



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TEXAS 76011-8064

June 1, 2001

S. Jess Larsen, Program Manager  
Kerr-McGee Corporation  
Kerr-McGee Center  
P.O. Box 25861  
Oklahoma City, Oklahoma 73125

SUBJECT: NRC INSPECTION REPORT 40-8006/01-01

Dear Mr. Larsen:

On May 9, 2001, the NRC completed an inspection of your Kerr-McGee Chemical, LLC, Technical Center site located in Oklahoma County, Oklahoma. The enclosed report presents the scope and results of this inspection.

The primary purpose of this inspection was to conduct an in-process review of your decommissioning efforts and radiological surveys at the Technical Center. The inspection included the collection and analysis of bias water and soil samples from the cavity of the former uranium test pits, the excavation pile, and nearby reference areas. The inspection also included a tour of your counting laboratory at your Cimarron site. This laboratory provides support to your decommissioning efforts at the Technical Center. No violations of NRC regulations were identified.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available **electronically** for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, please contact D. Blair Spitzberg, Ph.D. of my staff at (817) 860-8191.

Sincerely,

*/RA/*

Dwight D. Chamberlain, Director  
Division of Nuclear Materials Safety

Docket No.: 40-8006  
License No.: SUB-986

(cc on next page)  
cc w/enclosure:  
Mike Broderick, Director

Kerr-McGee Corporation

-2-

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**ENCLOSURE**

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket No.: 40-8006

License No.: SUB-986

Report No.: 40-8006/01-01

Licensee: Kerr-McGee Company

Facility: Kerr-McGee Chemical, LLC, Technical Center

Location: Intersection of NW 150<sup>th</sup> Street and State Highway 74  
Oklahoma County, OK

Dates: February 6 - May 9, 2001

Inspectors: E. M. Garcia, Health Physicist

Approved by: D. Blair Spitzberg, Ph.D., Chief  
Fuel Cycle & Decommissioning Branch

Attachments: Supplemental Information

ADAMS Entry: IR 04008006-01-01; on 02/06/01-05/09/01; Kerr-McGee  
Corporation; Technical Center. Decommissioning Report. No  
violations were identified.

## EXECUTIVE SUMMARY

Kerr-McGee Chemical, LLC, Technical Center  
NRC Inspection Report 40-8006/01-01

Kerr-McGee Corporation has notified NRC of their desire to decommission their Technical Center, located North of Oklahoma City, and terminate license SUB-986. At the Technical Center, the licensee possessed a series of calibration test pits containing uranium ores and its progeny. On July 11, 2000, Kerr-McGee Corporation submitted a decommissioning plan (DP) to the NRC. Based on the insufficient content of the DP as documented in the NRC's completeness review letter dated August 11, 2000, this plan was withdrawn on August 24, 2000, at which time the licensee stated their intent to revise their DP to include characterization and modeling of the pit area and to develop derived concentration guideline levels (DCGLs). The NRC determined however, that the licensee was authorized under their license to begin certain decommissioning activities including excavation of the test pits and disposal of buried material prior to approval of their DP. In early 2001, the licensee notified NRC Region IV that they had completed excavation of the test pits and were ready for any confirmatory measurements that NRC intended to conduct.

During this inspection, bias water and soils samples were taken in the cavity of the former uranium test pits, the excavation pile, and nearby reference areas. These samples were sent to NRC Region III for analysis. Contamination in the near surface groundwater was discussed; and the licensee's counting methodology was reviewed.

The licensee submitted a revised DP on April 5, 2001, but its review was not the subject of this inspection.

The conclusion on each major area examined is listed below:

### Near Surface Groundwater Contamination

- The licensee had established eight monitoring wells around the test pits. Sample results from these monitoring wells indicated that the test pits had not impacted the near surface groundwater. An unexplained source of contaminated water was seeping into the cavity generated during the removal of the uranium test pits. Total uranium concentrations in water samples collected and analyzed by the licensee at the west seep had been as high as 1270 pCi/l, but had trended down to 100 to 300 pCi/l by March 30, 2001. An Inspection Follow-up item (40-8006/0101-01) was open concerning the elevated west seep results, their cause, and whether they impact the adequacy of remediation (Section 2).

### Soils Analytical Laboratory

- The use of a spectrum fitting analytical method for soil sample analysis was found to be acceptable. Sample preparation and splitting was observed by the inspector and was found to be acceptable (Section 3).

In Process Confirmatory Survey

- The inspector collected water and soil samples from various locations: the excavation pile, the cavity of the former uranium test pits, and other nearby locations. With the exception of one water sample, NRC sample results were in agreement with the licensee measurements. The soil background as determined from NRC-collected samples were consistent with background levels previously determined by the licensee. An Inspection Follow-up Item was opened regarding the lack of agreement between the licensee and NRC analysis results on a water sample (Section 4).

## Report Details

### **1 Summary of Facility Status (88104)**

By letter dated January 7, 1999, Kerr-McGee Corporation notified NRC Region IV of the company's desire to decommission their Technical Center and terminate License SUB-986. The Technical Center is located North of Oklahoma City, near the intersection of NW 150<sup>th</sup> Street and State Highway 74 Oklahoma County, Oklahoma. At the Technical Center, the licensee had operated a series of calibration test pits containing uranium material, primarily ores and ore concentrates, that had been blended with natural sands to produce dilute known concentrations of uranium and its progeny. An open meeting between the licensee's staff, consultants and NRC representatives was held on January 22, 1999. The purpose of this meeting was to discuss issues associated with the decommissioning of the "test pits" and termination of the license. Subsequent to that meeting on July 11, 2000, the licensee submitted a Decommissioning Plan (DP). Based on the insufficient content of the DP as documented in the NRC's completeness review letter dated August 11, 2000, this plan was withdrawn on August 24, 2000. On August 24, 2000, another open meeting was held to discuss specific decommissioning and decontamination issues associated with the Technical Center. During that meeting the licensee stated that it was their intent to revise the DP to include characterization and modeling of the pit area and to develop derived concentration guideline levels (DCGLs). Also during that meeting, the NRC stated that the licensee was authorized under their license to begin certain decommissioning activities including excavation of the test pits and disposal of buried material prior to approval of their DP. In early 2001, the licensee notified NRC Region IV that they had completed excavation of the test pits and they were ready for any confirmatory measurements NRC intended to perform.

During this inspection, water samples and soil samples of the excavation pile and cavity of the former uranium test pits were collected; the contamination in the near surface groundwater was discussed; and the licensee's counting methodology was reviewed.

The licensee submitted a revised DP on April 5, 2001 which is under NRC review.

### **2 Near Surface Groundwater Contamination (83890)**

#### **2.1 Scope**

The inspector reviewed the information that had been provided in the original DP regarding the hydrology of the site and the location of eight monitoring wells that had been established around the former test pit area. The inspector also reviewed the results of well samples and surface water samples collected from the excavation of the former test pits, and interviewed the company hydrologist.

#### **2.2 Observations and Findings**

In a drawing included with the original DP, the licensee had indicated the relative locations of the monitoring wells with regard to the former test pits. This drawing also indicated the hydrological gradient around the test pit area. The drawing did not indicate

the depth of the wells or the extent of screening in the wells. During an interview with the company hydrologist, additional information about the wells was provided. Established wells were appropriately located to evaluate the hydrological conditions affecting the test pit area. That is, they appear to be at an appropriate depth and were appropriately screened although the well locations will also be considered as part of the DP review.

Measurements made in 1999 and 2000, indicated that the near-surface groundwater flowing across the test pit was divergent with some flowing to the west and some to the northwest. The licensee believes that the surface groundwater flow is relatively slow and not associated with the potable water aquifer. The licensee's hydrologist believes that the hydrological conditions have not changed since the test pits were established.

The inspector noted that the drawings submitted in the original DP incorrectly located the main water line. The company hydrologist stated that although the main water line may not be correctly indicated on the drawing, the location of the test pits in relation to the monitoring wells were correctly represented in the drawings. The licensee also stated that the revised DP would correctly indicate the location of the main water line.

Monitoring Wells 3, 4, 5 and 6 are up gradient from the test pits. Measurements made in 1999 and 2000 on these wells had concentrations of total uranium ranging from 9.8 to 16.8 pCi/l. The only well that appeared to be directly down gradient from the test pits had concentrations of 12.9 pCi/L total uranium. The licensee's hydrologist stated that although the concentrations on Monitoring Wells 1, 2 and 7 were higher (25.4 to 35.8 pCi/l) than those in the up gradient, these monitoring wells are not truly down gradient from the test pits and these values are within the background values seen in other areas of Oklahoma. The licensee believes these values do not indicate an impact on the surface groundwater by the test pits.

The licensee observed elevated total uranium values in the water that accumulated in the excavated cavity. The values have ranged from 158 to 1270.42 pCi/L. The highest values have been observed on the west end of the cavity in a seep. The licensee continued to remove soil from the west end of the cavity until reaching bed rock. The licensee attributes these elevated values to the uranium coming from small fractures in the bed rock. The licensee plans on continued sampling and monitoring of the accumulated waters in the excavated cavity. In November 21, 2000, the total uranium concentrations in a water sample collected at the west seep was 1270.42 pCi/l but the concentrations had trended down to around 100 to 300 pCi/l by March 30, 2001. An Inspection Follow-up item (40-8006/0101-01) was opened concerning the elevated west seep results, their cause, and whether they impact the adequacy of remediation.

At the conclusion of the site visit, the cavity remained open and the licensee continued to drain, sample and analyze the accumulating water.

## 2.3 Conclusions

The licensee had established eight monitoring wells around the test pits. Sample results from these monitoring wells indicated that the test pits had not impacted the near surface groundwater. An unexplained source of contaminated water was seeping into the cavity generated during the removal of the uranium test pits. Total uranium concentrations in water samples collected and analyzed by the licensee at the west seep had been as high as 1270 pCi/l, but had trended down to 100 to 300 pCi/l by March 30, 2001. An Inspection Follow-up item (40-8006/0101-01) was opened concerning the elevated west seep results, their cause, and whether they impact the adequacy of remediation

## 3 **Soils Analytical Laboratory (83890)**

### 3.1 Scope

The inspector toured the licensee's soils laboratory at their Cimarron facility. Sample preparation and splitting was observed. The analytical method used was discussed with licensee's contractors responsible for operating the laboratory.

### 3.2 Observations and Findings

The licensee used their Cimarron laboratory to do their soil sample analysis. This laboratory was operated by the licensee's contractor, NEXTEP Environmental.

The inspector observed the licensee's contractors dry and split the samples. The licensee used appropriate controls to prevent cross contamination and to maintain sample integrity.

The analytical method used at this laboratory is based on a total spectrum fitting and not photo peak identification. This method is described in PB 280 237, "Least-Square Resolution of Gamma-Ray Spectra in Environmental Samples," published by the Tennessee Valley Authority and the Environmental Protection Agency in August 1977. The licensee assumes that their samples only contained these four constituents: natural uranium, radium-226, thorium and potassium-40. Therefore, any observed spectrum must be the sum of these four spectra corrected for concentration of each individual constituent. By using a reiterative process and finding the best least-square fit, the concentration of each constituent is determined. The licensee had used this method for many years and it has been previously examined during other NRC inspections.

For many years the licensee had used a large 3-inch NaI(Tl) detector. However, they had recently placed in service a new 5-inch NaI(Tl) well detector that allowed very short sample count times. On the older detector system, the licensee routinely used a 15 minute count time. With the new system, the count time was 5 minutes. Appropriate minimum detectable concentrations (MDC) are achieved because unlike in traditional spectrum analysis where only the photons detected in the region of interest of the photo peak are considered, all detected photons are considered.

This analytical method was not calibrated for water samples. For water samples, the licensee dried an aliquot of the sample in a planchet and performed a gross alpha/beta count using a gas proportional counter.

### 3.3 Conclusions

The licensee used of a spectrum fitting analytical method for soil sample analysis which was found to be acceptable. Sample preparation and splitting was observed by the inspector and was found to be acceptable.

## 4 **In Process Confirmatory Survey (83890)**

### 4.1 Scope

To evaluate the effectiveness of the licensee's effort to remove contamination from the test pits, the inspector reviewed the licensee's internal reports and requested and observed licensee contractor staff collect water and soil samples for independent and confirmatory analysis. A total of 5 water samples and 20 soil samples were collected for this evaluation. Two of the water samples and five of the soil samples were collected in background reference areas. Two additional water samples were collected in what at first appeared to be suspect areas, but were in fact reference areas. The NRC analysis results and when possible their comparison to the licensee's results are listed below. Since the licensee does not have an approved decommissioning plan, the sample results could not be compared to specific radiological criteria for license termination.

### 4.2 Observations and Findings

#### a. Soil Samples

The inspector reviewed a licensee internal document titled "Description of Kerr-McGee Technical Center Test Pit Characterization and Excavation." A copy of this document is attached to this report. This document included several soil sample analysis results. These soil samples had been collected at the bottom of the pit, on the side walls of the pit, adjacent soils, and the test pit overburden/stockpile. This report did not include any information regarding water found in the pit or flowing into the pit.

On February 6, 2001, the inspector observed the licensee's contractor staff collect 15 soil samples at locations specified by the inspector from the excavation pile and from the former uranium test pits. These 15 samples were prepared, split, and analyzed by the licensee. The other split was sent to the NRC's Region III laboratory for analysis. Comparison results of the licensee's analysis with the NRC's analysis of the samples as presented in the following tables were all in agreement with at least one licensee detector, when compared using the criteria in NRC Inspection Procedure 84525, "Quality Assurance and Confirmatory Measurements."

**TABLE 1**  
**Acceptance Criteria<sup>1</sup>**

| Resolution <sup>2</sup> | Ratio <sup>3</sup> |
|-------------------------|--------------------|
| <4                      | 0.4 - 2.5          |
| 4 - 7                   | 0.5 - 2.0          |
| 8 - 15                  | 0.6 - 1.66         |
| 16 - 50                 | 0.75 - 1.33        |
| 51 - 200                | 0.80 - 1.25        |
| >200                    | 0.85 - 1.18        |

<sup>1</sup> Criteria from Inspection Procedure 84525, Quality Assurance and Confirmatory Measurements for In-Plant Radiochemical Analysis

<sup>2</sup> Resolution is the NRC result divided by its associated 1σ uncertainty.

<sup>3</sup> Ratio is the licensee result divided by NRC result.

**TABLE 2**  
**Sample Analysis Comparison of Soil Samples**  
**from the Excavation Pile and Pit of the Former Uranium Test Pits**  
**Collected on February 6, 2001**

| Sample # /Isotope    | KM Analysis<br>pCi/g <sup>1</sup> | NRC<br>Analysis<br>pCi/g <sup>1</sup> | Resolution <sup>2</sup> | Ratio <sup>2</sup> | Agreement<br>Status <sup>2,3</sup> |
|----------------------|-----------------------------------|---------------------------------------|-------------------------|--------------------|------------------------------------|
| <b>#6</b>            | <b>NW Seep Soil</b>               |                                       |                         |                    |                                    |
| U-238                | Not Measured                      | 1.57 ±0.1                             |                         |                    |                                    |
| U-Total(234,235,238) | 3.7 ±1.29 (Detector 1)            | 3.21 ±0.2                             | 17                      | 1.15               | <b>Acceptable</b>                  |
|                      | 3.5 ±0.56 (Detector 2)            |                                       | 17                      | 1.09               | <b>Acceptable</b>                  |
| <b>#7</b>            | <b>Mid Trench North</b>           |                                       |                         |                    |                                    |
| U-238                | Not Measured                      | 1.98 ±0.1                             |                         |                    |                                    |
| U-Total(234,235,238) | 3.2 ±1.35 (Detector 1)            | 4.05 ±0.2                             | 17                      | 0.79               | <b>Acceptable</b>                  |
|                      | 3.7 ±0.64 (Detector 2)            |                                       | 17                      | 0.91               | <b>Acceptable</b>                  |
| <b>#8</b>            | <b>Mid Trench South</b>           |                                       |                         |                    |                                    |
| U-238                | Not Measured                      | 4.46 ±0.8                             |                         |                    |                                    |
| U-Total(234,235,238) | 6.9 ±1.27 (Detector 1)            | 9.13 ±1.7                             | 5                       | 0.76               | <b>Acceptable</b>                  |
|                      | 8.3 ±0.63 (Detector 2)            |                                       | 5                       | 0.91               | <b>Acceptable</b>                  |
| <b>#9</b>            | <b>Mid Trench East</b>            |                                       |                         |                    |                                    |
| U-238                | Not Measured                      | 1.01 ±0.1                             |                         |                    |                                    |
| U-Total(234,235,238) | 0.1 ±1.23 (Detector 1)            | 2.07 ±0.1                             | 14                      | 0.05               | <b>Unacceptable</b>                |
|                      | 2.8 ±0.57 (Detector 2)            |                                       | 14                      | 1.35               | <b>Acceptable</b>                  |

|                      |                               |           |   |      |                   |
|----------------------|-------------------------------|-----------|---|------|-------------------|
| <b>#10</b>           | <b>1st Bench South Center</b> |           |   |      |                   |
| U-238                | Not Measured                  | <2.96     |   |      |                   |
| U-Total(234,235,238) | 1.9 ±1.4 (Detector 1)         | <6.06     |   |      |                   |
|                      | 3.7 ±0.65 (Detector 2)        |           |   |      |                   |
| <b>#11</b>           | <b>776N 76E</b>               |           |   |      |                   |
| U-238                | Not Measured                  | <1.80     |   |      |                   |
| U-Total(234,235,238) | 2.6 ±1.1 (Detector 1)         | <3.69     |   |      |                   |
|                      | 2.4 ±0.52 (Detector 2)        |           |   |      |                   |
| <b>#12</b>           | <b>765N 85E</b>               |           |   |      |                   |
| U-238                | Not Measured                  | <1.74     |   |      |                   |
| U-Total(234,235,238) | 4.2 ±1.06 (Detector 1)        | <3.56     |   |      |                   |
|                      | 2.7 ±0.5 (Detector 2)         |           |   |      |                   |
| <b>#13</b>           | <b>770N 95E</b>               |           |   |      |                   |
| U-238                | Not Measured                  | 1.8 ±0.5  |   |      |                   |
| U-Total(234,235,238) | 3.3 ±1.1 (Detector 1)         | 3.68 ±1.1 | 3 | 0.90 | <b>Acceptable</b> |
|                      | 2.1 ±0.46 (Detector 2)        |           | 3 | 0.57 | <b>Acceptable</b> |
| <b>#14</b>           | <b>762.5N 102.5E</b>          |           |   |      |                   |
| U-238                | Not Measured                  | <2.75     |   |      |                   |
| U-Total(234,235,238) | 2.6 ±1.06 (Detector 1)        | <5.63     |   |      |                   |
|                      | 2.7 ±0.51 (Detector 2)        |           |   |      |                   |
| <b>#15</b>           | <b>780N 101E 2nd Bench</b>    |           |   |      |                   |
| U-238                | Not Measured                  | <2.74     |   |      |                   |
| U-Total(234,235,238) | 2 ±1.06 (Detector 1)          | <5.60     |   |      |                   |
|                      | 2.4 ±0.52 (Detector 2)        |           |   |      |                   |
| <b>#16</b>           | <b>775N 95E 4th Bench</b>     |           |   |      |                   |
| U-238                | Not Measured                  | <3.50     |   |      |                   |
| U-Total(234,235,238) | 2 ±1.23 (Detector 1)          | <7.25     |   |      |                   |
|                      | 2.4 ±0.57 (Detector 2)        |           |   |      |                   |
| <b>#17</b>           | <b>777N 97.5E 3rd Bench</b>   |           |   |      |                   |
| U-238                | Not Measured                  | <1.49     |   |      |                   |
| U-Total(234,235,238) | 1.9 ±1.14 (Detector 1)        | <3.05     |   |      |                   |
|                      | 2.1 ±0.51 (Detector 2)        |           |   |      |                   |

| #18                  | Near Well #5           |       |  |  |  |
|----------------------|------------------------|-------|--|--|--|
| U-238                | Not Measured           | <1.59 |  |  |  |
| U-Total(234,235,238) | 1.9 ±1.2 (Detector 1)  | <3.26 |  |  |  |
|                      | 2.7 ±0.55 (Detector 2) |       |  |  |  |
| #19                  | 772.5N 117.5E          |       |  |  |  |
| U-238                | Not Measured           | <2.35 |  |  |  |
| U-Total(234,235,238) | 1.6 ±1.11 (Detector 1) | <4.80 |  |  |  |
|                      | 2.1 ±0.52 (Detector 2) |       |  |  |  |
| #20                  | 772.5N 122.5E          |       |  |  |  |
| U-238                | Not Measured           | <3.65 |  |  |  |
| U-Total(234,235,238) | 2.2 ±1.02 (Detector 1) | <7.46 |  |  |  |
|                      | 2.3 ±0.49 (Detector 2) |       |  |  |  |

<sup>1</sup> Kerr-McGee reported their uncertainties as two sigmas. NRC Region III laboratory reported their uncertainty as one sigma.

<sup>2</sup> Resolution, ratio and agreement status were determined from Acceptance Criteria Table above.

<sup>3</sup> Where NRC results were reported as < the respective value, no direct comparison was made with the corresponding licensee result.

b. Water Samples

On February 6, 2001, the inspector observed the licensee's contractor staff collect five water samples at locations specified by the inspector. These samples were collected inside the excavation pit of the former uranium test pits and at four other locations nearby. These five samples were prepared, split, and analyzed by the licensee. The other half of the split was sent to NRC's Region III for analysis by their laboratory. NRC Region III laboratory used gamma spectroscopy for analysis of the samples. The gamma emission of thorium-234 was used to quantify the uranium-238 present. Total uranium was determined from the relative radiological abundance of U-234 and U-235 to U-238. The results are presented in the following table. Only one result was compared using the criteria in NRC Inspection Procedure 84525, "Quality Assurance and Confirmatory Measurements." Where NRC results were reported as less than the respective value, no direct comparison was made with the corresponding licensee result. The one set of results that was compared using the criteria in NRC Inspection Procedure 84525 was found to be outside the acceptable range. The discrepancy between the licensee's and the NRC's results of the water sample analysis of the Northwest Seep could not be resolved during the inspection. This matter will be followed up as an Inspection Follow-up Item (40-8006/0101-02).

**TABLE 3**  
**Sample Analysis Comparison of Water Samples**  
**from the Pit of the Former Uranium Test Pits and other Nearby Locations**  
**Collected on February 6, 2001**

| Sample # /Isotope    | KM Analysis<br>pCi/ml <sup>1</sup>          | NRC<br>Analysis<br>pCi/ml <sup>1</sup> | Resolution <sup>2</sup> | Ratio <sup>2</sup> | Agreement<br>Status <sup>2,3</sup> |
|----------------------|---|--|-------------------------|--------------------|------------------------------------|
| <b>#1</b>            | <b>Northwest Seep bottom excavation pit</b> |  |                         |                    |                                    |
| U-238                | Not Measured                                | 1.38 ±0.1                              | 14                      |                    |                                    |
| U-Total(234,235,238) | 0.717 ±0.052                                | 2.82 ±0.2                              | 14                      | 0.25               | <b>Unacceptable</b>                |
| <b>#2</b>            | <b>East Water Main, Valve Box</b>           |  |                         |                    |                                    |
| U-238                | Not Measured                                | <0.73                                  |                         |                    |                                    |
| U-Total(234,235,238) | 0.013 ±0.007                                | <1.49                                  |                         |                    |                                    |
| <b>#3</b>            | <b>Northwest Section South Pond</b>         |  |                         |                    |                                    |
| U-238                | Not Measured                                | <0.70                                  |                         |                    |                                    |
| U-Total(234,235,238) | 0.013 ±0.007                                | <1.43                                  |                         |                    |                                    |
| <b>#4</b>            | <b>Technical Center Main Pond</b>           |  |                         |                    |                                    |
| U-238                | Not Measured                                | <0.93                                  |                         |                    |                                    |
| U-Total(234,235,238) | 0.018 ±0.008                                | <1.90                                  |                         |                    |                                    |
| <b>#5</b>            | <b>Lake Supply Well</b>                     |  |                         |                    |                                    |
| U-238                | Not Measured                                | <0.73                                  |                         |                    |                                    |
| U-Total(234,235,238) | 0.025 ±0.010                                | <1.49                                  |                         |                    |                                    |

<sup>1</sup> Kerr-McGee reported their uncertainties as two sigmas. NRC Region III laboratory reported their uncertainty as one sigma.

<sup>2</sup> Resolution, ratio and agreement status were determined from Acceptance Criteria Table above.

<sup>3</sup> Where NRC results were reported as < the respective value, no direct comparison was made with the corresponding licensee result.

c. NRC Collected Background Soil Samples

With the aid of the licensee's staff, the inspector collected soil samples in areas outside the licensee's controlled area that were not likely to have been impacted by licensed operations. These samples were split, prepared and analyzed by the licensee and the other half of the split was sent for analysis by NRC's Region III laboratory. The results of these analyses are listed below.

**TABLE 4**  
**Background Soil Sample**  
**Collected on February 6, 2001**

| Location  | KM Detector 1<br>Total U<br>pCi/g | KM Detector 2<br>Total U<br>pCi/g | NRC<br>U-238<br>pCi/g | NRC<br>Total U<br>pCi/g |
|---|-----------------------------------|-----------------------------------|-----------------------|-------------------------|
| South of North Section SW Pond                                | 1.8 ±1.10                         | 3.1 ±0.60                         | <1.96                 | <4.01                   |
| East of Tech Center Outside Property                          | 2.4 ±1.07                         | 2.2 ±0.51                         | <2.59                 | <5.31                   |
| Creek North of Esperanza Development                          | 3.5 ±1.41                         | 1.2 ±0.56                         | <3.34                 | <6.85                   |
| Southwest of South Bridge Access Road                         | 1.6 ±0.97                         | 2.3 ±0.49                         | <2.67                 | <5.47                   |
| South of Technical Center near Hwy. 74 & NW 150 <sup>th</sup> | 1.7 ±1.08                         | 2.2 ±0.44                         | <3.54                 | <7.25                   |

#### 4.3 Conclusions

The inspector collected water and soil samples from the excavation pile and cavity of the former uranium test pits, and from other nearby locations. The soil background as determined from NRC-collected samples, were consistent with background levels previously determined by the licensee. With the exception of one water sample and one soil sample, NRC sample results were in agreement with the licensee's measurements. The soil sample in non-agreement was counted using the licensee's detector 1 and was an isolated case. Other soil samples counted with detector 1 were in good agreement with NRC results. An Inspection Follow-up Item was opened regarding the lack of agreement between the licensee and NRC analysis results on a water sample.

#### 5 **Exit Meeting Summary**

On February 8, 2001, at the end of the site visit, an exit briefing was conducted onsite with the corporate radiation safety officer. On May 9, 2001, after the results of laboratory analysis of water and soil samples collected by the inspector were received and analyzed, a final telephonic exit briefing was conducted with the program manager. The licensee did not identify as proprietary any information provided to, or reviewed by, the inspector.

## ATTACHMENT 1

### SUPPLEMENTAL INFORMATION

#### **PARTIAL LIST OF PERSONS CONTACTED**

##### Licensee

J. Larsen, Program Manager  
D. Ezell, V.P. Research and Development  
K. Morgan, Corporate Radiation Safety Officer  
H. Gay, Project Supervisor (Technical Center)  
L. Smith, QA Coordinator  
J. Johnson, Sr. Safety Specialist

##### NEXTEP Environmental (Licensee Contractor)

S. Marshall, Contractor  
H. J. Newman, Health Physicist  
R. Callahan, Contractor  
W. A. Rogers, Contractor

#### **INSPECTION PROCEDURES USED**

IP 88104 Decommissioning Inspection Procedure for Fuel Cycle Facilities  
IP 83890 Closeout Inspection and Survey

#### **ITEMS OPENED, CLOSED AND DISCUSSED**

##### Opened

|                 |     |  |
|-----------------|-----|--|
| 40-8006/0101-01 | IFI | Elevated West Seep Results, Their Cause, and Whether They Impact the Adequacy of Remediation |
| 40-8006/0101-02 | IFI | Surface Water Sample Analysis Results Discrepancy  |

##### Closed

None

##### Discussed

None

#### **LIST OF ACRONYMS**

|       |  |
|-------|--|
| DCGLs | Derived Concentration Guideline Levels |
| DP    | Decommissioning Plan                   |
| MDC   | Minimum Detectable Concentration       |
| NRC   | Nuclear Regulatory Commission          |
| pCi/g | Pico-Curies per gram                   |
| pCi/l | Pico-Curies per liter                  |