1  
AI 05C-001      "VETIP Process," Revision 0  
AI 15C-001      "Correspondence Screening," Revision 1  
AP 15C-001      "Procedure Writer's Guide," Revision 6  
AP 16-001      "Control of Maintenance," Revision 1  
AP 16A-002      "Corrective Maintenance," Revision 0  
AI 16B-002      "Updating Managed Maintenance Data Base," Revision 0  
AP 16B-003      "Planning and Scheduling Preventive Maintenance Tasks," Revision 0  
AP 16C-001      "Action Request," Revision 1

AP 16C-002	"Work Controls," Revision 3
AP 16E-002	"Post Maintenance Testing," Revision 0
AP 22C-003	"Weekly Schedule Risk Assessment," Revision 0
AP 29-001	"Central Work Authority," Revision 2