

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Inspection Report: 70-925/94-01

License: SNM-928

Licensee: Kerr-McGee Corporation
P. O. Box 25861
Oklahoma City, Oklahoma 73125

Inspection At: Cimarron Facility, Crescent, Oklahoma

Inspection Conducted: November 17-18, 1994

Inspectors: R. J. Evans, Health Physicist
Fuel Cycle and Decommissioning Branch

C. L. Cain, Chief
Fuel Cycle and Decommissioning Branch

Approved: C. L. Cain
C. L. Cain, Chief
Fuel Cycle and Decommissioning Branch

1/18/95
Date

Inspection Summary

Areas Inspected: Routine, announced inspection of facility status, management organization and controls, radiation protection program, and followup of previously identified NRC inspection findings.

Results:

- The licensee had established a radiation protection organization with defined responsibilities and functions, a procedure review and approval process, and a system to perform internal reviews and audits. The staffing at the site was acceptable for the work in progress at the facility. The quarterly self-assessment audits were comprehensive. It was noted that the licensee had not formally documented the backup responsibilities for key positions in the radiation protection organization (Section 2).
- The radiation protection program was inspected to ensure licensee compliance with the new 10 CFR Part 20 regulations and License Amendment 10. Procedures were developed that incorporated the new regulations into the radiation protection program. The radiation protection program procedures were of high quality and comprehensive. (Sections 3.1 and 3.2).

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- Radiation protection program attributes determined to be acceptable included radiological area control and postings, the respiratory protection program, personnel monitoring, and site radiological surveys (Section 3.2).
- External and internal monitoring controls were acceptable. External exposures to radiation were low and were only a small fraction of regulatory and site administrative limits. Internal monitoring attributes found to be acceptable included the air sampling program, contamination surveys, and bioassay sampling. Records indicate that the internal exposure estimates were also low (Section 3.3).

Summary of Inspection Findings:

- Open Item 70-1193/8601-01 was administratively closed (Section 4.1).
- Open Item 70-1193/8703-01 was administratively closed (Section 4.1).

Attachments:

- Attachment 1 - Persons Contacted and Exit Meeting
- Attachment 2 - Photographs Taken at Cimarron Facility

DETAILS

1 FACILITY STATUS

The Cimarron facility includes two non-operating fuel fabrication plants on a 1,100 acre site. One plant was used for fabrication of mixed-oxide fuels, while the second plant was used for enriched uranium fuel fabrication. Fuel fabrication was terminated at the facility in 1975. Decontamination of the site began in 1976. The mixed-oxide plant has since been remediated, and the mixed-oxide license (SNM-1174) was terminated on March 3, 1993. The major activity in progress at the time of the inspection involved decommissioning of the site for eventual termination of the uranium license.

The areas of the facility that were toured included the uranium building, the yard, and the onsite soil disposal cell (also referred to by the licensee as Burial Ground No. 4). Large amounts of building material and soil had been excavated from within and around the uranium building during the remediation process. The licensee stated that the lack of soil in and around the uranium building was creating a foundation support hazard. The inspector noted that some concrete blocks had been fabricated to assist in the support of the building foundation. The licensee was waiting on NRC approval of the final survey results of the remediated area prior to moving foundation support material back into the area.

Very little material remained inside the uranium building. The items that remained in the building included stacked barrels of soil and portions of the building heating and ventilation equipment.

During the decommissioning of the site, onsite soil was sorted according to the contamination concentration (measured in picocuries per gram) in the soil. The soil with elevated uranium concentrations was placed in two large piles, referred to as the north (Pile No. 1) and east (Pile No. 2) stockpiles. The material in the two piles had come from Burial Ground 1, sanitary lagoons, north field area, plant yard, and in-plant subsurface areas. Material with contamination concentrations below 30 pCi/g was left in place. The licensee stated that the material in these two piles will be buried in the onsite disposal cell. The licensee estimated that the two piles contained 250,000 to 300,000 cubic feet of material. A third pile, located adjacent to the north stockpile, was a consolidation of soil material that had been excavated from the north field area and the south side of the uranium building. The licensee recently consolidated two piles of dirt into one (Pile No. 3) for radioactive contamination sampling (the pile movement also promoted mixing of the soil for homogenization). Following sampling, the licensee plans to eventually transfer this pile to the disposal cell also. A fourth pile contained road rubble that was apparently being surveyed for contamination item by item. Two new, smaller piles of soil were also present in the yard. The material in one pile, surrounded by bales of hay, contained thorium in "Option 2" quantities. The licensee planned to eventually transfer this pile to the disposal cell also. The second small pile of soil contained "Option 4" material that has to be shipped off site for disposal.

The yet unused disposal cell was also visited. The disposal area consisted of an "L" shaped pit with a rain water collection pit at one end. The disposal pit was sloped so that all drainage would flow to the collection pit, which was lower in elevation than the disposal pit. Since the last NRC visit to the facility (July 1994), the licensee installed depth markers in the disposal cell. The markers were tagged at one foot intervals in preparation for movement of soil from the stockpiles to the disposal cell. The licensee has to verify soil density at each foot after the transfer and compaction of soil into the disposal cell.

The inspector noted that the license was maintaining positive control over contaminated areas. The contaminated areas were properly fenced, and signs were displayed in prominent locations around the facility. During the plant tour, an ion exchange resin barrel was noted to be reading 260 microRoentgen/hour on contact. The inspector noted that the barrel was a cardboard barrel and the barrel was deteriorating. Concerned about the possibility of spillage of radioactive resins, the inspector discussed the deteriorating barrel with the licensee. The licensee planned to take corrective actions to relocate the spent resins.

Since the last inspection, conducted in November 1991, two amendments were issued for Special Nuclear Materials License SNM-928. Amendment No. 9, issued December 30, 1992, revised Condition 20 to extend the required due date for submittal of the decommissioning plan to the NRC to June 30, 1995. Amendment No. 9 also added Conditions 22.a through 22.e to authorize backfilling of two sanitary lagoons and a former burial ground (all three locations have since been backfilled). Amendment No. 10 was issued on November 4, 1994, to modify six existing license conditions. Amendment No. 10 also authorized the disposal of 500,000 cubic yards of soil contaminated with low levels of uranium in the onsite disposal cell.

Recent licensee submittals to the NRC included the Facility Soil Survey Report in June 1994, the Radiological Characterization Report in October 1994, a Request for License Amendment dated November 15, 1994, and the Report on the South Uranium Yard Remediation on November 17, 1994. The remediation report contains the characterization data taken prior to and after remediation of the area around the uranium building. The license amendment request was a proactive action on the part of the licensee to update the license, which was first issued in its entirety in 1977. Several items mentioned in the current license, including site specific documents and organizational positions, were no longer applicable to the facility.

2 MANAGEMENT ORGANIZATION AND CONTROLS (88005)

This area was inspected to ensure that: the licensee had established an organization with defined responsibilities and functions; a procedure review and approval process was established; a system to perform internal reviews and audits was in place; and, a quality assurance program was in place.

2.1 Inspection Details

Procedure KM-CI-RP-1, "Organization and Responsibilities," Revision 0, provided a description of the radiation protection organization and described the positions and functions contained within that organization. An attachment to the procedure displayed an organization chart that was in effect at the facility. The licensee's organization included a program manager (filled by a Kerr-McGee vice president), a site manager, a radiation safety officer, an administrative and accounting supervisor/quality assurance manager (one person performed a dual function), three decontamination supervisors, a health physics supervisor, and the site support staff. At the time of the inspection, the licensee had 25 employees on site.

All positions listed in the organization chart had been properly staffed. However, the procedure did not designate the backups for each critical position in the organization. One individual was introduced as the "assistant plant manager," a position that was not listed in the Organization and Responsibilities procedure. Thus, the licensee did not procedurally identify the backups, or alternates, for key positions in the organization prior to staffing this position.

Procedure KM-CI-RP-6, "Procedure Generation, Review and Approval," Revision 0, provided guidance for the development, review, and approval of the radiation protection procedures. No inconsistencies between the Procedure KM-CI-RP-6 requirements and the approved procedures in use at the facility were identified.

Procedure KM-CI-RP-4, "Radiological Control and Safety Audits," Revision 0, provided guidance on the conduct of quarterly radiological control and safety audits. The NRC inspector concluded that the quarterly audits of the radiation protection program appeared to be comprehensive.

A second procedure, KM-CI-RP-5, "Radiological Occurrence Reports," Revision 0, provided instructions to uniformly identify, document, and investigate radiological deficiencies and incidents for determination of root causes and corrective actions. This program was similar to a problem reporting system, but for radiological incidents. The Radiological Occurrence Report procedure was recently generated, and no reports had been written or submitted into the program at the time of the inspection. The licensee's internal quality assurance program procedures were not reviewed although they did exist at the time of the inspection.

2.2 Conclusions

The licensee had established: (1) a radiation protection organization with defined responsibilities and functions, (2) a procedure review and approval process, (3) a system to perform internal reviews and audits, and (4) a quality assurance program. The staffing at the site was acceptable for the work in progress at the facility. The quarterly audits were comprehensive. The licensee had not formally documented the backup responsibilities for key positions in the radiation protection organization.

3 RADIATION PROTECTION (83822)

An inspection of the radiation protection program was performed to determine whether the licensee was complying with license and regulatory requirements, and to determine the adequacy of the program. Special emphasis was placed on ensuring that the licensee had incorporated the new 10 CFR Part 20, Standards for Protection Against Radiation, requirements into their radiation protection program. The licensee's environmental monitoring and employee training programs were not reviewed at this time.

3.1 License Compliance Inspection

A major focus of the inspection was ensuring that the licensee was in compliance with the conditions established in License SNM-928, Amendment 10.

Compliance with the following license conditions was reviewed and found to be satisfactory:

- Condition 13, which requires the licensee to calibrate radiation survey instruments at least every six months.
- Condition 15, which requires records be kept for inspection by the NRC.
- Condition 16, which requires the licensee to conduct routine radiological surface surveys of the facility on a monthly basis (the routine surveys of the kitchen area and planchet holders were a concern during the previous inspection; however, these surveys were now being adequately performed).
- Condition 21, which requires the licensee to periodically inspect the area for inadvertent intrusion (the security personnel performed this function on a daily basis).
- Condition 22.e, which requires the licensee to perform activities in a manner that is consistent with the concept of ALARA (As Low As Reasonably Achievable).

License Condition 18 requires the licensee to dispose of radioactive contaminated solid wastes generated by licensed activities at a licensed disposal site. At the time of the inspection, the licensee had 72 barrels of material ready for shipment off site, including soil that the licensee could not bury on site. Problems with locating a disposal site that would accept the wastes were delaying the offsite disposal process.

Several license conditions contain errors or out-of-date information. For example, License Conditions 11 and 14 reference job positions that are no longer staffed at the facility. The licensee recently submitted a license amendment request to the NRC to update the license.

In conclusion, no license noncompliances were identified during the inspection.

3.2 Radiation Protection Program and Procedures

During the course of the inspection, 23 Cimarron radiation protection program procedures were reviewed. During the tours of the facility, licensee compliance with the procedural guidance was also reviewed. Overall, the licensee's radiation protection program appeared to be properly developed and implemented in accordance with regulatory requirements, including 10 CFR Part 20, and the site procedures. The implementing procedures were noted to be of high quality and comprehensive.

10 CFR 20.1101 requires that each licensee develop, document, and implement a radiation protection program commensurate with the scope and extent of licensed activities and sufficient to ensure compliance with the provisions of Part 20. The inspector noted that although revised 10 CFR Part 20 regulations were effective January 1, 1994, the licensee's procedures were not in place until October 1994, some 10 months later.

The following program attributes were determined to be acceptable and in compliance with program requirements:

- Radiological postings and labelling of the restricted areas were properly located throughout the facility.
- The licensee had established and maintained positive control of the radiologically restricted areas, from both security and health and safety standpoints.
- The respiratory protection program was adequately implemented, including cleaning, maintenance, and storage of the respiratory protection equipment.
- Air samplers were properly located and in service at the facility.
- Quarterly radiological control and safety audits were being performed in a timely manner; the audits appeared to be comprehensive in nature.
- Radiological survey records were comprehensive and complete.

Additionally, no out-of-calibration survey instruments were identified during the plant tours.

The radiation protection procedure, KM-CI-RP-7, "Control of Health Physics Procedures, Records, and Documents," Revision 0, step 3.1, stated that "Cimarron Radiation Protection Program records/documents shall be prepared and maintained using the highest standard of accuracy, traceability and legibility to meet both regulatory and administrative requirements." However, one logbook reviewed needed improvement to meet the intent of the KM-CI-RP-7 procedure requirement. The radiation detection instrumentation calibration logbook appeared disorganized and in need of updating. For example, several pages were not signed by performer or reviewer, several calibration record sheets appeared to be missing, and the instrument calibration record sheets

for several instruments were not up-to-date. Additionally, inconsistent information was documented on the logbook forms. For example, the "next calibration due" dates were inconsistent. This logbook was apparently an isolated case because other logbooks that were reviewed did not have these problems.

Procedure KM-CI-RP-46, "Calibration and Use of Radiation Detection Instrumentation," Revision 0, discussed the requirements for calibration, use, and quality control of instruments used to measure radiation. Step 5.1.11 stated that instruments shall be calibrated on a quarterly basis, with each calibration within 120 days of the last one. Following a review of the instrument calibration logbook, several instruments were identified that had exceeded the licensee administrative limit of 120 days. However, no out-of-date instruments were found in the plant, and no instrument used had exceeded the 6-month calibration requirement of License Condition 13.

The "ALARA Program" Procedure KM-CI-RP-10, Revision 0, was reviewed. Although the procedure stated that an ALARA suggestion program existed at the site, only one sentence was identified which described the program. The licensee had not procedurally described the program, developed a form to document the suggestions, or provided an employee ALARA suggestion box. This was discussed with licensee representatives.

The Cimarron Radiological Characterization Report was reviewed and no problems were noted. (Formal NRC review and approval of this report is the responsibility of NRC's Office of Nuclear Materials Safety and Safeguards.)

The Annual Environmental Monitoring Report, submitted to the NRC on March 2, 1994, was reviewed. A review of the reporting history was also performed. Annual submittals were required by Condition 11 of terminated License 70-1174. Since License 70-1174 was terminated on March 3, 1993, the licensee was no longer required to submit such reports.

According to 10 CFR Part 70.59, Effluent Monitoring Reporting Requirements, "Each licensee authorized to possess and use special nuclear material for processing and fuel fabrication, scrap recovery, conversion of uranium hexafluoride, or in a uranium enrichment facility shall submit a (semi-annual) report to the appropriate NRC Regional Office . . ." The licensee was granted authorization to discontinue submitting these effluent monitoring reports to the NRC Region III office on September 14, 1990. The last effluent monitoring report submitted to the NRC was on February 19, 1990.

The Site Emergency Plan was also reviewed. Appendix A of the Emergency Manual KM-CI-EM-I was missing the immediate reporting and 24-hour reporting requirements established by 10 CFR Parts 20 and 70. Also, during a plant tour, problems were observed with the wind speed/direction chart recorder. The wind speed needle was out of ink, the wrong time was displayed on the recorder, and the wind direction needle appeared to be stuck in place. This was discussed with the licensee as an item needing repair, although the license does not specifically require its operability.

3.3 External and Internal Exposure Controls

3.3.1 External Exposure Control

The external exposure records (film badge records) appeared to be thorough and complete. The three highest external doses measured during 1994 were 80 millirems, 50 millirems, and 30 millirems for three different workers. The licensee believed that the highest dose, 80 millirems, was apparently a medical dose and was not an operational dose. The licensee also believed that the worker with the second highest dose improperly handled the badge, which resulted in a higher than expected reading. The third highest reading was apparently a legitimate exposure value. Regardless, the exposure readings were a small fraction of the NRC annual limit of 5000 millirems and the licensee's annual administrative limit of 4000 millirems.

3.3.2 Internal Exposure Control

The licensee conducted radiation surveys in accordance with Cimarron Radiation Protection Procedure KM-CI-RP-39, "Performance of Radiation, Contamination and Airborne Radioactivity Surveys," Revision 0. The inspectors examined records of surveys as follows:

- Release of materials and equipment off site

The records review disclosed that only a few items were released from the site during 1994. There was a significant number of records for materials released during previous years. All results indicated compliance with the release limits specified in License Condition 15.

- Daily smear surveys in change rooms and soil counter rooms

All results were less than 100 disintegrations per minute (dpm)/100 centimeters squared (cm²).

- Daily smear surveys in the uranium plant and production area

All results were less than 350 dpm/100 cm².

- Weekly direct contamination surveys in the uranium plant and production area

All results were less than 4000 dpm/100 cm² and typically less than 350 dpm/100 cm².

- Weekly smear surveys in uranium plant nonproduction areas (offices, labs, lunch rooms, vehicle pedals and floors, etc.)

Results were typically less than 350 dpm/100 cm².

- Monthly contamination surveys in plutonium building

All results less than 50 dpm/100 cm² direct and 4 dpm/100 cm² smearable.

- Quarterly dose rate surveys in plutonium building

Results ranged from 6 to 10 microRoentgen per hour (μ R/h).

Records were maintained for other surveys such as an annual fence line dose rate survey and routine surveys of clean laundry. All surveys were conducted in compliance with License Condition 16. Records identified the surveyor and the type of instrument used and included the signature of a management reviewer.

Air samples had been obtained using low-volume samplers (typically six running at 15 liters/minute), high-volume samplers (one at 2 cubic feet per minute), and lapel samplers (3 to 5 liters/minute).

The low- and high-volume samplers had been operated as area samplers for about 8 hours per day. Filters were held for a 12-hour decay prior to counting in order to reduce radon/thoron influence. The results of these counts had often been near the Derived Air Concentration (DAC) for natural uranium described in 10 CFR Part 20, 2×10^{-11} microcuries per cubic centimeter (μ Ci/cc). The filters had then been held for a 7-day decay and counted for 10 minutes. These latter results have rarely exceeded 10 percent of the DAC and more typically have ranged from 0.1 to 1 percent of the DAC. (One percent of the DAC would signify an estimated committed effective dose equivalent of 50 millirems per year.)

The inspector reviewed in detail the licensee's data, calculations, and documentation of the conversion of sample counts and sampler flow rates to units of μ Ci/cc. Although the records did not always list the units used (e.g., flow rates were not specified), the conversion technique was verified.

Lapel sample data was also reviewed. (The licensee's conversion technique was not reviewed.) The occasions and duration of lapel sampler use were deemed appropriate. The licensee derived worker exposure from these data in terms of DAC-hours. Rarely was a respirator factor other than unity applied. Results were low for 1994. The highest values were 0.8 and 1.5 DAC-hours. (The licensee used an administrative 40 DAC-hour control measure.) A review of data for earlier years disclosed work such as sand blasting projects resulting in exposures as high as 8.3 MPC-hours.

The licensee had used a bioassay program consisting of urinalysis for natural uranium and in-vivo counting for U-235 and thorium. This program was described in licensee Procedure KM-CI-RP-18, Revision 0, "Internal Exposure Monitoring," Revision 0.

Urine samples had been collected semimonthly and analyzed by a contractor. The licensee's technical center verified contractor results. Nonroutine samples had also been collected in association with special worker

assignments. The licensee's Quality Assurance program included the submission of blank and spiked samples. Typically, results were less than 0.6 picocuries per liter (pCi/l); however, a sample result for a worker in July 1994 was 1.5 pCi/l.

Detection sensitivity had not enabled this program to be quantitatively meaningful; however a licensee representative stated that an effort is underway to improve and refine the program.

The inspector also reviewed the results of in-vivo lung counts administered to 20 workers and thorium whole-body counts administered to 17 workers. These counts were performed by contractor during 1993. All of the thorium results were at the detection limit. The highest of the lung counts for U-235 revealed the presence of 51 μg +/- 31. The inspector judged this deposition to be negligible after an analysis of the report and a comparison of the result with Annual Limits on Intake in 10 CFR Part 20.

3.4 Conclusions

The major focuses of the inspection were to ensure compliance with license conditions and to verify that the licensee had incorporated the new 10 CFR Part 20 requirements into their radiation protection program. No noncompliances were identified, and the new 10 CFR Part 20 regulations had been incorporated into the radiation protection program.

The implementing procedures were high quality, comprehensive procedures. Other radiation protection program attributes determined to be acceptable included radiological area control and postings, the respiratory protection program, personnel monitoring, routine self-assessment audits of the program, and site radiological surveys.

Areas needing improvement include the updating of one logbook, ensuring all radiological detection instruments in use are calibration checked once per quarter (a procedure requirement that is more restrictive than the license), expanding the procedural description of the ALARA program, updating the emergency manual to include notifications required by the regulations, and repairing the wind speed/direction meter.

Overall, external and internal monitoring controls were acceptable. External exposures to radiation were low at the facility and were only a small fraction of regulatory and site administrative limits. Internal monitoring attributes found to be acceptable included the air sampling program, site surveys, and bioassay sampling. Records indicated that the internal exposure estimates were also low.

A review of the environmental monitoring reporting history noted that the licensee is apparently no longer required to submit annual reports to the NRC.

4 FOLLOWUP (92701)

4.1 Open Item Status

An audit was performed by the Region IV office on the status of all open items, violations, and deviations that were opened or closed since 1984 for the Cimarron facility. The audit revealed that two Open Items were still open for the SNM-1174 license and none were open for the SNM-928 license. The two open items, 70-1193/8601-01 and 70-1193/8703-01, are being administratively closed because the SNM-1174 license was terminated on March 3, 1993.

Therefore, at the time of this inspection, there are no open items on the Inspection Followup System (Region IV's computerized tracking system) for License SNM-1174 or SNM-928.

ATTACHMENT 1

1 PERSONS CONTACTED

1.1 Cimarron/Kerr-McGee Corporation

J. Kegin, Site Manager
M. Hodo, Administrative and Accounting Supervisor/Quality Assurance Manager
T. Moore, Radiation Safety Officer
K. Morgan, Supervisor, Health Physics
J. Stauter, Vice President

1.2 State of Oklahoma

P. DeWoody, Department of Environmental Quality

1.3 NRC Personnel

C. Cain, Chief, Fuel Cycle and Decommissioning Branch
R. Evans, Health Physicist, Fuel Cycle and Decommissioning Branch

In addition to the personnel listed above, the inspectors contacted other personnel during this inspection period.

2 EXIT MEETING

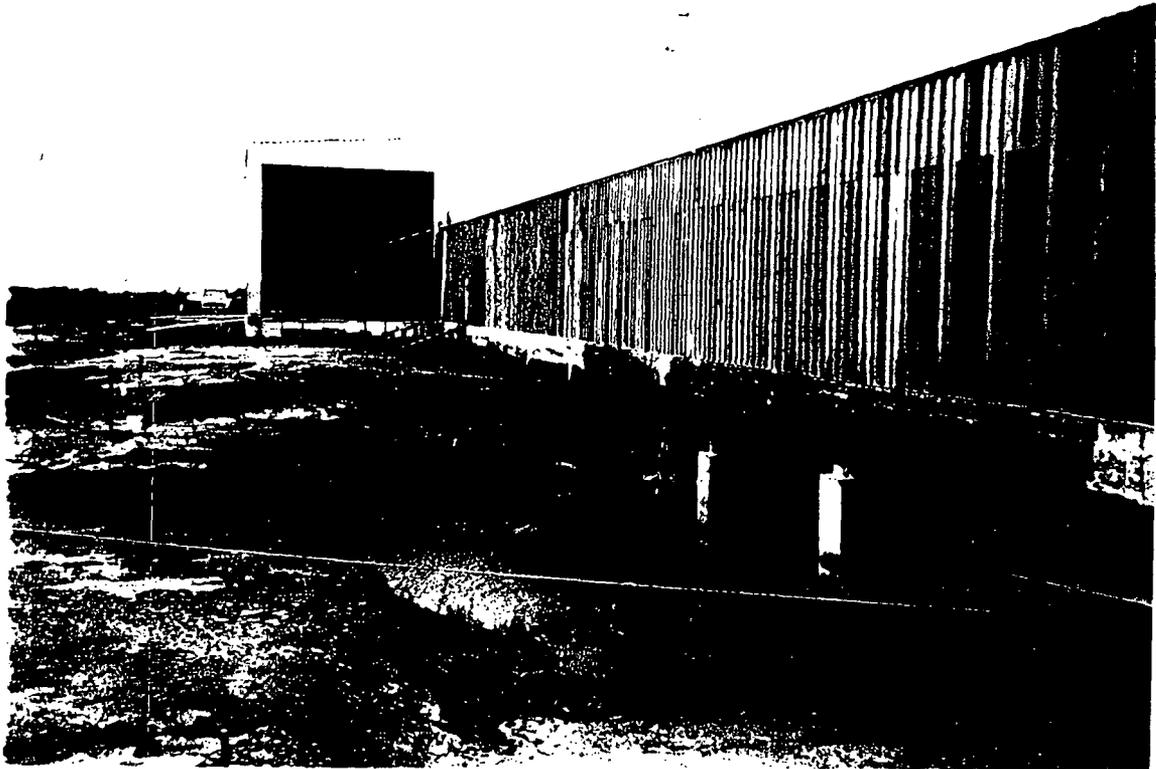
An exit meeting was conducted on November 18, 1994, at the Cimarron facility in Crescent, Oklahoma. During this meeting, the inspectors reviewed the scope and findings of the report. The participants did not identify as proprietary any information provided to, or reviewed by, the inspector.



Photograph 1: Cimarron Facility, as seen from the Soil Disposal Cell.



Photograph 2: Soil Disposal Area (on site disposal cell).



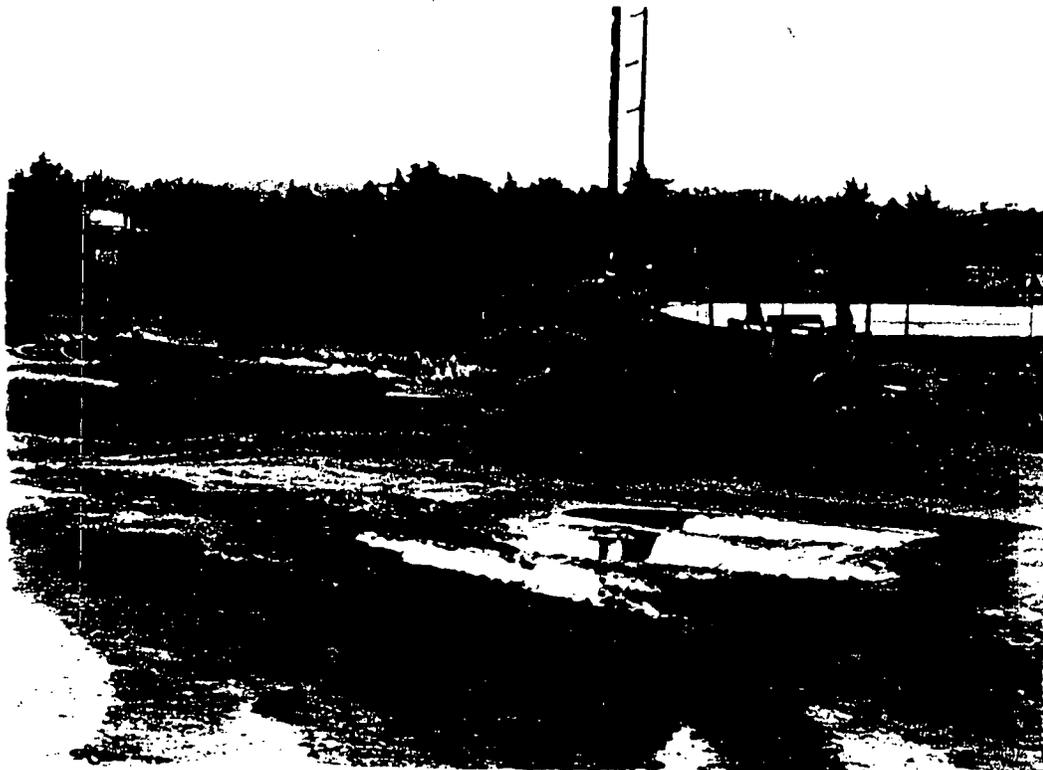
Photograph 3: Uranium Building (south end). Note excavation of soil around foundation.



Photograph 4: Pile of concrete blocks from Uranium Building (recently relocated from inside to outside the drainage ditch in foreground).



Photograph 5: Piles of Soil; the consolidated pile No. 3 (left rear), road rubble, (left center). two new piles (right center).



Photograph 6: New piles. Pile with Option 2 Thorium (left side) and Option 4 Material (right side).