

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Inspection Report: 50-482/95-21

License: NPF-42

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

Facility Name: Wolf Creek Generating Station

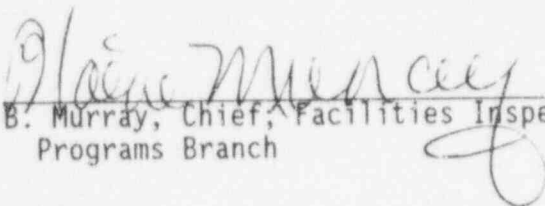
Inspection At: Burlington, Kansas

Inspection Conducted: August 7-11, 1995

Inspectors: L. T. Ricketson, P.E., Senior Radiation Specialist  
Facilities Inspection Programs Branch

M. P. Shannon, Radiation Specialist  
Facilities Inspection Programs Branch

Approved:

  
B. Murray, Chief, Facilities Inspection  
Programs Branch

  
Date

Inspection Summary

Areas Inspected: Routine, announced inspection of radiation protection activities including: audits and appraisals; program changes; training and qualifications; exposure controls; and control of radioactive materials and contamination; surveys and monitoring; and the program to maintain occupational exposures as low as is reasonably achievable (ALARA).

Results:

- Quality assurance surveillances were performed by qualified personnel and were good management tools, providing insight into the radiation protection organization's performance. The corrective action program was appropriately used by the radiation protection organization to identify and correct problems (Section 1).
- Good training programs were maintained for radiation protection technicians and radiation protection supervisors and professionals. The licensee's support of professional development of radiation protection

technicians was average, but improving. The licensee used a suitable mechanism to ensure that only qualified individuals performed assigned tasks (Section 3).

- Good internal and external exposure control programs were implemented by the licensee but a non-cited violation was identified as a result of a failure to instruct radiation workers of a potential hazard in the radwaste building (Section 4).
- Excellent controls of radioactive materials and contamination were implemented. The portable instrument calibration program was very good, but minor revisions to procedures and vendor supplied information would improve the program. The radiation survey program was generally very good, but one related non-cited violation was identified (Section 5).
- A comprehensive ALARA program was in place. Excellent results in maintaining person-rem ALARA were achieved. Poor support for the Site ALARA Working Group by some site organizations was noted (Section 6).

Summary of Inspection Findings:

- Two non-cited violations were identified (Sections 4.1 and 5.2).

Attachment:

- Attachment - Persons Contacted and Exit Meeting

## DETAILS

### OCCUPATION RADIATION EXPOSURE CONTROL (83750)

The licensee's program was inspected to determine compliance with Technical Specification 6.8 and the requirements of 10 CFR Part 20, and agreement with the commitments of Chapter 12 of the Final Safety Analysis Report.

#### 1 Audits and Appraisals

To evaluate the licensee's programs for identifying and correcting problems, the inspectors interviewed quality assurance personnel, reviewed quality assurance surveillances of radiation protection activities, and reviewed performance improvement requests (PIRs) assigned to the radiation protection program.

##### 1.1 Quality Assurance Activities

No audit of the radiation protection program had been performed since audits were last reviewed during NRC Inspection Report 50-482/95-15. The inspectors reviewed surveillances performed by the quality assurance organization and noted that numerous surveillances were conducted during the 1994 refueling outage. Two quality assurance surveillances (S-3065 and S-3095) were performed in 1995. Each was conducted over several days and covered multiple aspects of the radiation protection program. The inspectors determined that the surveillances reviewed sufficient issues to make them good management assessment tools.

Quality assurance personnel assigned to perform surveillances of radiation protection activities had radiation protection knowledge and experience, enabling them to assess radiation protection performance and to identify problems. Issues identified during quality assurance surveillances were resolved through the use of PIRs.

##### 1.2 Corrective Action Program

The licensee corrective action document was the PIR. Through a review of a PIR summary, the inspectors determined that licensee personnel used the corrective action system extensively. Selected examples were reviewed, and it was noted by the inspectors that responses to PIRs by radiation protection personnel were timely, identified root causes when required, and addressed the issues with proper corrective actions. The inspectors noted no adverse trends in the radiation protection program during the review of PIRs.

##### 1.3 Radiation Protection Supervisor Tours

Another oversight tool used by radiation protection management consisted of a series of plant tours by radiation protection supervisors. The supervisors reviewed plant conditions to ensure that regulatory requirements and management expectations were met. The superintendent of radiation protection scheduled areas of the radiological controlled area to be reviewed and

assigned responsibilities to individual radiation protection supervisors. The inspectors reviewed the results of the tours and noted that the tours were performed by the supervisors, as assigned, only 50-60 percent of the time. There were no procedural requirements to implement the program. Because this initiative was an enhancement to the program and not a regulatory requirement, the inspectors concluded that it was a good management tool; however, the lack of complete supervisor participation kept it from being as effective as it might have been.

#### 1.4 Conclusion

Quality assurance surveillances were performed by qualified personnel and were good management tools, providing insight into the radiation protection organization's performance. The corrective action program was appropriately used by the radiation protection organization to identify and correct problems.

#### 2 Changes

The inspectors interviewed licensee personnel to determine if there had been major changes, since the last inspection, in organization, personnel, facilities, equipment, programs, and procedures.

The major change to the radiation protection program staffing was the loss of one health physicist position and one decontamination technician position. The individual who previously filled the health physicist position was promoted to the position of superintendent of the chemistry group. No immediate adverse effect on the radiation protection organization was noted. Overall, staffing of the radiation protection organization was stable. Turnover of personnel was very low. There was no dependence on contract personnel during routine operations.

Access control procedures were changed at the end of June 1995 when the licensee began using electronic, alarming dosimeters for all personnel entering the radiological controlled area.

The inspectors concluded that there had been no major changes in organization, personnel, facilities, equipment, programs, and procedures other than the implementation of use of electronic, alarming dosimeters for entering the radiological controlled area.

#### 3 Training and Qualifications

The inspectors reviewed radiation protection technician and professional staff training, training records, instructor staffing, professional development of radiation protection technicians, and portions of radiation worker training.

##### 3.1 Radiation Protection Technician Training and Qualifications

The radiation protection technician instructor staffing level remained unchanged with three instructors. The inspector determined that continuing training content was appropriate. Training included discussions of current

industry events as well as technical topics and reviews of procedures. The inspectors noted that the supervisor of health physics operations maintained a current copy of a technician qualification matrix that identified individuals that were qualified to perform specific radiation protection tasks.

Information provided by the licensee indicated that 15 of the approximately 35 eligible individuals were registered by the National Registry of Radiation Protection Technologists. The inspectors concluded that the licensee's performance in promoting the professional advancement of its radiation protection technicians was typical of the industry. However, the inspectors noted that a training session to aid technicians prepare for the next registration examination was included in radiation protection technician continuing training, signifying increasing management support.

### 3.2 Radiation Protection Supervisor and Professional Training

The inspectors reviewed training for radiation protection supervisors and health physicists and determined that the licensee implemented a good program of continuing technical training for these individuals. Training included attendance of professional meetings and seminars, vendor supplied training, and visits to other reactor sites for program comparisons.

### 3.3 Radiation Worker Training

Subsequent to the identification of an issue discussed in Section 4.1, the inspectors reviewed radiation worker training material and determined that the material did not include instructions to workers informing them not to climb into overhead areas or on ladders in certain areas of the plant without contacting radiation protection personnel. The licensee wrote a PIR (No. 95-2020) to document and correct this weakness in their Radiation Worker Training program.

### 3.4 Conclusion

Good training programs were maintained for radiation protection technicians and radiation protection supervisors and professionals. The licensee's support of professional development of radiation protection technicians was average, but improving. The licensee used a suitable mechanism to ensure that only qualified individuals performed assigned tasks.

## 4 Exposure Controls

### 4.1 External Exposure Controls

The inspectors conducted several tours of the radiological controlled area and reviewed area posting, high radiation area controls, area radiation monitors, radiation work permits, and radiation worker practices. The inspectors also reviewed dosimetry processing and results. Independent radiation measurements were performed by the inspectors to confirm the appropriateness of postings and controls. Very good results were observed in almost all areas.

When reviewing the high level radioactive waste storage area, the inspectors noted that notches or openings were left in the concrete block walls on opposite sides of the area. These notches made it possible to transfer radwaste containers into and out of the area with the aid of a radwaste building crane. The bottom of the openings in the walls were approximately 12 feet high and the walls were wide enough on which to stand. Entry into the high level radioactive waste storage area was unlikely through this route, because one ladder would have been necessary to scale the wall and another to descend into the storage area. However, radiation levels in the notch, itself, ranged from 100 to 150 millirems per hour. Because of ALARA considerations, radiation levels inside the high level radwaste storage area were not routinely measured.

The notch on one side of the high level radwaste storage area was posted as an entrance to a high radiation area. The opposite side was not. Licensee representatives stated that only one side was posted because there was easy access by way of a fixed ladder on the posted side. The other side was considered by the licensee to be inaccessible, in accordance with the guidance provided by Regulatory Guide 8.38, "Control of Access to High and Very High Radiation Areas in Nuclear Power Plants."

Regulatory Guide 8.38 states that physical barriers should be sufficient to prevent inadvertent entry. An example of measures that are adequate for controlling a high radiation area is given as a combination of "a 6-foot fence, with worker training and signs or procedures to deter climbing." Clearly, the shield wall constituted a barrier equal to or greater than a 6-foot fence, but there were no signs to deter climbing. Procedure AP 25B-100, "Radiation Worker Guidelines," included no instructions to deter climbing nor did Radiation Worker Training materials. Radiation protection personnel stated that radiation work permit instructions did not contain instruction preventing climbing or addressing work in the overhead areas.

Regulatory Guide 8.38 provides further guidance. The guide states:

Implicit in the definition of an entrance or access point to a high radiation area is that the opening (or portal) itself is accessible to personnel. Openings in physical barriers around a high radiation area are not required to be controlled as entrances if exceptional measures are needed to access them. Examples of areas that do not need to be controlled as entrances are the manway to a tank or vessel that has its cover bolted in place or an opening in a shield wall that is physically difficult to access without a ladder or mobile platform.

The opening in the licensee's shield wall conformed to the second example. Therefore, according to this guidance, the notch without a fixed ladder was inaccessible and did not need to be controlled (barricaded and posted). However, Regulatory Guide 8.38 also states that the requirements in 10 CFR Part 19 to instruct the worker on the radiological hazards in these areas are applicable. 10 CFR 19.12 requires, in part, that all individuals working in or frequenting any portion of a restricted area be kept informed of the

storage, transfer, or use of radioactive materials or radiation in such portions of the restricted area and be instructed in precautions or procedures to minimize exposure. Because the licensee did not instruct workers through training, postings, procedure, radiation work permit or other method that climbing or work in overhead areas was not to be done without permission of radiation protection personnel, the inspectors identified this as a violation of 10 CFR 19.12. Licensee representatives responded that they had identified such concerns in PIR 95-1193, initiated May 21, 1995. The inspectors reviewed PIR 95-1193 and the licensee's draft Health Physics Position File entitled, "Position on High Radiation Area Controls," initiated on July 6, 1995. The proposed corrective actions in PIR 95-1193 included both the posting of instructions regarding climbing into overhead areas and the enhancement of Radiation Worker Training to include such topics. This licensee identified and corrected violation is being treated as a non-cited violation, consistent of Section VII of the NRC Enforcement Policy.

During a review of the preceding item, the inspectors noted that RPP 02-215, "Posting of Radiological Controlled Areas," Revision 10, did not address the barricading of high radiation areas. Licensee representatives stated that this requirement was stated in the Radiation Protection Program document, but acknowledged that it should be included in the posting procedure. Licensee representatives stated that the posting procedure would be revised.

#### 4.2 Internal Exposure Controls

The inspectors reviewed air sampling, continuous air monitoring, respiratory protection equipment use, and whole body counting. No problems were identified.

#### 4.3 Conclusion

Good internal and external exposure control programs were implemented by the licensee but a non-cited violation was identified as a result of a failure to instruct radiation workers of a potential hazard in the radwaste building.

### 5 Control of Radioactive Materials and Contamination, Surveying, and Monitoring

The inspectors reviewed the licensee's radiation survey practices and records, portable radiation instrument service and calibration program, use of contamination monitors by radiation workers, and releases of items from the radiological controlled area.

#### 5.1 Portable Instrument Calibration

The licensee maintained a very good portable instrument calibration program, but the inspectors noted that the licensee's procedures did not address actions to be taken when an instrument's response was found, during the initial steps of calibration, to be out of the acceptable tolerance range. This appeared to be an oversight, because the licensee's procedures included actions to be taken when the same situation was identified during response testing prior to use. These actions included a review of the work activities

and areas in which the instrument was used to determine the impact of potentially inaccurate radiological data. Related to this situation, the inspectors determined that calibration of the neutron survey instruments was performed by a vendor. Records of calibrations performed on these instruments did not include as-found readings, and no contractual agreement existed with the vendor for telephone notification of this information. This meant that the licensee would not know of instances in which instruments were found to have been out of tolerance, and thus the licensee would not initiate efforts to review work activities and areas in which such instruments were used and potentially inaccurate radiological data was recorded and later used for decision making. The inspectors considered this a minor weakness. PIR 95-2016 was initiated by the licensee to document and correct this situation.

## 5.2 Survey of Radwaste Building

In the radwaste building, the inspectors identified that unrestricted access was available to the roof of the building. Because some high level radioactive waste was stored in the building, one of the inspectors and a radiation protection technician performed radiation measurements in accessible areas on the roof. Radiation levels measured by the licensee and confirmed by the inspector were 6 millirems per hour. Because the radiation levels exceeded 5 millirems per hour, the area on the roof was a radiation area, as defined by 10 CFR 20.1003. The licensee did not include the uncontrolled area in its routine survey schedule. The inspectors identified the failure to survey the radiation area as a violation of 10 CFR 20.1501(a), which requires that the licensee make or cause to be made, surveys that may be necessary to comply with the regulations in Part 20, and are reasonable under the circumstances to evaluate the extent of radiation levels and potential radiological hazards that could be present. To comply with 10 CFR 1902(a), which requires that radiation areas be conspicuously posted, it would have been necessary for the licensee to have identified the radiation area on the roof of the radwaste building by means of a radiation survey.

Licensee representatives stated that the routine survey schedule would be revised to include the roof of the radwaste building and initiated PIR 2017 to document and correct the situation. This failure constitutes a violation of minor significance and is being treated as a non-cited violation, consistent with Section IV of the NRC Enforcement Policy.

## 5.3 Conclusion

Excellent controls of radioactive materials and contamination were implemented. The portable instrument calibration program was very good, but minor revisions to procedures and vendor supplied information would improve the program. The radiation survey program was generally very good, but one related non-cited violation was identified.



## 6 Maintaining Occupational Exposure ALARA

The inspectors reviewed ALARA committee activities, source reduction initiatives, temporary shielding program, the ALARA suggestion program, and ALARA goals and results.

### 6.1 ALARA Committee

The inspectors reviewed minutes of meetings of both the ALARA Committee and the Site ALARA Working Group (SAWG). Meetings of the ALARA Committee were conducted as required by Procedure AP 25A-410, "ALARA Committee Charter," Revision 0. Meeting of the SAWG did not conform to the guidance of Procedure AP 25A-600, "Site ALARA Working Group," Revision 0. The procedure states, "The group will normally meet bi-weekly unless the HP Supervisor ALARA decides that insufficient business exists to hold a meeting for the week." Meeting minutes indicated that no meeting was conducted during the first quarter of 1995. No justification was provided. Procedure AP 25A-600 states, "The minimum number of members required for a quorum is five, including the Chairman or his designated alternate." The inspectors noted that meetings were conducted on April 5, May 18, and June 9, 1995 when this guidance was not met. During the May 18, 1995, meeting, an ALARA Improvement Report was reviewed and accepted.

Support for the SAWG by some site organizations was poor. The meeting minutes recorded poor attendance by the representatives from the operations, mechanical maintenance, and systems engineering organizations.

### 6.2 ALARA Suggestion Program

The inspectors reviewed the status of suggestions or ALARA Improvement Reports submitted to the ALARA suggestion program from January 1, 1994, to the date of the inspection. Based on the number of suggestions submitted, the inspectors concluded that the program had good support from the site workers. The oldest ALARA suggestion not acted upon was submitted in 1991. This suggestion involved a design modification to the steam generator bowl drains and was intended for implementation during Refueling Outage VII. However, emerging issues and changing priorities prevented the work. The modification was rescheduled for Refueling Outage VIII. The inspectors determined that no accepted ALARA suggestions remained unimplemented by oversight.

### 6.3 Source Term Reduction

The inspectors reviewed the licensee's "Long Range Exposure Reduction Plan." The document detailed various means the licensee used to reduce source term in the plant. These methods included the use of absolute filtration, cobalt reduction, elevated pH, hydrogen peroxide injection during shutdown, zero fuel defect operation, foreign material exclusion, and zircaloy fuel grid straps. The inspector concluded that the licensee had implemented a comprehensive source term reduction program.

#### 6.4 Temporary Shielding

During tours of the radiological controlled area, the inspectors observed temporary shielding on the residual heat removal lines located in the north and south piping penetration rooms, (Nos. 1322 and 1323). The lead shielding was put in place September 1991 to reduce the general radiation levels in the rooms. The inspectors reviewed Procedure ADM 03-960, "Use of Temporary Lead Shielding," Revision 10. Section 5.1 of the procedure defines temporary shielding as "shielding applied in support of a work activity intended to be removed upon completion of the activity or to be replaced by permanent shielding/design enhancements via plant modification." Section 6.4.9 states, "The health physics supervisor ALARA should evaluate the need for permanent shielding after 6 consecutive months of temporary shielding placement." The inspectors reviewed shielding logs and determined that both areas have been shielded since September 1991, and no evaluation for permanent shielding has been performed. The licensee initiated PIR 95-2014 to document and correct this item.

#### 6.5 ALARA Results

Person-rem totals for the previous five years are shown below.

	1990	1991	1992	1993	1994
Licensee results	182	308	70	182	235
National PWR Average	291	223	219	194	134

A discussion of the licensee's results versus its goal for the most recent refueling outage was included in NRC Inspection Report 50-482/94-16. The 1995 site goal was set at 12.9 person-rems. At the end of the second quarter of 1995, the licensee had accrued 10.4 person-rems. If the goal is achieved for the nonoutage year, the licensee will be well below the national rolling average for pressurized water reactors.

#### 6.6 Conclusion

A comprehensive ALARA program was in place. Excellent results in maintaining person-rem ALARA were achieved. Poor support for the Site ALARA Working Group by some site organizations was noted.

## ATTACHMENT

### 1 PERSONS CONTACTED

#### 1.1 Licensee Personnel

R. A. The licensee initiated PIR 2017 to document and correct the situation. Blecha, Maintenance Planner  
M. A. Blow, Superintendent, Chemistry  
L. F. Breshars, Staff Health Physicist  
S. C. Burkdoll, Supervising Instructor, Health Physics  
C. A. Clark, Health Physics/Chemistry Technician  
T. A. Conley, Superintendent, Radiation Protection  
\*T. M. Damashek, Supervisor, Regulatory Compliance  
\*R. D. Flannigan, Manager, Regulatory Services  
\*R. C. Hagan, Vice President, Engineering  
\*R. A. Hammond, Supervisor, Health Physics - Operations  
J. A. Harris, Supervisor, Health Physics - Support  
\*S. F. Hatch, Performance Assessment  
\*L. M. Kline, Staff Health Physicist  
\*S. R. Koenig, Supervisor, Quality Evaluations - Surveillances  
P. A. Lawson, Licensed Supervising Instructor - Nuclear Station Operators  
\*W. M. Lindsay, Manager, Performance Assessment  
\*O. L. Maynard, Vice President, Plant Operations  
\*C. M. Medency, Supervisor, Health Physics - Radwaste  
\*T. S. Morrill, Assistant to Vice President of Engineering  
T. D. Patten, Health Physics/Chemistry Technician  
\*E. M. Peterson, Supervisor, Quality Evaluations - Audits  
\*C. A. Redding, Engineering Specialist, Regulatory Compliance  
\*C. C. Reekie, Engineering Specialist, Regulatory Compliance  
R. L. Sims, Supervisor, Operations Support  
\*C. B. Stone, Auditor, Quality Evaluations  
\*C. A. Swartzendruber, Principal Engineer, Performance Assessment  
\*M. G. Williams, Manager, Plant Support

#### 1.2 NRC Personnel

\*J. F. Ringwald, Senior Resident Inspector  
\*J. L. Dixon-Herrity, Resident Inspector

\*Denotes personnel that attended the exit meeting. In addition to the personnel listed, the inspector contacted other personnel during this inspection period.

### 2 EXIT MEETING

An exit meeting was conducted on August 11, 1995. During this meeting, the inspector reviewed the scope and findings of the report. The licensee did not express a position on the inspection findings documented in this report. The licensee did not identify as proprietary, any information provided to, or reviewed by the inspector.