



**KERR-McGEE CORPORATION**

KERR-McGEE CENTER • OKLAHOMA CITY, OKLAHOMA 73125

ENVIRONMENT AND HEALTH MANAGEMENT DIVISION

April 19, 1994

EDWIN T. STILL, DVM  
VICE PRESIDENT AND DIRECTOR

Mr. David N. Fauver, Project Manager  
Facilities Decommissioning Section  
Division of Low-Level Waste Management  
and Decommissioning  
Office of Nuclear Material Safety  
and Safeguards  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

Re: Docket No. 70-0925  
License No. SNM-928  
Cimarron Facility Soil Disposal Plan

Dear Mr. Fauver:

Cimarron facility submits herein four copies of the plan the facility will follow for the on-site disposal of contaminated soil meeting the Branch Technical Position Option 2 criteria.

Cimarron requests prompt consideration of this plan and issuance of the license amendment approving on-site disposal in accordance with Cimarron's long standing application and the Commission's finding of no significant impact associated with the disposal (59 FR 13513, 22 March 94). The plan is consistent with our understanding of the conditions and restrictions recommended in the Environmental Assessment, as summarized in the Register notice.

Cimarron hopes this matter can be resolved quickly. We are available to meet with you and other Commission officials to address any further issues or concerns that may be outstanding. Please call me at 405/270-2934 to arrange the time and attendees if a meeting is indicated.

Sincerely,

ETS:lld

Attachment

copy with attachment:  
John H. Austin - NRC  
Gary Comfort - NRC  
J. Kegin/K. Morgan  
R. Smith

RECEIVED BY

APR 20 1994

R.R. SMITH

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## 1.0 INTRODUCTION

This plan provides for the surveying, sorting, on-site transportation and on-site disposal of Branch Technical Position Option 2 materials at the Cimarron Facility. Branch Technical Position Option 2 materials and on-site disposal are addressed in "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations", 46 Federal Register, No. 205, Friday, October 23, 1981.

## 2.0 REFERENCES

- 2.1 NRC Branch Technical Position "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations" (46-FR-205, pp 52601-52063, 10/23/81).
- 2.2 Monitoring for Compliance with Decommissioning Termination Survey Criteria (NUREG/CR-2082, June, 1981)
- 2.3 Manual for Conducting Radiological Surveys in Support of License Termination (NUREG/CR-5849, Draft, 1992)
- 2.4 Onsite Disposal of Radioactive Waste (NUREG-1101, Vol. 1, March, 1986)
- 2.5 Cimarron Facility Radiation Safety Procedures - KM-NC-10-61, KM-NC-10-62, KM-NC-10-63, KM-NC-10-64, KM-NC-10-3, KM-NC-10-4, KM-NC-10-71, KM-NC-10-72, KM-NC-10-77, KM-NC-10-78, KM-NC-10-85, KM-NC-10-86, KM-NC-20-2, KM-NC-10-101, KM-NU-15-2
- 2.6 License No. SNM-928

## 3.0 RESPONSIBILITIES

- 3.1 Facility Manager and/or designated alternate (Project Manager):
  - 3.1.1 Reports to the Vice-President of Cimarron Corporation.
  - 3.1.2 Responsible for overall administration of all on-site activities for the Cimarron facility.
  - 3.1.3 Responsible for changes made to this procedure.
  - 3.1.4 Responsible for notifying the Vice-President of any situation which is unsafe or which could result in any operation which is in violation of procedures or existing regulations.

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3.1.5 Ensures that Option 2 materials placed in the on-site disposal cell are in compliance with guidelines in this plan and other health physics procedures.

3.1.6 Signature authority for approval of this plan and other related procedures.

**3.2 Radiation Safety Officer**

3.2.1 Reports to the President of Cimarron Corporation.

3.2.2 Responsible for performing routine reviews of operations (sampling data, survey data, disposal data, controlled areas, etc.) to ensure verification of conformance of operations with this procedure.

3.2.3 Responsible for notifying the Facility Manager of situations believed radiologically unsafe or that could result in operations in violation of procedures or existing regulations.

3.2.4 Responsible for recommending solutions to quality related problems and the verification that such approved solutions are effectively implemented.

3.2.5 Responsible for reviewing sampling and analytical data generated during on-site disposal of the Option 2 material.

3.2.6 Responsible for ensuring that Option 2 materials placed in the on-site disposal cell are in compliance with guidelines set forth in this plan and other health physics procedures.

3.2.7 Signature authority for approval of this plan and other related procedures.

**3.3 Health Physics Supervisor:**

3.3.1 Reports to the Facility Manager.

3.3.2 Reports to the Radiation Safety Officer for matters involving radiological safety.

3.3.3 Provides overall day to day supervision of Health Physics staff operations.

3.3.4 Responsible for notifying the Facility Manager of situations believed unsafe or that could result in operations not addressed by existing procedures.

3.3.5 Provides specialized Radiation Protection training to health physics staff as required.

3.3.6 Responsible for ensuring that survey, sampling and analytical records associated with on-site disposal operations are consolidated, indexed and prepared for retention until the license for the facility is terminated.

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3.3.7 Responsible for attaching survey and analytical results to each "Option 2 Material Data Sheet" and for maintaining such records.

3.3.8 Responsible for ensuring that Option 2 materials placed in the on-site disposal cell are in compliance with guidelines set forth in this plan and other health physics procedures.

3.3.9 Provides Radiation Protection and Industrial Safety training for employees and contractor personnel associated with on-site Option 2 material disposal operations.

**3.4 Health Physics staff:**

3.4.1 Report to the Health Physics Supervisor

3.4.2 Provide survey and sample counting activities as required.

3.4.3 Document and report data collected for on-site Option 2 material disposal.

3.4.4 Provide surveys and documentation of such surveys for contractor equipment utilized under this procedure.

3.4.5 Utilize and maintain air monitoring equipment at locations where excavation, loading, and disposal operations are conducted.

3.4.6 Responsible for notifying the Health Physics supervisor of situations believed unsafe or that could result in operations not addressed by existing procedures.

3.4.7 Responsible for notifying the Radiation Safety Officer and the Quality Coordinator of any conditions not in compliance with this plan or existing procedures.

3.4.8 Maintain radiation detection instrumentation and health and safety equipment in a safe and operable condition.

3.4.9 Provide direction to radiation workers on methods of contamination control.

**3.5 Decontamination Supervisors:**

3.5.1 Report to the Facility Manager.

3.5.2 Responsible for notifying the Facility Manager of situations believed unsafe or that could result in operations not addressed by existing procedures.



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- 3.5.3 Responsible for the safe loading and unloading of Option 2 materials and the acquisition and documentation of data required to confirm compliance with loading and unloading of Option 2 materials as defined in this plan.
- 3.5.4 Responsible for ensuring that activities defined in section 6.0 and section 8.0 are completed and that documentation is maintained.

### 3.6 Quality Coordinator

- 3.6.1 Reports to the President of Cimarron Corporation.
- 3.6.2 Responsible for performing random quality checks of operations, to include review of sampling data, survey data, disposal cell data, training records, maintenance of restricted areas and other activities, to ensure independent verification of conformance of operations with this plan.
- 3.6.3 Responsible for reviewing at least on a weekly basis sampling and analytical data generated during on-site disposal of the Option 2 material and the maintenance of the records relating to the disposal.
- 3.6.4 Responsible for reporting to the President of Cimarron Corporation appropriate findings and recommendations.

### 3.7 All Other Personnel:

- 3.7.1 Observe and comply with this plan and other Cimarron facility procedures.
- 3.7.2 Ensure that personal monitoring and safety equipment is operable and used in the proper manner.
- 3.7.3 Immediately report unsafe conditions or practices to the supervisor.
- 3.7.4 Suggest improvements to enhance the overall safety of operations.

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#### **4.0 DEFINITIONS**

##### **4.1 Option 2 Material**

For the purpose of this plan, Option 2 Material to be disposed of on-site is defined as soil with limited inorganic rubble and debris (e.g. rocks, construction materials, small metal materials) contaminated with enriched uranium such that the average concentration of uranium in the disposed material is less than or equal to 100 pCi/g and the maximum concentration is less than or equal to 250 pCi/g. The average concentration limit of 100 pCi/g is based upon uranium solubility of 100%, and may be adjusted upward, not to exceed 250 pCi/g, on the basis of actual solubility determined.

##### **4.2 Restricted Area**

For the purpose of this plan, the restricted area is defined as the areas where the Option 2 materials are identified or have been stockpiled, the road from the stockpiled Option 2 materials to the on-site disposal area and the disposal area. There are other restricted areas at the facility which will not be affected by operations related to on-site disposal of Option 2 Materials,

##### **4.3 Disposal Area**

The Disposal Area is located within the Cimarron facility boundary and is approximately 0.75 miles northeast of the uranium plant. The area has been approved by the Nuclear Regulatory Commission for burial of the Option 2 materials pursuant to 10 CFR 20.2002.

##### **4.4 Stockpiled Material**

Stockpiled Material refers to Option 2 material identified, excavated and sorted during previous building and area decontamination activities and placed in discrete piles for on-site disposal in the Disposal Area.

##### **4.5 In Situ Material**

In Situ Material refers to Option 2 material to be identified, excavated and sorted during remaining building and area decontamination activities and collected for on-site disposal in the Disposal Area.

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## 5.0 PRECAUTIONS

### 5.1 Protective Clothing

- 5.1.1 Coveralls, safety shoes and safety glasses (or other approved eye protection) shall be worn by personnel working in the restricted areas defined in this plan. Smocks shall be worn to enter restricted areas to get supplies, non-contaminated equipment, or during inspections/tours. Gloves shall be worn when handling contaminated or potentially contaminated equipment.
- 5.1.2 Smocks may be worn by health physics personnel, supervisors, and other individuals unless such personnel are engaged in work with contaminated materials.
- 5.1.3 Visitors shall wear smocks and safety glasses when in the restricted area. Contractor personnel shall wear protective clothing equal to that required for company employees, unless otherwise directed by Health Physics.
- 5.1.4 Protective clothing requirements, equipment requirements and any other special instructions shall be posted at the designated personnel and equipment entrances to the restricted area.

### 5.2 Training

- 5.2.1 All site personnel are required to have radiation safety orientation training which includes instruction on radiation safety practices, procedures, instrumentation and emergency procedures prior to being permitted to work in the restricted area. After initial radiation safety orientation training, such training shall be performed on an annual basis.
- 5.2.2 All radiation workers are required to participate in a radiation safety lecture at least on a quarterly basis.
- 5.2.3 All site personnel shall receive training on this plan and related procedures prior to commencing work.
- 5.2.4 Records of training will be maintained for all personnel receiving training.

### 5.3 Radiation Safety

- 5.3.1 All levels of management are responsible for overall safety of the operations. Each supervisor is responsible for the safety of employees and work locations under his/her supervision and for assuring that personnel exposure to radioactive materials is kept as low as reasonably achievable (ALARA).

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5.3.2 Health physics personnel shall be available when work is conducted which involves or likely could involve exposure to radioactive materials. Each supervisor is responsible for assuring that required health physics personnel are present when such work is conducted.

5.3.3 Each employee is responsible for radiation safety and is expected to perform work in a manner that will minimize exposure to radiation and the spread of contamination.

#### 5.4 Personnel Monitoring

5.4.1 The radiation detection device utilized for monitoring personnel external exposure consists of a film badge with indium foil. The film badges are changed out monthly and individual exposures are tracked and reviewed by the RSO to ensure compliance with 10 CFR 20, Subpart C.

5.4.2 An individual entering the restricted area shall be issued and required to wear a film badge.

5.4.3 Bioassay samples (urine) will be taken from personnel working in the restricted area.

#### 5.5 Radiological Surveys

5.5.1 Radiological surveys shall be conducted on a routine basis within the restricted area while work is in progress to determine exposure rates and contamination levels (fixed and removable as appropriate). These surveys will be performed to monitor work in progress and the overall effectiveness of the radiation control program.

5.5.2 Equipment used in the restricted area shall be surveyed prior to leaving the restricted area. Contamination shall be removed as necessary to meet the facility unrestricted release criteria. The authorization to remove an item or equipment from the restricted area must be given and documented by health physics personnel.

#### 5.6 Air Sampling

5.6.1 Monitoring for airborne radioactive material shall be conducted by filtering air through commercial portable air samplers. The filters are subsequently analyzed for airborne concentrations of radioactive material. Air samples will be collected in work areas within the restricted area, as well as downwind from operations, when work is in progress.

5.6.2 At least one of the personnel working in the restricted area shall wear a lapel air sampler for monitoring the breathing zone air in the immediate work area when work is in progress.

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## 5.7 Quality Control for Analytical Equipment Operation

- 5.7.1 The confirmatory methodology and quality control for soil sample assays at the Cimarron facility has been accomplished through the use of a gamma pulse height analysis system. This system has been demonstrated to be satisfactory for the analysis of soil samples contaminated with uranium isotopes from past operations, as documented by numerous confirmatory surveys and evaluations completed by Oak Ridge Institute for Science and Education (ORISE). Additional quality checks will be performed prior to the initiation of this project to provide additional assurances with regard to the accurate characterization and disposal of on-site Option 2 materials.
- 5.7.2 Three (3) random soil samples will be taken from the stockpile of Option 2 soil material. The soil samples will be split into three equal homogeneous portions to be analyzed by two independent off-site laboratories and by the on-site facility laboratory. The samples will be analyzed by the offsite laboratories for uranium, thorium, plutonium and associated daughters. The uranium analysis results from the off-site independent laboratories will be compared to the on-site laboratory uranium results to provide additional verification of the analytical accuracy of the on-site facility laboratory.
- 5.7.3 The sodium iodide (NaI) detector used as the dirt probe will be calibrated in counts per minute (CPM) to correspond to Option 2 material concentrations over a range to include 30 pCi/g, 100 pCi/g and 250 pCi/g.
- 5.7.4 Survey and analytical equipment requiring annual or semi-annual calibration to be utilized throughout the duration of this project will be calibrated prior to the initiation of the project.
- 5.7.5 One composite sample per week representing at least one daily transport vehicle load of Option 2 material disposed in the disposal cell will be sent to an offsite independent analytical laboratory for analysis for uranium to provide continuing verification checks.

## 6.0 CHARACTERIZATION OF OPTION 2 MATERIAL

- 6.1 Surface and Subsurface areas with contamination levels exceeding Option 1 of the BTP (30 pCiU/g of soil) are identified by systematic scans and borehole sampling or logging using gamma detectors (NaI crystal).
- 6.2 Identified areas are excavated (mainly with mechanical equipment) and the removed soil probed with a 1 1/2 inch by 4 inch NaI detector encased in a 2 inch diameter PVC pipe with a brass pointed end connected to a Ludlum 2220 count rate meter (or equivalent).

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- 6.3 Excavated soil is initially sorted into BTP Option Categories 1, 2 or greater than 2 on the basis of the probe counts, using sort points determined by calibration of the probe in individual drums filled with soil uniformly contaminated with a specific concentrations of enriched uranium and the solubility of the contamination.
- 6.4 Soil samples are collected during excavation and analyzed in the facility soil counter (gamma spec system) to determine the definitive concentration.
- 6.5 On the basis of multiple previous solubility determinations, solubility has been conservatively set at 50% and the Option 2 concentration range as 30 to 150 pCi/g.
- 6.6 The stockpiled Option 2 Material will be further characterized prior to disposal in the following manner:
  - 6.6.1 The stockpile will be leveled by grading, the height determined and a 5 X 5 meter grid established.
  - 6.6.2 The stockpiles will be drilled at the intersections of each 5 X 5 meter block and soil aliquots taken from each vertical 0.5 meter interval.
  - 6.6.3 Each soil aliquot will be analyzed for uranium on the facility Soil Counter System and not less than two percent of the samples will be randomly selected, packaged and shipped to a certified laboratory for analysis for uranium, thorium, plutonium and naturally occurring radionuclides for quality assurance purposes.
  - 6.6.4 Any area of the stockpiled material determined to exceed 150 pCi/g will be further defined by sampling on a five-meter triangular grid.
  - 6.6.5 The results of the soil aliquot analyses will be recorded and statistical evaluations performed to determine the average, range and distribution of the contamination and location within the stockpile and for preparation of a loading plan if a loading plan is judged beneficial for achieving optimal material placement in the disposal cell.
  - 6.6.6 The statistical evaluation will guide the placement of the stockpiled soil into the Disposal Area such that material with the higher concentration is placed at the greater depths and the distribution of contamination is reasonably uniform.
- 6.7 Remaining In Situ Material that is excavated normally will not be stockpiled, but will be transported directly to the Disposal Area following the soil analysis on the Soil Counter System.
- 6.8 The supervisor will review daily the loading plan if a plan has been judged beneficial and direct the transport vehicle loading accordingly.

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## **7.0 TRANSPORTATION OF OPTION 2 MATERIAL**

- 7.1 The supervisor at the loading area will direct the loading of the transport vehicles to assure the loading is consistent and will maintain in a log book a current record by date the loaded vehicle identification along with any remarks deemed pertinent, such as location from which loaded and appearance of the material.
- 7.2 The supervisor at the loading area will dispatch the transport vehicle to the disposal area after appropriate measures are taken to minimize the spread of contamination during dusty conditions.
- 7.3 The supervisor at the disposal area will direct the placement of the Option 2 material in the Disposal Area and will keep in a log book a current count of loads placed in the Disposal Area.
- 7.4 The road between the Option 2 stockpile area and the disposal area will be designated as part of the restricted area for the duration of the on-site disposal effort and vehicles and personnel exiting this restricted area must be surveyed prior to exiting to ensure that facility release limits are not exceeded.

## **8.0 DISPOSAL OF OPTION 2 MATERIAL**

- 8.1 Prior to placement of Option 2 material into the disposal cell, an as-built survey will be completed to verify the dimensions of the disposal cell and to locate reference markers on the disposal cell side walls for tracking the volume of soil placed in the trench. The markers will be placed at one foot intervals up the side walls of the disposal cell. A maximum Option 2 volume reference marker will be placed four feet below the final grade of the cell designating the maximum allowable elevation of Option 2 material to be placed in the disposal cell.
- 8.2 Option 2 materials placed in the disposal cell will consist of soil and limited inorganic rubble and debris contaminated with enriched uranium.
- 8.3 Option 2 materials transported to the disposal cell for disposal will be compacted in lifts nominally of three (3) to four (4) feet in depth. Rubber tired or track type equipment will be utilized for the spreading of the Option 2 material and to compact each lift prior to the placement of each subsequent lift.
- 8.4 During Option 2 material placement in the disposal cell, dust conditions shall be controlled.
- 8.5 A final as-built survey shall be performed for the Option 2 material placed within the disposal cell to verify that the maximum Option 2 material elevation is at least four feet below final cell grade. Cross sections shall be taken every 50 feet along the length of the disposal cell. This survey shall

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be used to complete the as-built drawing for waste placement and for determining the volume of Option 2 material placed within the disposal cell.

- 8.6 Upon the placement of the last transport vehicle load of Option 2 material into the disposal cell and the subsequent removal of transport vehicles and construction equipment utilized during Option 2 material placement within the disposal cell, the road from the disposal cell to the Option 2 stockpile area shall be surveyed by health physics personnel and decontaminated as required.

#### 9.0 DETERMINATION OF TOTAL OPTION 2 ACTIVITY DISPOSED OF ON-SITE

- 9.1 The final total activity in the cell will be calculated using the average concentration of uranium in pCi/g determined by soil counter analysis of the soil samples and the weight of the material placed in the disposal cell, which will be determined from the volume of the Option 2 material placed in the cell and the nominal density determined for the material.
- 9.2 The average concentration is not to exceed 100 pCi/g (or greater if solubility is analytically determined prior to disposal) when all Option 2 material has been placed in the disposal cell.

#### 10.0 RUN-ON / RUN-OFF CONTROL

- 10.1 Prior to placement of Option-2 material in the disposal cell, stormwater run-on dikes are to be constructed around the perimeter of the disposal cell in any area which requires run-on control.
- 10.2 Run-off from within the disposal cell will be collected in a basin constructed down gradient of the northwest entrance to the disposal cell. Water collected shall be sampled and analyzed for total uranium prior to discharge. Sample results will be recorded in a water discharge log book.

#### 11.0 DISPOSAL CELL CAP PLACEMENT

- 11.1 Option 2 material placement will be discontinued and construction of the disposal cell cap will begin when Option-2 material placement reaches the disposal cell marker representing four feet below cell surface grade.
- 11.2 At project completion, a relatively low permeability barrier shall be placed across the disposal cell access road cut at the northwest corner of the disposal cell.
- 11.3 The disposal cell will be constructed in phases until the Option 2 material disposal is completed. As each construction phase is filled to planned capacity, a final verification survey will be



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completed in accordance with guidance in Draft NUREG/CR 5849 (1992). After completion of the final verification survey, that construction phase will be covered by four feet of clean materials resulting from excavation of the subsequent phase.

- 11.4 The clean soil to be placed over the Option 2 material will be spread and compacted in nominal lifts of approximately two (2) feet in thickness ahead of the construction equipment to minimize to the extent practicable the contact of construction equipment with Option 2 material and prevent spread of contamination. A minimum of four (4) feet of soil will be placed above the disposed Option 2 material. Additional clean soil (over and above the four (4) feet) will be placed on top of the disposal cell cap to contour the cap to the minimum slope which provides adequate drainage consistent with conforming to the original shape of the ridge. At the completion of all grading, the cell will be seeded to control erosion.
- 11.5 A final engineering survey will be performed to determine the elevation of the disposal cell cap and to complete the as-built drawing.
- 11.6 A radiation survey at the surface and at one meter above the disposal cell cap will be performed by health physics personnel utilizing a 10 meter by 10 meter grid system. The radiation survey shall be performed with a micro-R meter to ensure that readings are at or below site background levels.
- 11.7 The corners of the disposal cell are to be permanently identified by a brass plate affixed to a sunken concrete post that depicts the amount of contained uranium in curie units.
- 11.8 Notification is to be placed on the land title depicting the location of the disposal cell and the type and quantity of radioactivity.

## 12.0 RECORD OF DISPOSAL

A narrative report will be prepared that provides a description of the associated activities involved in sampling, removing, relocating and disposing the Option 2 material. The narrative report will include a summation of the volume of Option 2 material disposed, the types and quantities of radionuclides contained in the on-site disposal cell, the time period over which the disposal occurred, the physical characteristics of the disposed Option 2 material and disposal cell identification. This report and all associated records of on-site disposal of Option 2 material shall be maintained until 3 years after the termination of the license.

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#### REVIEW AND APPROVAL LISTING

/s/ Karen Morgan DATE: \_\_\_\_\_  
Health Physics

/s/ Virgil Richards DATE: \_\_\_\_\_  
Decontamination Operations

/s/ Mickey Hodo DATE: \_\_\_\_\_  
Administrative/Accountability

/s/ Joseph Kegin DATE: \_\_\_\_\_  
Cimarron Facility Standby Manager

/s/ Terrence Moore DATE: \_\_\_\_\_  
Radiation Safety Officer

/s/ John C. Stauter DATE: \_\_\_\_\_  
Corporate Environmental Services

/s/ Edwin T. Still DATE: \_\_\_\_\_  
Vice President, Cimarron Corporation

/s/ Roy R. Smith DATE: \_\_\_\_\_  
President, Cimarron Corporation