

ORISE
OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

070-00925

April 19, 1995

Mr. David Fauver
Division of Waste Management - NMSS
U.S. Nuclear Regulatory Commission
Two White Flint North T-8F37
11555 Rockville Pike
Rockville, MD 20852

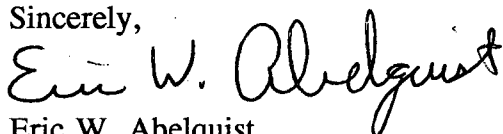
**SUBJECT: CONFIRMATORY SURVEY PLAN FOR THE SOUTH URANIUM YARD
REMEDATION, KERR-McGEE CORPORATION, CIMARRON
FACILITY, CRESCENT, OKLAHOMA (DOCKET NO. 79-925)**

Dear Mr. Fauver:

Enclosed is the revised survey plan for the South Uranium Yard at the Cimarron Facility in Crescent, Oklahoma. Your comments have been incorporated into the plan. Attachment A of the document contains the spending plan for this project.

If you have any questions, please direct them to me at (615) 576-3740 or W. L. (Jack) Beck at (615) 576-5031.

Sincerely,



Eric W. Abelquist
Project Leader
Environmental Survey and
Site Assessment Program

EA:kew

Enclosure

cc: R. Uleck, NRC/NMSS/TWFN 7F27
D. Tiktinsky, NRC/NMSS/TWFN 8A23
PMDA, NRC/NMSS/TWFN 8A23
W. Beck, ORISE/ESSAP
File/293

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**PROPOSED CONFIRMATORY SURVEY PLAN
FOR THE SOUTH URANIUM YARD REMEDIATION
KERR-McGEE CORPORATION
CIMARRON FACILITY
CRESCENT, OKLAHOMA**

INTRODUCTION

The Kerr-McGee Corporation operated the Cimarron facility in Crescent, Oklahoma to produce slightly enriched (approximately 3% U-235) uranium fuel and mixed oxide (uranium plus plutonium) fuel between 1965 and 1975. These activities were conducted under License SNM-928 with the Atomic Energy Commission (AEC), predecessor to the Nuclear Regulatory Commission (NRC). In 1983, Sequoyah Fuels Corporation (SFC) became the owner of the Cimarron Facility, when Kerr-McGee Nuclear Corporation was divided into SFC and Quivira Mining Corporation. Subsequently, Cimarron Corporation, a subsidiary of the Kerr-McGee Nuclear Corporation, became responsible for the Cimarron Facility.

Cimarron Corporation has discontinued fuel production activities and is in the process of performing the decontamination to terminate the NRC licensing restrictions. The decontamination and decommissioning (D&D) project was divided into several phases, which involved the Mixed Oxide Plant, the Uranium Plant, the On-site Burial Ground, and the Sanitary Lagoons.

As part of the overall D&D effort, remediation of contaminated soil at the Cimarron Facility began as early as 1976.¹ This soil is contaminated, primarily, with low-enrichment uranium; however, areas of thorium-contaminated soil, presumed to have been brought to the Cimarron Facility from the Kerr-McGee site at Cushing, have been identified.¹ Plutonium contamination was confined, primarily, to the interior surfaces of the Mixed Oxide Plant. Isolated locations of elevated plutonium activity were identified in the soil areas immediately adjacent to that building and no elevated levels of plutonium were identified in the survey of

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the Sanitary Lagoons.^{2,3} Therefore, plutonium is not considered as a likely contaminant in these soil areas.

The restricted area south of the Uranium Plant (Building 1) contained the Tank Storage Facility (Building 2), the Solvent Extraction Facility (Building 3), the UF₆ Receiving Area (Vaporizer Room in Building 1), and adjacent yard areas. During site operations, spills and overflows occurred, resulting in the contamination of soil beneath the flooring in these structures and the adjacent yard areas.

Remediation of the South Uranium Yard area was initiated with the removal of Buildings 2 and 3 in 1989 and 1990. The concrete floor of the Vaporizer Room was removed in 1992 and soil characterization was performed from May to June 1992. The South Uranium Yard areas were characterized during 1993.⁴

Contaminated soil at this facility was characterized and sorted into Option 1, Option 2, and Option 4 categories, according to the NRC Branch Technical Position on "Disposal or Onsite Storage of Thorium and Uranium Wastes from Past Operations".⁵ The Option 1 soil was left in place. Option 2 soil has been stockpiled, in anticipation of being permanently relocated to the on-site disposal cells. Option 4 soil has been removed and sent for off-site disposal.

On May 4 and 5, 1994, the Environmental Survey and Site Assessment Program (ESSAP) performed a confirmatory survey of two Option 2 soil piles, adjacent to the Uranium Plant.⁶ Since the time of that survey, further soil excavation at the site has resulted in the establishment of one additional Option 2 soil pile.

The U.S. Nuclear Regulatory Commission, Division of Waste Management (NMSS), has requested that the Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education (ORISE) perform an independent confirmatory survey of the South Uranium Yard area and the new Option 2 soil pile at the Kerr-McGee Cimarron Facility, in Crescent, Oklahoma.

SITE DESCRIPTION

The Kerr-McGee Corporation, Cimarron facility is located on a site of approximately 450 hectares in Logan County, Oklahoma, about 8 kilometers south of Crescent (Figure 1). The main facilities at this site were the Uranium Plant and the Mixed Oxide Plant. Directly south of the Uranium Plant, the South Uranium Yard remediation includes the soil area beneath the Vaporizer Room, the excavated soil area beneath the former Building 2 location, and adjacent yard areas (Figure 2). Additionally, the Option 2 soil stockpile, created since the time of the last ESSAP survey, is located on-site.

OBJECTIVES

The objectives of the confirmatory survey are to provide independent document reviews and radiological data for use by the NRC in evaluating the adequacy and accuracy of the licensee's procedures and radiological survey results.

RESPONSIBILITY

Work described in this survey plan will be performed under the direction of William L. (Jack) Beck, Program Director and Eric Abelquist, Project Leader with ESSAP. The cognizant site supervisor has the authority to make appropriate changes to the survey procedures as deemed necessary. After consultation with the NRC site representative, the scope of the survey may be altered based on findings as the survey progresses.

DOCUMENT REVIEW

ESSAP has reviewed the licensee's survey report on the South Uranium Yard remediation and provided verbal comments to the NRC.⁴ Procedures and methods utilized by the licensee were reviewed for adequacy and appropriateness. The data were reviewed for accuracy, completeness and compliance with guidelines.

PROCEDURES

Survey activities will be conducted in accordance with the ORISE/ESSAP Survey Procedures and Quality Assurance Manuals. Specific survey procedures applicable to this survey are listed on Pages 7 and 8 of this survey plan. Deviations to the survey plan or procedures will be documented in the site log book.

SURVEY PROCEDURES

Reference Grid

The reference grid system established by the licensee will be used by ESSAP. Measurement and sampling locations on ungridded surfaces will be referenced to prominent site features or the existing grid.

Surface Scans

Exterior soil surfaces will be scanned for gamma radiation using NaI scintillation detectors. A 25 to 50% scan of the soil within the South Uranium Yard, and a 25% scan of the soil within the Option 2 soil pile, will be performed. All detectors will be coupled to ratemeters or ratemeter-scalers with audible indicators. Locations of elevated direct radiation will be marked for further investigation.

Exposure Rate Measurements

A minimum of six locations for area background exposure rate measurements will be selected within a 0.5 to 10 km radius of the site. Site exposure rate measurements will be performed at each soil sample location within the South Uranium Yard. Exposure rate measurements will be performed at 1 m above the surface using a microrem meter.

Soil Sampling

Background soil samples will be collected from each location of external background exposure rate measurement.

A total of twenty (20) surface and subsurface soil samples will be collected at randomly selected locations from the soil excavation beneath the Vaporizer Room, the excavated soil area beneath the former Building 2 location, and adjacent yard areas. Soil samples will also be collected from any exterior locations of elevated direct radiation identified by surface scans.

Approximately ten (10) soil samples will be collected from the soil stockpile that resulted from recent soil excavation work.

Confirmatory Analyses

Five to eight soil samples will be selected from the licensee's sample archive. The basis for selection of these samples is to provide a range of activities, from approximately 100 to 400 pCi/g total uranium. Analytical results for these samples will be compared to those reported by the licensee and a determination made as to whether the results are comparable.

SAMPLE ANALYSIS AND DATA INTERPRETATION

Samples and data will be returned to ORISE's ESSAP laboratory in Oak Ridge, Tennessee for analysis and interpretation. Soil samples will be analyzed by gamma spectrometry and a limited number of samples will also be analyzed by alpha spectrometry. The radionuclides of interest are U-235 and U-238; however, spectra will be reviewed for other identifiable photopeaks. Gamma spectrometry data will be reported in pCi/g. Exposure rate measurements will be recorded in units of $\mu\text{R/h}$. The data generated will be compared with the licensee's documentation and NRC guidelines established for release to unrestricted use. Results will be presented in a draft report and provided to the NRC for review and comment.

GUIDELINES

The primary contaminant of concern for this site is enriched uranium. The generic guidelines for residual concentrations of uranium in soil are provided in the NRC Branch Technical Position on "Disposal or Onsite Storage of Thorium and Uranium Wastes from Past Operations".⁵ Specifically, the Option 1 average soil guideline for enriched uranium is 30 pCi/g, and the Option 2 average soil guideline is 100 pCi/g.

The exposure rate guideline, measured at 1 m from the surface, is 5 μ R/h above background.

TENTATIVE SCHEDULE

Measurement and Sampling	April 24 - 26, 1995
Sample Analysis	May 1995
Draft Report	June 1995

LIST OF CURRENT PROCEDURES

Applicable procedures from the ORISE ESSAP Survey Procedures Manual (Revision 8; December 31, 1993) include:

- Section 5.0 Instrument Calibration and Operational Check-Out
 - 5.1 General Information
 - 5.2 Electronic Calibration of Ratemeters
 - 5.3 Gamma Scintillation Detector Check-Out and Cross-Calibration
 - 5.5 GM Detector Calibration and Check-Out
 - 5.13 Field Measuring Tape Calibration
- Section 6.0 Site Preparation
 - 6.2 Reference Grid System
- Section 7.0 Scanning and Measurement Techniques
 - 7.1 Surface Scanning

7.5 Gamma Radiation (Exposure Rate) Measurement

Section 8.0 Sampling Procedure

8.1 Surface Soil Sampling

8.2 Subsurface Soil Sampling

8.8 Miscellaneous Sampling

8.9 Sample Identification and Labeling

Section 9.0 Integrated Survey Procedures

9.2 General Survey Approaches and Strategies

Section 10.0 Health and Safety Control of Cross Contamination

Section 11.0 Quality Assurance and Quality Control

Applicable procedures from the ORISE/ESSAP Quality Assurance Manual (Revision 7; January 31, 1995) include:

Section 5 Training and Certification

Section 6 Equipment and Instrumentation

Section 7 Quality Control

Section 8 Sample Chain-of-Custody

Section 9 Data Management

Section 10 Data Review and Validation

Section 11 Records Handling and Storage

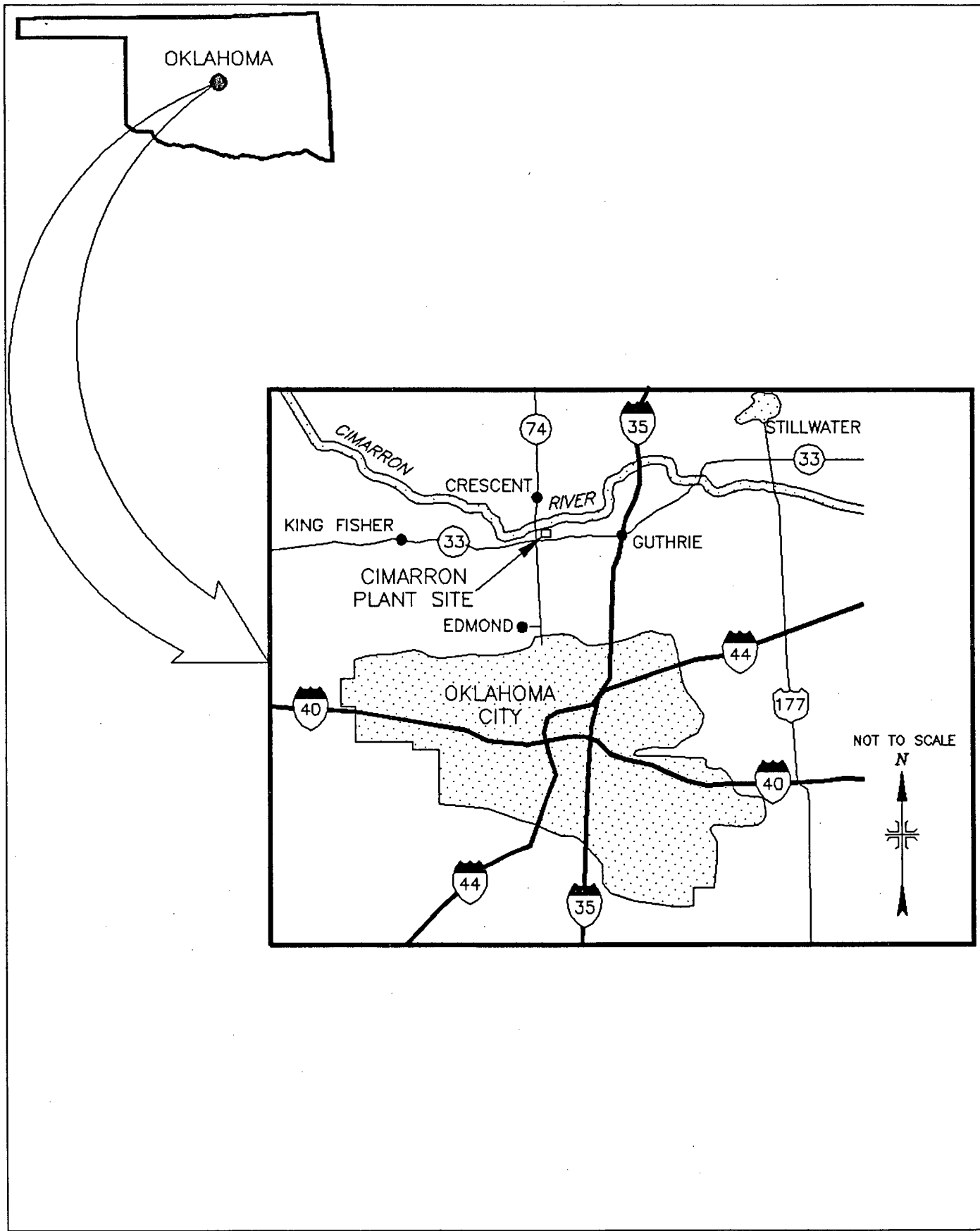


FIGURE 1: Location of the Cimarron Facility, Crescent, Oklahoma

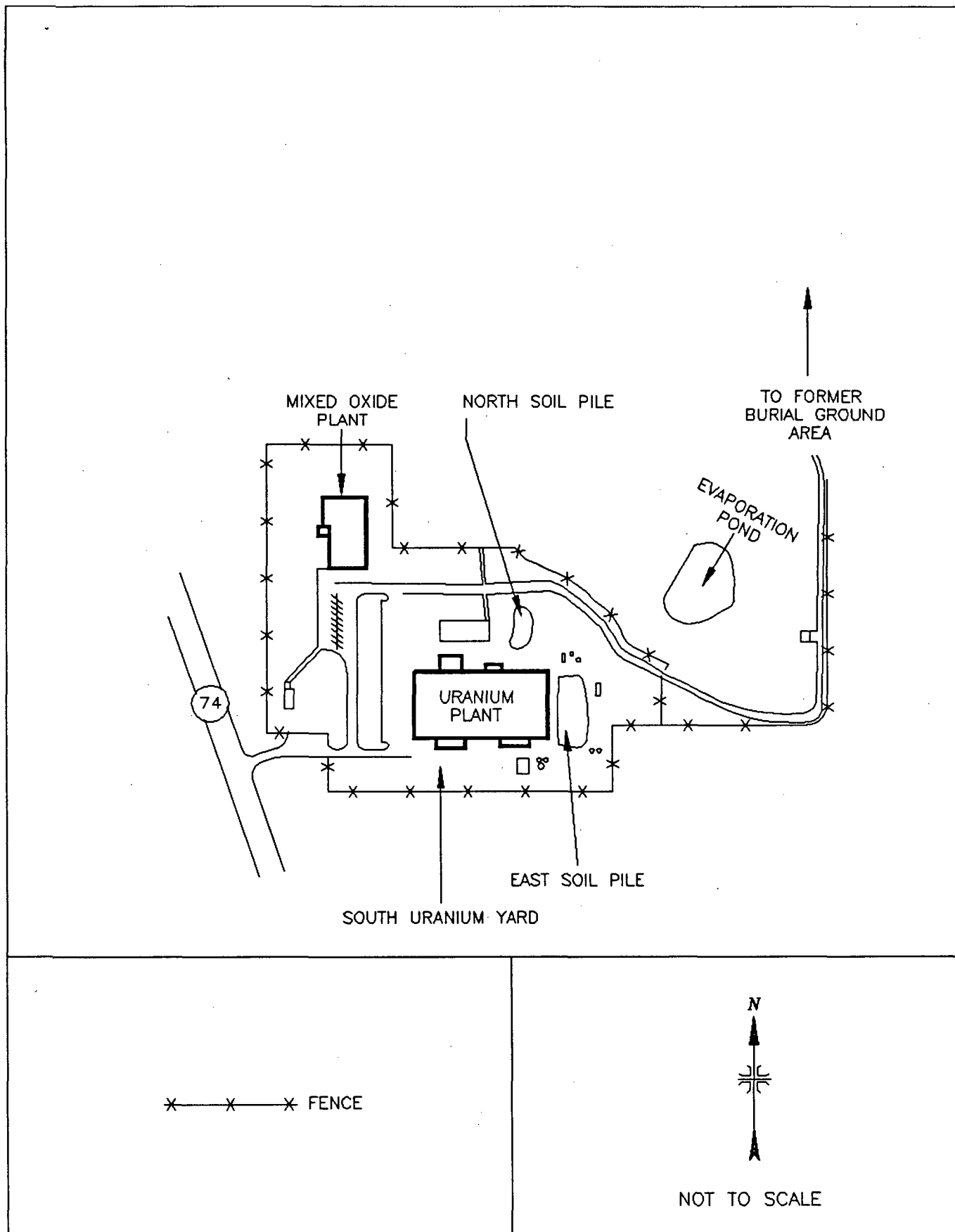


FIGURE 2: The Cimarron Facility - Plot Plan

REFERENCES

1. Cimarron Corporation, "Report of Characterization of Option 2 Stockpiled Soil," prepared by Karen Morgan, May 4, 1994.
2. Oak Ridge Institute for Science and Education, "Confirmatory Survey of the Cimarron Corporation Mixed Oxide Fuel Fabrication Plant, Crescent, Oklahoma," January 1991.
3. Oak Ridge Institute for Science and Education, "Confirmatory Radiological Survey of the Sanitary Lagoons at the Cimarron Corporation Facility, Crescent, Oklahoma," November 1991.
4. Cimarron Corporation, "Report on the South Uranium Yard Remediation at the Cimarron Facility," November 1994.
5. U.S. Nuclear Regulatory Commission, "Disposal or Onsite Storage of Thorium and Uranium Wastes from Past Operations," 46 FR 52061, Washington, D.C., October 23, 1981."
6. Oak Ridge Institute for Science and Education, "Confirmatory Radiological Survey of Two Soil Piles Proposed for On-Site Storage, Kerr-McGee Corporation, Cimarron Facility, Crescent, Oklahoma," October 1994.

Attachment A

SPENDING PLAN		PERFORMANCE PERIOD		
		From	To	
Name of Laboratory: Oak Ridge Institute for Science and Education		Apr-95	Jun-95	
		RFTA	Est. Project Cost	
Title of Project: # Cimarron-South Uranium YA			\$53,100.00	
		NRC Fin Number	ORISE Number	
TAC Number:		A9076	1286.02	
COST ELEMENTS	Oct-94	Nov-94	Dec-94	Jan-95
Direct Costs	\$0.00	\$0.00	\$0.00	\$0.00
Indirect Costs- (G&A, DOE Factor)	\$0.00	\$0.00	\$0.00	\$0.00
Total Estimate Costs	\$0.00	\$0.00	\$0.00	\$0.00
Project Completion	0.00%	0.00%	0.00%	0.00%
COST ELEMENTS	Feb-95	Mar-95	Apr-95	May-95
Direct Costs	\$0.00	\$0.00	\$20,550.00	\$14,940.00
Indirect Costs- (G&A, DOE Factor)	\$0.00	\$0.00	\$7,730.00	\$5,590.00
Total Estimate Costs	\$0.00	\$0.00	\$28,280.00	\$20,530.00
Project Completion	0.00%	0.00%	53.26%	91.92%
COST ELEMENTS	Jun-95	Jul-95	Aug-95	Sep-95
Direct Costs	\$3,120.00	\$0.00	\$0.00	\$0.00
Indirect Costs- (G&A, DOE Factor)	\$1,170.00	\$0.00	\$0.00	\$0.00
Total Estimate Costs	\$4,290.00	\$0.00	\$0.00	\$0.00
Project Completion	100.00%	100.00%	100.00%	100.00%
ACTIVITY INFORMATION	Hours	Estimated Cost		
Site Visit	0.0	\$0.00		
Document Review	5.0	\$1,100.00		
Presurvey	20.0	\$4,600.00		
Travel- Labor	32.0	\$7,300.00		
Travel- Other Expenses		\$4,500.00		
Survey Activities	66.0	\$15,100.00		
Report Preparation	50.0	\$11,800.00		
Sample Analysis		\$8,700.00		
Other		\$0.00		
Total	173.0	\$53,100.00		