APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-482/92-17

Operating Licenses: NPF-42

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

Facility Name: Wolf Creek Generating Station (WCGS)

Inspection At: WCGS Site, Burlington, Coffey County, Kansas

Inspection Conducted: July 13-17, 1992

Inspector: L. T. Ricketson, P.E., Senior Radiation Specialist
Facilities Inspection Programs Section

Approved: for B. Murray, Chief, Facilities Inspection Programs Section — 8/10/92 Date

Inspection Summary

Inspection Conducted July 13-17, 1992 (Report 50-482/92-17)

Areas Inspected: Routine, announced inspection of the radiation protection program, including external exposure controls, internal exposure controls, and controls of radioactive materials and contamination, surveys and monitoring.

Results: Within the areas inspected, no violations or deviations were identified. The following is a summary of the inspection findings:

- A state-of-the art dosimetry system was in use.
- Dosimetry records were complete and proper notifications of radiation exposures were made.
- A thorough investigation was conducted of an incident involving personnel exposure from a hot particle.
- The radiation work permits program provided good instructions for radiation workers.
- Radiation areas were properly posted and controlled.

- Good programs had been implemented for respiratory protection equipment fitting, cleaning, maintaining, and issuance.

  A good whole body counting program was implemented to verify the effectiveness of the respiratory protection program.

- A good program had been established for radiation and contamination surveys.

- The program for controlling radioactive materials and contamination was strengthened by the installation of new personnel contamination surveys; however, a potential weakness in radiological controlled area access controls was noted.

- A good instrument calibration program was in place that kept pace with the needs of the radiation protection program.

- Increased use of computers improved schedule tracking and information verification.

DETAILS

1. PERSONS CONTACTED

WCNOC

*T. D. Anselmi, Licensing Engineer
*T. A. Conley, Health Physics Support Supervisor
*C. W. Fowler, Instruments and Controls Manager
*R. D. Flannigan, Manager, Nuclear Safety Engineering
*R. A. Hammond, Health Physicist
J. Harris, Health Physics Technician
*R. W. Holloway, Maintenance and Modification Manager
*E. C. Holman, Health Physics Operations Supervisor
*C. M. Medency, Radwaste Supervisor
L. Nigels, Lead Health Physics Technician
T. Patten, Lead Health Physics Technician
*M. A. Reed, Health Physicist
*C. L. Taylor, ALARA Coordinator
*S. Wideman, Supervisor, Licensing
*M. G. Williams, Manager, Plant Support

NRC

*G. A. Pick, Senior Resident Inspector
*L. E. Myers, Resident Inspector

*Indicates those present at the exit on July 17, 1992.

The inspector also contacted other members of the health physics staff during the inspection.

2. OCCUPATIONAL EXPOSURE (IP 83750)

The licensee's program was inspected to determine compliance with Technical Specifications 6.10, 6.11, and 6.12 and the requirements of 10 CFR Part 20, and agreement with the commitments of Chapter 12 of the Final Safety Analysis Report

2.1 Changes

The licensee added and staffed an additional health physicist position. The individual filling the position was formerly a lead technician in the health physics department. There were no other substantive changes in the organization, facilities, equipment, programs, or procedures.

2.2 External Exposure Control

The inspector reviewed the dosimetry processing laboratory and determined that the licensee used a state-of-the art dosimetry system and had two dosimetry readers available. The licensee used four element thermoluminescent

dosimeters with filters over the elements of 14, 300, 300, and 1000 milligrams per centimeter squared (mg/cm^2), respectively. Adequate supplies of thermoluminescent dosimeters were available for routine and emergency use.

The licensee's personnel dosimetry program was certified in all eight American National Standard Institute (ANSI) N13.11 test categories by the National Voluntary Laboratory Accreditation Program (NVLAP). The accreditation is valid until January 1, 1993. As part of the dosimetry quality control program, the licensee participated successfully in an interlaboratory comparison of irradiated dosimeters which tested the system in two of the NVLAP categories per calendar quarter.

The inspector verified through a random review that pocket ion chambers had been properly calibrated and that doses measured by the pockets ion chambers were routinely compared to doses measured by thermoluminescent dosimeters.

In order to prevent exceeding regulatory exposure limits, the licensee had established administrative dose limits. All departments at the plant were provided routine results of their cumulative exposures.

The inspector reviewed selected dosimetry records and determined that they contained the required information. The inspector also verified through random examination that individuals who had terminated employment were sent the required reports regarding their radiation exposures.

Licensee Event Report 92-007 identified that an individual had become exposed by a hot particle. NRC Inspection Report 50-482/92-05 detailed the events of the occurrence and the licensee's subsequent investigation. The resident inspectors determined that the licensee had conducted a thorough investigation of the matter. After the above NRC report was issued, the licensee received results of a vendor's analysis of the particle and calculation of exposure. The results were as follows:

Assay of particle - 5.5 microcuries cobalt-60
Exposure time - 1.25 hours
Skin of the whole body - 15.9 rem
Whole body deep dose - 64 mrem
Extremity deep dose - 51 mrem

As stated in NRC Inspection Report 50-482/92-05, a Notice of Violation was not issued as a result of this event. This action was in agreement with the guidance provided by the Office of Enforcement. The licensee had completed only one of the corrective actions listed in the licensee event report (LER); therefore, the NRC review of this LER will not be closed at this time. A film including a policy on the use of communication equipment in contaminated areas has been completed. Other actions committed to the LER are:

- An evaluation of the hot particle control program will be made to determine if hot particle definitions and guidelines should be revised.

- Hot particle control will be emphasized during work planning for steam generator bowl draining activities.

- The radiation work permit specific to the steam generator bowl draining activities will include information to reduce the possibility spreading hot particles.

- A discussion of the event will be included in general employee training and radiation worker requalification training.

The inspector reviewed the radiation work permit program and determined that the radiation work permits provided good instructions to radiation workers. Each worker was required to read and certify his/her understanding of the radiation work permit by signature, once per shift.

The inspector performed random reviews to verify that individuals in the radiological controlled area had signed the appropriate radiation work permit register and that individuals had received an ALARA pre-job briefing, when appropriate, prior to entering the radiological controlled area.

One individual was assigned the responsibility for preparing radiation work permits during normal operations. The inspector interviewed the individual, who stated that he attended weekly work planning meetings and that he maintained good communications with the craft groups. The inspector noted that increased staffing would likely be necessary in this area, in preparation for outage work, in order to ensure that adequate time is allowed for review of radiation hazards associated with specific radiation work permits.

The ALARA coordinator stated that, during routine operations, the radiation dose accrued on each radiation work permit was reviewed to determine if it exceeded the projected dose and to determine if changes were needed in the instructions to workers. Daily reviews of radiation work permits were performed during outages.

The inspector made several tours of the radiological controlled area and reviewed radiation postings and locked high radiation areas. The inspector performed independent radiation measurements and did not identify any additional areas needing posting or controlling. Keys for locked high radiation areas were controlled by the security department and were checked out, when necessary, to members of the health physics department.

No violations or deviations were identified.

Conclusions

A state-of-the-art dosimetry system was used. Dosimetry records were complete, and proper notifications of radiation exposures were made. The licensee conducted a thorough investigation of an incident involving personnel exposure to a hot particle but had not yet completed all remedial actions.

Radiation work permits provided good instructions to the radiation workers. Radiation areas were properly posted and controlled.

2.3 Internal Exposure Control

The inspector reviewed the licensee's internal exposure control program. The licensee's policy statement regarding the respiratory protection was in the Radiation Protection Manual and signed by the Director of Plant Operations. The policy addressed the subjects listed in Section C.1 of Regulatory Guide 8.15.

Portable high efficiency particulate air (HEPA) ventilation units were used as engineering controls where practical to confine airborne radioactive materials. The units were tested for bypass leakage annually to ensure proper function.

The inspector reviewed records of air sampling and determined that a proper air sampling program was in use. The program was recorded and tracked maximum permissible concentration hours. The licensee had some lapel air samplers, however, did not use them in the field. Several members of the health physics department expressed concerns regarding the reliability, accuracy, or practicality of such units. Licensee representatives also stated that they were continuing to study the use of lapel samplers and were communicating with other sites regarding the use of these samplers and to determine if there were other options available to establish breathing zone concentrations.

Ambient air fit testing units were used. Health physics personnel were able to review a radiation worker's respiratory protection qualifications either by using the computer terminal in the health physics office or reading the hardcopy listing of qualified respirator users which was kept at the respirator issue point. The inspector noted that the list of qualified users was approximately 2 weeks old, and thus was not the most current. However, the inspector reviewed respirator issue records and determined that respirators of the proper size were issued and that respirator users had current qualifications.

The inspector also verified that respirators were properly inspected and maintained. Two licensee personnel were qualified to perform maintenance on regulators to self-contained breathing apparatuses. The licensee followed the equipment suppliers instructions and flow tested the self-contained breathing apparatuses annually and overhauled them every 3 years. A computerized tracking system aided the licensee in maintaining proper maintenance schedules.

The inspector determined through record review that air supplied by the licensee's air tank filling system for self-contained breathing apparatus met or exceeded Grade D air standards, as described by Industry Standard ANSI/CGA G-7.1.

The licensee evaluated the effectiveness of sorbent canisters in atmospheres containing radioactive iodine by comparing the results of air sampling

(maximum permissible concentration-hours) and whole-body counting. The program verified that the canisters provided effective protection against radioactive iodine.

Proper procedures were implemented for the startup and use of the whole body counters. Background and source checks were performed at the start of each shift on which the counters were used. Investigational limits were implemented, and a review of the whole-body count results indicated that the investigational limits had not been exceeded.

Licensee representatives stated that the chemistry department performed radiological urinalysis on the refueling personnel during outages and that no other form of bioassay has been necessary.

No violations or deviations were identified.

Conclusions

The program of fitting, cleaning, maintaining, inspecting, and issuing respiratory protection equipment was good, as was the program for whole-body counting.

2.4 Control of Radioactive Materials and Contamination, Surveys, and Monitoring

A schedule for radiation surveying, contamination monitoring, and air sampling was approved by the health physics operations supervisor. The inspector reviewed selected surveys records and determined that the schedule had been maintained and that the records contained the required information.

The inspector observed activities at the access control entrance and exit and determined that they were in agreement with applicable procedures and good health physics practice.

The licensee had changed the radiologically controlled area boundary in the yard in the rear of the plant. The boundary had formerly been a chain link fence, which ran along the rear of the yard. The gates were locked to control access. In order to allow access to the underground diesel storage tanks without entrance into the radiological controlled area, the boundary had been moved closer to the building. A rope barrier identified the radiologically controlled area; however, the inspector noted that the gates to the yard were no longer shut or locked, making it relatively easy for personnel to gain access to the radiologically controlled area without passing through the designated access control point. No entries into the area through this route were observed, and the licensee's representatives stated that they would evaluate this situation to determine if actions were necessary to prevent this from being a weakness in the radioactive contamination control program.

The licensee had installed new personnel contamination monitors at the radiologically controlled area exit. Individuals leaving the area were required to pass through both beta and gamma sensitive monitors. If the

monitor alarmed, personnel were instructed by posting (and prior training) to notify health physics personnel for assistance. The radiation workers surveyed their own hand carried items with a frisker. The area housing the personnel contamination monitors and frisker was viewed by a television camera sometimes monitored by health physics personnel in the count room. The television monitor was located in the health physics office. The inspector did not identify workers disregarding alarms of the personnel contamination monitors when exiting the radiological controlled area. Licensee representatives stated that the number of personnel contamination events identified was higher than last year, because of the increased sensitivity of the new monitors. The monitors could detect mixed contamination levels of 5000 disintegrations per minute.

The inspector reviewed the number of entries into the radiological controlled area by health physics supervisory personnel and noted an increase from previous inspection of this area. The licensee implemented a supervisory inspection program of the radiological controlled area in which daily tours and observations were made by health physics supervisors personnel. The results of these inspections were reviewed by the radiation protection manager who directed further actions as necessary.

Calibration of radiation survey instruments, air samples, personnel contamination monitors, and portal monitors were conducted by health physics personnel. Assistance by Instruments and Controls personnel was provided during outages. Routine computer printouts enabled the licensee to identify instruments needing calibration within a selected time frame. Gamma radiation fields produced by the calibration sources were measured using calibrated Condenser R chambers. Portal monitors located at the radiologically controlled area exit and the protected area exit were calibrated to detect less than 200 nanocuries of cesium-137. Neutron survey instruments were sent to a vendor for calibration.

The inspector verified that a sufficient supply of radiation survey instruments was available for routine use and that survey instruments, air monitors, and personnel contamination monitors were calibrated and response tested.

Through records review, the inspector also verified that sealed sources had been properly inventoried and tested for leakage.

The inspector reviewed waste stream sampling results for dry activated waste and noted that the licensee's most abundant isotope was iron-55. Iron-55 decays by electron capture and emits weak x-rays. The licensee used no special survey procedures to detect iron-55 and stated that any time it was present, easily detectable cobalt-60 (the next most abundant isotope) would likely be present as well.

During tours of the radiologically controlled area, the inspector noted that many pieces of equipment used during the outage were still present. The equipment was bagged or covered with plastic and surrounded with a rope barrier or chain link fence (and posted as contaminated). The inspector also

noted some tools left in contaminated areas. Both situations were already the subject of study by the licensee.

Sufficient supplies of protective clothing were available. Laundering of protective clothing was performed offsite by a vendor.

All trash originating within the radiologically controlled area was sent to a vendor for processing. Trash originating outside the radiologically controlled area, but within the protected area, was sent to a local landfill. According to licensee representatives, the landfill was surveyed weekly with gamma scintillation instrumentation.

No violations or deviations were identified.

Conclusions

A good program of radiation surveying and contamination monitoring was implemented. The program of controlling radioactive materials and contamination was strengthened by the installation of new personnel contamination monitors. Radiologically controlled area access controls could be bypassed in the area near the diesel storage tanks. A good instrument calibration program kept pace with the needs of the radiation protection program.

3. EXIT MEETING

The inspector met with the resident inspectors and the licensee's representatives denoted in paragraph 1 at the conclusion of the inspection on July 17, 1992, and summarized the scope and findings of the inspection as presented in this report. The licensee did not identify as proprietary any of the material provided to, or reviewed by, the inspector during the inspection.