



UNITED STATES  
**NUCLEAR REGULATORY COMMISSION**

REGION IV

611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TEXAS 76011-8064

August 26, 1999

Otto L. Maynard, President and  
Chief Executive Officer  
Wolf Creek Nuclear Operating Corporation  
P.O. Box 411  
Burlington, Kansas 66839

SUBJECT: NRC INSPECTION REPORT NO. 50-482/99-16

Dear Mr. Maynard:

This refers to the inspection conducted on August 9-13, 1999, at the Wolf Creek Generating Station facility. The purpose of this routine announced inspection was to review selected activities of your radiation protection program. The enclosed report presents the results of this inspection.

This inspection focused on your as low as is reasonably achievable program, training program for contract radiation protection personnel, and the radiation protection quality assurance program. We concluded that the areas inspected were effectively implemented.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room (PDR).

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

Original signed by

Gail M. Good, Chief  
Plant Support Branch  
Division of Reactor Safety

Docket No.: 50-482  
License No.: NPF-42

Enclosure:  
NRC Inspection Report No.  
50-482/99-16

cc w/enclosure:  
Chief Operating Officer  
Wolf Creek Nuclear Operating Corp.  
P.O. Box 411  
Burlington, Kansas 66839

Jay Silberg, Esq.  
Shaw, Pittman, Potts & Trowbridge  
2300 N Street, NW  
Washington, D.C. 20037

Supervisor Licensing  
Wolf Creek Nuclear Operating Corp.  
P.O. Box 411  
Burlington, Kansas 66839

Chief Engineer  
Utilities Division  
Kansas Corporation Commission  
1500 SW Arrowhead Rd.  
Topeka, Kansas 66604-4027

Office of the Governor  
State of Kansas  
Topeka, Kansas 66612

Attorney General  
Judicial Center  
301 S.W. 10th  
2nd Floor  
Topeka, Kansas 66612-1597

County Clerk  
Coffey County Courthouse  
Burlington, Kansas 66839-1798

Vick L. Cooper, Chief  
Radiation Control Program  
Kansas Department of Health  
and Environment  
Bureau of Air and Radiation  
Forbes Field Building 283  
Topeka, Kansas 66620

Wolf Creek Nuclear Operating Corporation -3-

Mr. Frank Moussa  
Division of Emergency Preparedness  
2800 SW Topeka Blvd  
Topeka, Kansas 66611-1287

E-Mail report to T. Frye (TJF)  
 E-Mail report to D. Lange (DJL)  
 E-Mail report to NRR Event Tracking System (IPAS)  
 E-Mail report to Document Control Desk (DOCDESK)

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**ENCLOSURE**

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket No.: 50-482  
License No.: NPF-42  
Report No.: 50-482/99-16  
Licensee: Wolf Creek Nuclear Operating Corporation  
Facility: Wolf Creek Generating Station  
Location: 1550 Oxen Lane, NE  
Burlington, Kansas  
Dates: August 9-13, 1999  
Inspector: J. Blair Nicholas, Ph.D., Senior Radiation Specialist  
Plant Support Branch  
Approved By: Gail M. Good, Chief, Plant Support Branch  
Division of Reactor Safety  
Attachment: Supplemental Information

## EXECUTIVE SUMMARY

### Wolf Creek Generating Station NRC Inspection Report No. 50-482/99-16

This announced, routine inspection reviewed selected radiation protection program activities. Areas reviewed included: planning and preparation, the program to maintain occupational exposure as low as is reasonably achievable (ALARA), temporary shielding program, hot spot reduction program, contract radiation protection technician training and qualification program, and quality assurance of radiation protection activities.

#### Plant Support

- As low as is reasonably achievable (ALARA) work planning was effectively implemented. Radiological work packages were well planned, and ALARA personnel were very involved during the outage planning stage. Lessons-learned from past similar work were properly incorporated into the radiological work packages. Effective ALARA based initiatives were incorporated into the outage planning (Section R1.1).
- The 1998 and 1999 nonoutage exposure goals were challenging. Departmental and task activity doses were properly tracked and trended by the as low as is reasonably achievable staff. The station's 3-year exposure average of 131 rem for 1998 was above the industry median of 116 rem. The higher exposure experienced during the 1997 refueling outage was due to the reactor core axial offset anomaly. This caused a higher source term and an increase in the station's 3-year exposure average. The temporary shielding program was effectively implemented. The hot spot reduction program was properly monitored (Section R1.2).
- The as low as is reasonably achievable committee was not fully supported by the integrated plant scheduling and licensing/corrective actions departments (Section R1.2).
- The contract radiation protection technician training program was effectively implemented. Qualification tasks included all the tasks assigned to contract senior radiation protection technicians. Contract senior radiation protection technicians met the technical experience requirement of Technical Specification 6.3.1 and the training requirements delineated in station procedures (Section R5).
- Overall, an effective quality assurance program was maintained. The quality assurance audits and radiation protection department self-assessment provided management with a good assessment of the radiation protection program. Timely, effective corrective actions were implemented in response to audit and assessment findings. No negative trends were identified during the review of performance improvement requests written since January 1998 (Section R7).

## Report Details

### Summary of Plant Status

The plant operated at full power during the inspection.

## IV. Plant Support

### **R1 Radiological Protection and Chemistry Controls**

#### R1.1 Planning and Preparation

##### a. Inspection Scope (83750)

Radiation protection personnel involved in radiation protection planning and preparation were interviewed. The following items were reviewed:

- ALARA job planning
- ALARA packages
- Incorporation of lessons learned from similar work

##### b. Observations and Findings

Radiological work packages were well planned, and ALARA personnel were appropriately involved during the refueling outage RF-10 planning stage. Post-job briefings captured lessons-learned. A review of selected radiological work packages revealed that lessons-learned from past similar work and the industry were properly incorporated into radiological work packages to improve job task performance.

ALARA based initiatives were appropriately incorporated into the outage schedule. The following initiatives are examples of those incorporated into the refueling outage planning: installation and usage of the Remote Acquisition Display System (RADS), use of wireless transmitting dosimetry, maintaining the secondary side of "A" steam generator full of water for shielding during the performance of the in-service inspection, and better sequencing of jobs while setting the reactor head. During discussions with the licensee, the inspector concluded that these and other ALARA initiatives saved the licensee approximately 20 person-rem during Refueling Outage RF-10.

##### c. Conclusions

As low as is reasonably achievable (ALARA) work planning was effectively implemented. Radiological work packages were well planned, and ALARA personnel were very involved during the outage planning stage. Lessons-learned from past similar work were properly incorporated into the radiological work packages. Effective ALARA based initiatives were incorporated into the outage planning.

R1.2 Maintaining Occupational Exposure As Low As is Reasonably Achievable (ALARA)

a. Inspection Scope (83750)

The inspector interviewed radiation protection personnel involved with the ALARA program. The following areas were reviewed:

- Exposure goal establishment and status
- Chemistry controls
- ALARA committee meeting minutes
- Temporary shielding program
- Hot spot reduction program

b. Observations and Findings

**Exposure Goals**

The inspector reviewed the nonoutage exposure goals for 1998 and 1999. The 1998 nonoutage actual exposure of 10.4 rem was approximately 4 rem less than the established exposure goal. This placed the station in the best quartile for personnel exposure in 1998. The inspector noted that the station's 3-year exposure average of 131 rem for 1998 was above the industry median of 116 rem. From a review of licensee supplied data, the inspector determined that the higher exposure experienced during the 1997 refueling outage was due to the reactor core axial offset anomaly. This caused a higher source term and an increase in the station's 3-year exposure average. The inspector determined that the 1999 nonoutage goal of 15 person-rem was aggressive and was based on 12.75 rem for nonoutage operation and an additional 2.25 rem to perform the spent fuel rerack modifications. The inspector noted that the station's personnel exposure status was tracked and trended by the ALARA radiation protection supervisor and distributed to and monitored by the work week manager and all station department managers on a weekly basis. The 1999 normal operation person-rem exposure results showed that the year-to-date exposure goal was being met.

The inspector noted that the 1999 refueling outage exposure goal of 170 rem was 67 rem less than the 1997 actual refueling outage exposure. From discussions with the licensee, the inspector determined that the 1999 RF-10 refueling outage exposure goal was established using past performance and industry experience. The inspector noted that the ALARA committee and department managers were appropriately involved in the development of the refueling outage exposure goal. The 1999 refueling outage actual exposure of 134 rem was approximately 36 rem less than the approved outage exposure goal. Based on the RF-10 outage actual personnel exposure, RF-10 accomplished the third lowest radiation exposure refueling outage in the station's history.

### **Chemistry Controls**

During discussions with chemistry personnel, the inspector determined that management support for shutdown chemistry controls was very good. The shutdown chemistry controls were effective in removing approximately 4,377 curies of cobalt-58 activity from the reactor coolant system prior to Refueling Outage RF-10 which significantly reduced the source term.

### **ALARA Committee**

The inspector attended an ALARA committee meeting and noted excellent participation by the members who were present. In addition, the inspector reviewed the minutes of 10 meetings conducted during 1998 and 9 meetings conducted during 1999. The inspector noted that the meetings were held in accordance with management expectations and that the ALARA committee discussed appropriate ALARA topics. However, during the review of the ALARA committee meeting minutes, the inspector noted that a representative from the integrated plant scheduling department was not in attendance at 6 of the 10 meetings held in 1998 and 3 of the 9 meetings year-to-date in 1999. In addition, the licensing and corrective actions department was not represented at 30 percent of the committee meetings each year. The inspector commented that full station support was needed to help enhance the station's ALARA performance. The licensee acknowledged the inspector's comment.

### **Temporary Shielding Program**

The inspector reviewed nine temporary shielding packages, six of which were still in place. All the temporary shielding packages contained a drawing or photograph of the shielding installation, pre- and post-radiological surveys of the area or component shielded, an ALARA review, an exposure reduction effectiveness evaluation, and an appropriate engineering evaluation.

The inspector noted that 62 temporary shielding packages were prepared for Refueling Outage RF-10; however, only 21 of these shielding packages needed to be installed. From discussions with the ALARA staff, the inspector concluded that the installation of the 21 temporary shielding packages during the outage resulted in an estimated dose savings of approximately 23 person-rem. The temporary shielding program was effectively implemented.

### **Hot Spot Reduction Program**

Thirty hot spots were currently located throughout the radiological controlled area. The hot spots were properly updated, tracked, and trended by the ALARA radiation protection supervisor. However, the inspector noted that the ALARA staff did not prioritize the removal of hot spots. Additionally, the amount of dose contributed to station personnel from these hot spots was not known. The inspector commented that this information was important to determine the need or priority to eliminate the hot spots. Radiation protection management acknowledged the inspector's comment. The

licensee wrote Performance Improvement Request 99-2712 to evaluate and determine the priority for flushing the existing hot spots.

c. Conclusions

The 1998 and 1999 nonoutage exposure goals were challenging. Departmental and task activity doses were properly tracked and trended by the ALARA staff. The 1998 nonoutage actual exposure of 10.4 rem was approximately 4 rem less than the established exposure goal. The 1998 nonoutage personnel exposure of 10.4 rem ranked the station as the fourth best in the nation at pressurized water reactors. The station's 3-year exposure average of 131 rem for 1998 was above the industry median of 116 rem. The higher exposure experienced during the 1997 refueling outage was due to the reactor core axial offset anomaly. This caused a higher source term and an increase in the station's 3-year exposure average. The 1999 refueling outage actual exposure of 134 rem was approximately 36 rem less than the approved outage exposure goal. The RF-10 outage personnel exposure was the third lowest exposure for a refueling outage in the station's history. The ALARA committee was not fully supported by the integrated plant scheduling and licensing/corrective actions departments. The temporary shielding program was effectively implemented. The hot spot reduction program was properly monitored.

**R5 Staff Training and Qualification in Radiological Protection and Chemistry**

b. Inspection Scope (83750)

Personnel involved with contract radiation protection technician selection, qualification, and training were interviewed. The following items were reviewed:

- Training instructor qualifications
- Resumes of contract radiation protection technicians
- Contract radiation protection training program

c. Observations and Findings

The inspector reviewed the qualifications of the radiation protection instructor assigned to provide training to the radiation protection staff and contractor radiation protection technicians. The instructor had a strong operational radiation protection background, a number of years of radiological experience, and was registered by the National Registry of Radiation Protection Technologists. Additionally, the training instructor was used to supplement the radiation protection staff during station outages.

The inspector reviewed the qualifications and training of randomly selected contract senior radiation protection technicians. Training material for contract radiation protection technicians, which included site and industry lessons learned, was appropriate for tasks assigned. Radiation protection management was involved in developing the qualification tasks. The contract radiation protection technicians were tested on site-specific information and station radiation protection procedures. The

Northeast Utilities examination was used to assess the basic radiation protection technical knowledge of the contract radiation protection technicians. Performance demonstrations of knowledge, skills, and abilities were also required. Qualification cards were signed by a radiation protection supervisor and the chemistry and radiation protection manager prior to contract technicians being assigned radiation protection tasks. The inspector concluded that the contract senior radiation protection technicians met the technical experience requirement of Technical Specification 6.3.1 (3 years of radiation protection experience) and the training requirements delineated in station procedures.

d. Conclusions

The contract radiation protection technician training program was effectively implemented. Radiation protection management was involved in the development of the contract radiation protection technician training program and qualification task topics. Qualification tasks included all the tasks assigned to contract senior radiation protection technicians. Contract senior radiation protection technicians met the technical experience requirement of Technical Specification 6.3.1 and the training requirements delineated in station procedures.

**R7 Quality Assurance in Radiological Protection and Chemistry Activities**

a. Inspection Scope (83750)

The following items were reviewed:

- Qualifications of the auditor and technical specialists who performed the radiological quality assurance audits
- Quality assurance audits performed since January 1, 1998
- Radiation protection department self-assessment performed since January 1, 1998
- Radiological performance improvement requests written since January 1, 1998

b. Observations and Findings

The inspector reviewed the qualifications of the auditor and technical specialists used to perform the radiation protection program audits and identified no problems. The auditor had a number of years of practical radiation protection experience and was assisted by technical specialists from radiation protection departments at other nuclear power facilities. The inspector determined that the quality assurance auditor and technical specialists were properly qualified.

### **Quality Assurance Audit Reports**

Two quality assurance radiation protection program audits were performed since January 1998. These audits covered a broad range of radiation protection activities and provided management with a good assessment of the radiation protection program. Eleven program deficiencies were identified during the 1998 and 1999 annual audits. These deficiencies were documented in performance improvement requests. The inspector determined that the corrective actions for the six deficiencies identified in the 1998 audit were appropriate to prevent recurrence and closed in a timely manner. The inspector determined that radiation protection management and the auditor who conducted the audit were involved in reviewing the corrective actions and the closure of the deficiencies. The five deficiencies identified in the 1999 audit were documented in performance improvement requests issued within the past 30 days. Resolution and corrective actions for these deficiencies were not completed as of August 13, 1999.

### **Department Self-Assessment**

One radiation protection department self-assessment was performed since January 1998. This self-assessment was conducted during February 1998 and focused on the licensee's efforts to reduce the number of personnel contamination incidents. The inspector determined that the self-assessment provided management with a critical assessment of the number of personnel contamination incidents experienced during nonoutage and outage operation. The assessment identified nine recommendations for improvement. These recommendations were documented and tracked in the performance improvement request reporting system and closed in a timely manner.

### **Radiological Performance Improvement Requests**

The inspector reviewed a random selection of program improvement requests dealing with radiation protection issues written since January 1, 1998. This review revealed that the licensee identified and documented radiological issues at the proper threshold which provided management with a good tool to evaluate the radiation protection program. The program improvement requests reviewed were closed in a timely manner. No problems or negative trends were identified.

c. Conclusions

Overall, an effective quality assurance program was maintained. The auditor and technical specialists used to conduct the audits of the radiation protection program had strong operational radiation protection backgrounds. The quality assurance audits and radiation protection department self-assessment provided management with a good assessment of the radiation protection program. Timely, effective corrective actions were implemented in response to audit and assessment findings. No negative trends were identified during the review of performance improvement requests written since January 1998.

## **V. Management Meetings**

### **X1 Exit Meeting Summary**

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on August 13, 1999. The licensee acknowledged the findings presented. No proprietary information was identified.

## ATTACHMENT

### SUPPLEMENTAL INFORMATION

#### PARTIAL LIST OF PERSONS CONTACTED

##### Licensee

M. Blow, Manager, Chemistry and Radiation Protection  
S. Burkdoll, Supervisor, Health Physic/Chemistry Training  
V. Canales, Supervisor, Quality Evaluations  
K. Davison, Manager, Integrated Plant Scheduling  
R. Flannigan, Manager, Nuclear Engineering  
T. Garrett, Manager, Design Engineering  
M. Guyer, Superintendent, Operations Support  
K. Hall, Acting Manager, Licensing and Corrective Action  
D. Jacobs, Manager, Support Engineering  
G. Lawson, Superintendent, Maintenance Planning  
O. Maynard, President and Chief Executive Officer  
B. McKinney, Vice President Operations and Plant Manager  
C. Medency, Health Physics Supervisor  
D. Parks, Manager, Training  
G. Pendergrass, Supervisor, Reactor Engineering  
W. Pickering, Health Physics Supervisor - Outage  
L. Ratzlaff, Supervisor, System Engineering  
C. Reekie, Engineering Specialist, Licensing and Corrective Action  
R. Sims, Manager, System Engineering  
T. Smith, Supervisor, Integrated Plant Scheduling  
R. Stumbaugh, Health Physics Supervisor - ALARA

##### NRC

R. Azua, Acting Resident Inspector

#### INSPECTION PROCEDURE USED

83750 Occupational Radiation Exposure

#### LIST OF DOCUMENTS REVIEWED

##### QUALITY ASSURANCE AUDITS AND DEPARTMENTAL SELF-ASSESSMENT

Audit Report K-490, "Plant Support," conducted March 3 through June 30, 1998

Audit Report K-509, "Radiation Protection," conducted March 1 through June 25, 1999

Radiation Protection Department Self-Assessment, "Effectiveness Follow-up of RF-9 Personnel Contamination Incident," conducted February 5 through March 1, 1998

PROCEDURES

- AP 20A-003 "Audit/Surveillance Scheduling," Revision 2
- AP 25A-002 "Radiation Protection Interdepartmental Program Review," Revision 0
- AP 30D-100 "Health Physics Training Program," Revision 1
- AP 25A-401 "ALARA Program," Revision 0
- AP 25A-410 "ALARA Committee," Revision 3

OTHER

- ALARA Committee Meeting Minutes for 1998 and 1999
- Selected contract radiation protection technician qualification cards
- Selected radiological performance improvement requests (1/1/98 to 7/31/99)