



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TEXAS 76011-4005**

September 18, 2003

Douglas M. Finch, Program Manager  
Cimarron Corporation  
Kerr-McGee Center  
P.O. Box 25861  
Oklahoma City, Oklahoma 73125

**SUBJECT: NRC INSPECTION REPORT 070-00925/03-001**

Dear Mr. Finch:

An NRC inspection was conducted on June 24-27, 2003, at your Cimarron site near Crescent, Oklahoma, of activities authorized by NRC Special Nuclear Materials License SNM-928. On September 11, 2003, following our receipt and evaluation of water sample results from your contract laboratory, the lead inspector conducted a telephonic exit briefing with the manager, planning and regulatory compliance, project manager. The enclosed report presents the scope and results of that inspection.

This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of a review of your organization and management, radiation protection, solid radioactive waste management, transportation of radioactive materials, environmental protection, and corrective actions on a previously identified violation. In addition, groundwater and surface water samples were collected for analysis.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you provide one, will be made 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/reading-rm/adams.html> (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, please contact D. Blair Spitzberg, Ph.D. at (817) 860-8191 or Emilio M. Garcia at (530) 756-3910.

Sincerely,

**/RA/**

D. Blair Spitzberg, Ph.D., Chief  
Fuel Cycle and Decommissioning Branch

Docket No.: 070-00925  
License No.: SNM-928

Cimarron Corporation

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Enclosure:  
NRC Inspection Report  
070-00925/03-001

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U. S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket No.: 070-00925

License No.: SNM-928

Report No.: 070-00925/03-001

Licensee: Cimarron Corporation  
Kerr-McGee Center  
Oklahoma City, Oklahoma 73125

Facility: Cimarron Site

Location: Crescent, Oklahoma

Dates: June 24 through September 11, 2003

Inspectors: Emilio M. Garcia, Health Physicist  
R. Rick Muñoz, Health Physicist

Accompanied By: Kenneth M. Kalman, Project Manager, DWM NMSS  
Jon M. Peckenpaugh, Groundwater Hydrologist, DWM NMSS  
Gary W. Purdy, Health Physicist, DWM NMSS

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

Attachment: Supplemental Information

## **EXECUTIVE SUMMARY**

Cimarron Corporation  
NRC Inspection Report 070-00925/03-001

The Cimarron Corporation has been conducting site remediation activities in preparation for the termination of Special Nuclear Materials License SNM-928. Decommissioning inspections and radiological surveys had been conducted by the NRC at the Cimarron Site as part of the overall confirmatory survey process. This inspection was a continuation of that process. This inspection included reviewing organization and management, radiation protection, solid radioactive waste management, transportation of radioactive materials, and environmental protection. The inspection also involved collecting water samples from groundwater wells and from surface waters.

### **Radiation Protection**

- Radiation survey instruments used were operable and within their calibration interval (Section 1).
- No occupational exposure was received in 2002 or the first quarter of 2003 (Section 1).
- Radioactive sources were stored in a locked and properly labeled cabinet (Section 1).
- The As Low As Reasonably Achievable (ALARA) Committee had met quarterly through the first quarter of 2003, with one additional Special ALARA Committee meeting on June 26, 2002 (Section 1).
- All removable contamination surveys reviewed were less than the minimum detectable activity (MDA) (Section 1).
- Appropriate training has been presented to all affected individuals (Section 1).
- The licensee had adequately implemented the health physics program (Section 1).

### **Radioactive Waste Management and Waste Generator Requirements and Transportation Activities**

- There has been no offsite, nor onsite disposal of decommissioning wastes, nor shipments of radioactive waste since the last inspection (Section 2).
- Approximately 200 pounds of monitor well sediment and soil waste is temporarily being stored in the uranium building awaiting offsite disposal to an authorized receiving facility (Section 2).
- The licensee had effectively implemented the license requirements related to the management and shipment of radioactive waste (Section 2).

### Management Organization and Controls

- The inspectors concluded that the revised organizational reporting chain did not cause a degradation in safety or environmental commitments addressed in the NRC approved Cimarron Radiation Protection Plan nor the Decommissioning Plan (Section 3.1).
- Radiation protection procedures were reviewed and approved by the radiation safety officer (Section 3.2).
- The inspectors concluded that audit and surveillances were being effectively and objectively implemented (Section 3.3).
- The Cimarron ALARA Committee membership met the requirements of License Condition 27(e).3 (Section 3.4).

### Environmental Protection

- The licensee had procedures and practices in place to implement the environmental protection program at the site. All environmental samples were taken as required by the licensee (Section 4).

### Closeout Inspection and Survey

- The groundwater analytical result from five well locations exceeded the applicable release criteria of 180 pCi/l for total uranium. These samples were collected from wells located on a known groundwater plume (Section 5).
- All measurement results for Tc-99, but one, were below 3,790 pCi/l. The one exception was at Seep 1208 as measured by the licensee's contract laboratory (Section 5).

### Follow-up

- The NRC regional and headquarters cognizant staff concluded that the lack of agreement in the Tc-99 analysis results between the licensee's and NRC's contract laboratories was not due to sampling nor analytical methods employed by the licensee's contractor laboratories. This item is considered closed (Section 6).

## **Report Details**

### **1 Radiation Protection (83822, 88104)**

#### **1.1 Inspection Scope**

The inspectors interviewed individuals regarding the implementation of their health physics program, reviewed applicable records, and observed the storage of radioactive materials.

#### **1.2 Observations and Findings**

The licensee had submitted their revised radiation protection plan to NRC for review and approval. The NRC accepted the revised plan on April 17, 2000.

##### **a. Survey Instruments**

The inspectors selected four portable instruments and one stationary radiation survey instrument used by the licensee to determine if they were operable and within their calibration frequency. The instruments were operable, had charged batteries, responded to radiation and were within the calibration interval. The licensee has their portable instruments on a 6-month calibration interval and annual for the Tennelec LB 5100 used in the laboratory. Some instruments were calibrated onsite and some were shipped offsite for calibrations.

##### **b. Personnel Monitoring**

The inspectors reviewed the exposure reports through the first quarter of 2003, submitted by the external dosimetry supplier, United States Dosimetry Tech Inc., selected licensee reports and internal memorandums related to external dosimetry.

The external dosimetry supplier was accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). The licensee used thermoluminescence dosimeters (TLDs) as the primary means of determining the dose of record. No occupational dose was reported as having been received for any of the quarters reviewed. A review of NRC Forms 4 and 5 for all monitored individuals indicated the forms were completed accurately. These forms were reviewed through April 2003. Only two personnel devices were permanently assigned. The rest were issued as visitor badges and assigned on a quarterly basis. A total of 24 visitor badges was reviewed for the period covered. Administrative limits were set at 100 milliRem (mRem) for individuals and 200 mRem for the collective dose. Visitors were no longer given a temporary TLD, but the licensee wished to keep that option open in the event a potential for exposure may exist for special circumstances during decommissioning. Doses for the year were 0 mRem for individuals and for the collective dose. The licensee's as low as reasonably achievable (ALARA) goals were met.

c. Radiation Work Permits

The licensee issues special work permits (SWP) for work where the potential for significant exposure to radioactive materials exists and for which no standard operating procedure (SOP) exists. Special work permits used by the licensee contain the details of the job to be performed, any precautions necessary to reduce exposure and radiological monitoring and sampling required before, during, and following completion of the job. The radiation safety officer (RSO) indicates, by signature, the review of each SWP prior to the initiation of the work. The work appears to be carried out in adherence to the conditions of the SWPs. An internal audit conducted April 29 through May 1, 2003, identified that the drilling of wells surrounding Seep 1206 was performed without an active SWP. Section 9.1 of Annex A of the Radiation Protection Plan requires that a SWP be developed whenever work with potentially hazardous or radioactive material is performed. It was determined that Seep 1206 was inadvertently omitted from the title of SWP 3024. The SWP was written for all new cell installations on the site. Seep 1206 was added to the current SWP 3024, Revision 0. Training was verified on all SWPs. Each work permit included a signed and dated sheet by all parties involved and initialed by the health physics (HP) technician or site manager. The inspectors did not identify any problems with the SWP program and SWPs issued.

d. Radiation Protection Program

The inspectors reviewed selected records of the revised radiation protection plan dated April 23, 2001. The ALARA Committee maintained procedure control over its radiation protection plan (RPP) and SOPs by reviewing and approving SOP changes through License Condition 27(e) authorization. The records appeared to be maintained in accordance with the requirements of 10 CFR 20.2102.

e. Security

The licensee maintains 22 radioactive check sources in a secured cabinet safe. The cabinet was observed to be locked and the appropriate posting was in place. The sources were leak-tested and inventoried quarterly by procedure KM-CI-RP-35 "Source Receipt, Control, Inventory, Leak Testing & Disposal," Revision 5, March 26, 2002. Quarterly inventories and leak testing were performed through May 21, 2003, with all sources accounted for.

f. ALARA Committee

The minutes of the quarterly ALARA Committee were reviewed for calendar year 2002, and the first quarter of 2003, which met on May 14, 2003. The RSO confirmed that ALARA Committee meetings have been held each calendar quarter. A special ALARA Committee meeting was held on June 26, 2002, to discuss the NRC Notice of Violation dated November 26, 2001. The minutes of this ALARA Committee meeting appeared to adequately address measures to prevent recurrence. The ALARA Committee established ALARA goals with an administrative limit of 100 mRem/year for individuals and 200 mRem/year for the collective dose. These goals were established for calendar year 2003. In addition, the ALARA Committee met on March 12, 2002, to approve



organizational changes to the radiation protection plan listing Jeff Lux as the Site Manager of the Cimarron facility as noted in Section 2.3 of the RPP. A License Condition 27(e) evaluation was performed on March 14, 2003, to revise the RPP in Revision 3. The Committee met again on June 18, 2002, to approve the RPP (Annex A) revision for implementation of the change.

g. Removable Contamination Surveys

Since the last inspection, the ALARA committee approved the discontinuance of 15 survey locations in the uranium building due to the building being released by NRC. Procedures require removable alpha contamination surveys using wipes be conducted weekly at 10 locations whenever significant decommissioning activities are performed. Change rooms, offices, count and instrument rooms, soil count room, guard station and laundry room were included in the 10 wipe locations. Area wipes not conducted as part of the routine weekly wipe surveys were last performed on January 22, 2003, during the most recent significant decommissioning activities. Personnel monitoring devices were surveyed for removable contamination on January 15, 2003, before being shipped for processing. Results for all removable contamination surveys reviewed were less than the minimum detectable activity (MDA).

h. Training

All persons who were permitted to enter the Cimarron facility restricted areas received information and training in radiation safety. The depth of the training was commensurate with the potential radiation safety problems and was in compliance with the requirements of 10 CFR 19 and 10 CFR 20. The licensee had several levels of training, such as visitor, escorted radiation worker, radiation worker, and health physics technician training. The RSO was responsible for training workers. Visitor training requirements were approved by the RSO, but may be administered by radiation workers.

One new employee had been hired since the last inspection. The individual, hired on March 3, 2003, as an administrative assistant. This individual had received hazardous communication, health and safety plan, and hearing conservation training. Site specific annual radiation protection training was presented in June 2003. The licensee had conducted monthly safety meetings covering areas of sanitation, first-aid, healthy living, stresses in the work place, and severe acute respiratory syndrome (SARS).

1.3 Conclusions

Radiation survey instruments used were operable and within their calibration interval. No occupational exposure was received in 2002 or the first quarter of 2003. Radioactive sources were stored in a locked and properly labeled cabinet. The ALARA Committee had met quarterly through the first quarter of 2003, with one additional Special ALARA Committee meeting on June 26, 2002. All removable contamination surveys reviewed were less than the minimum detectable activity. Appropriate training has been presented to all affected individuals. The licensee had adequately implemented the health physics program.

## **2 Radioactive Waste Management and Waste Generator Requirements and Transportation Activities (84850 and 86740)**

### **2.1 Inspection Scope**

The inspectors interviewed licensee representatives, toured the radioactive waste storage area, and reviewed applicable records related to radioactive waste management to determine if the licensee had established and maintained an effective program, and to determine whether transportation of licensed materials was in compliance with the applicable NRC and US Department of Transportation regulations.

### **2.2 Observations and Findings**

There were no radioactive waste shipments made since the last inspection. The last shipment of radioactive waste was on October 2000. The shipment consisted of ten 55-gallon drums of soil and debris. The shipment contained material that was characterized as waste greater than the Branch Technical Position (BTP), Option 2 concentration limit of 100 pCi/g uranium; therefore, requiring burial offsite. There had been no offsite nor onsite disposal of decommissioning wastes since the last inspection. No decommissioning waste material had been free released.

At the time of the inspection, radioactive waste was being stored at the facility waiting disposal. This waste originated during the decommissioning of monitoring Well 1319. The decommissioning of Well 1319, completed in February of 2003, generated approximately 200 pounds of contaminated sediments and soil. The casing of the well was at ground level and not elevated or covered as the standard sampling wells were constructed. Eventually, contaminated particulates were allowed to get inside the casing and accumulate at the bottom over the years. As a result of the decommissioning of the well's components, the sediments were removed and dried. The licensee is temporarily storing the waste on a pallet in 14 plastic bags inside the uranium building located in (Area K). The bags were stored away from daily personnel traffic. Licensee management accompanied the inspectors to conduct radiological surveys of the waste. Readings were consistent with those from background levels.

In March of 2003, Cimarron personnel surveyed the waste containers for fixed and removable contamination using Ludlum and Tennelec detectors. Surveying at 3 inches, the maximum radiation detected was 1,454 cpm. At 1-meter, the reading was 5 mRem. Removable contamination surveys identified 0.51 dpm/100 cm<sup>2</sup> for alpha particles and a maximum of 1.30 dpm for beta particles. Analysis results obtained in March of 2003 from samples sent to the Cushing facility, revealed a maximum activity of 8.72 pCi/g and a minimum of 5.81 pCi/g total uranium.

### **2.3 Conclusions**

No disposal of decommissioning wastes, nor shipments of radioactive waste had occurred since the last inspection. Approximately 200 pounds of monitor well sediment and soil waste is temporarily being stored in the uranium building. The licensee had

effectively implemented the license requirements related to the management and shipment of radioactive waste.

### **3 Management Organization and Controls (88005, 88104)**

#### **3.1 Organizational Structure**

##### **a. Inspection Scope**

The inspectors interviewed cognizant licensee staff regarding the licensee's organizational structure and reviewed related documentation.

##### **b. Observations and Findings**

Figure 3-1 of Revision 5 to the Cimarron Radiation Protection Plan describes the revised organizational reporting chain. On January 2, 2003, the licensee entered into a contractual agreement with NEXTEP Environmental for site management. With this agreement all former independent contractors were to report to the NEXTEP site manager. On June 24, 2003, the Cimarron ALARA Committee approved the License Condition 27(e) evaluation of the change in the organizational reporting chain. On June 24, 2003, the NEXTEP site manager implemented the revised organizational reporting chain.

Major changes to the organization included: the reporting of the quality assurance coordinator, the health physics staff, and the clerical staff to the NEXTEP site manager. The NEXTEP site manager reported to the project manager, Kerr-McGee. The project manager is also titled manager, planning and regulatory compliance. This position reported to the program manager, safety and environmental affairs division, Kerr-McGee. The program manager in turn reported to the vice president, Cimarron Corporation, Kerr-McGee, who was also titled director of chemical and nuclear environmental remediation, safety and environmental affairs division, Kerr-McGee. It should be noted that in the revised organization reporting chain, the quality assurance coordinator maintained a dashed link to the vice president, Cimarron Corporation.

The position of health physics supervisor/radiation safety officer had been re-titled as radiation safety officer. This position reported to the program manager, safety and environmental affairs division, Kerr-McGee.

##### **c. Conclusions**

The inspectors concluded that the revised organizational reporting chain did not cause a degradation in safety or environmental commitments addressed in the NRC approved Cimarron Radiation Protection Plan nor the Decommissioning Plan.

### **3.2 Procedure Controls**

#### **a. Inspection Scope**

The inspectors reviewed radiation protection procedures revised since the last inspection to verify that the licensee's system for approving procedures complies with license requirements.

#### **b. Observations and Findings**

Section 2.1.1 of Procedure KM-CI-RP-6, Procedure Generation, Review, and Approval, states that the "Health Physics Supervisor/Radiation Safety Officer (HPS/RSO) is responsibility for approving all Cimarron radiation protection procedures."

Since the last inspection in June 2002, the licensee had revised six radiation protection procedures. All procedures were approved by the radiation safety officer.

#### **c. Conclusions**

Radiation protection procedures were reviewed and approved by the RSO.

### **3.3 Reviews, Audits, and Assessments**

#### **a. Inspection Scope**

The inspectors reviewed audit report Numbers 02-09-005, 02-09-006, and 03-02-007. The inspectors also reviewed quality assurance surveillance checklists and inspection form reports S-03-006, and S-02-059.

#### **b. Observations and Findings**

The inspectors noted that the auditors were independent of the areas audited, trained and qualified and the audit and surveillances included performance-based elements. Audits had corrective actions completed and signed by appropriate responsible party.

#### **b. Conclusions**

The inspectors concluded that audit and surveillances were being effectively and objectively implemented.

### **3.4 Safety Committee**

#### **a. Inspection Scope**

The inspectors reviewed the ALARA Committee membership and meeting minutes for compliance with applicable requirements.

b. Observations and Findings

License Condition 27(e).3 specifies that the membership of the ALARA Committee shall consist of a minimum of three individuals employed by the licensee and one of these shall be designated as the ALARA Committee chairman. Membership shall include an individual with expertise in management; one individual expertise in decommissioning and one member shall be the site corporate RSO.

The inspectors noted that the Cimarron ALARA Committee membership consisted of three individuals employed by the licensee with assistance from contractor staff. The membership included the RSO and individuals with expertise in management and decommissioning. As noted on Section 1.2 f above, the ALARA Committee had met at least quarterly.

c. Conclusions

The Cimarron ALARA Committee membership met the requirements of License Condition 27(e).3.

**4 Environmental Protection (88045, 88104)**

4.1 Inspection Scope

The environmental protection program was reviewed to assess the effectiveness of the licensee's programs and to evaluate the impact, if any, of site activities on the local environment.

4.2 Observations and Findings

a. Environmental Monitoring

Section 15 of the Cimarron Radiation Protection Plan requires the licensee to implement an environmental monitoring program. The licensee's environmental monitoring program includes monitoring surface water and groundwater well sites. The licensee's program no longer requires the licensee to submit an annual environmental report to the NRC; however, the analytical data is retained on-site.

b. Surface Water Monitoring

Surface water samples were collected annually at seven locations and were analyzed for gross alpha, gross beta, and total uranium concentrations. All results for total uranium analysis were below the applicable effluent concentration limit specified in 10 CFR Part 20, Appendix B, Table 2.

c. Groundwater Monitoring

Water samples were collected annually from 25 monitoring wells. All samples were analyzed for gross alpha, gross beta, and total uranium concentrations. Some water

samples were also analyzed for technetium-99. The inspectors reviewed the 2002 analytical groundwater data used to compile the annual environmental report. Monitoring Well 1315A had the highest total uranium of 2509 pCi/l.

In July 2002, monitoring Wells 1315 and 1316 were replaced by 1315A and 1316A, respectively. The existing monitoring wells were replaced because they were screened in more than one water-bearing unit.

The licensee continued to monitor the contaminated groundwater within and adjacent to Burial Area 1. Monitoring wells in this area have reported total uranium concentrations in the groundwater greater than the 180 pCi/l total uranium release criteria specified in the license for groundwater. The licensee is continuing to monitor these wells.

#### 4.3 Conclusions

The licensee had procedures and practices in place to implement the environmental protection program at the site. All environmental samples were taken as required by the licensee.

### 5 **Closeout Inspection and Survey (83890)**

#### 5.1 Inspection Scope

On June 24-25, 2003, NRC staff observed the collection of 23 groundwater samples from wells and two seeps. The samples were split between the licensee and NRC. The NRC hydrologist preserved the NRC splits by acidification on collection. The NRC splits were sent to the NRC's contractor laboratory operated by Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science Education. The NRC splits were analyzed for gross alpha and gross beta, and by alpha spectroscopy for uranium. Seventeen of the samples were analyzed for technetium-99 by chemical separation and radiological analysis. The licensee splits were sent to a contract laboratory for analysis. One blind duplicate sample was sent to the NRC laboratory for quality assurance. There are no NRC groundwater release criteria for gross alpha or gross beta.

NRC License SNM-928, issued to Cimarron Corporation, lists the release criteria in License Condition 27. The applicable values are:

#### Groundwater

6.7 Bq/l (180 pCi/l) total uranium

The attachment to a letter from the NRC project manager to the licensee's, Jess Larsen dated March 13, 1997, states that the technetium-99 concentration in groundwater should not exceed the US Environmental Protection Agency's Interim Primary Drinking Water Regulations (40 CFR 141.16). This regulation requires that the average annual concentration in drinking water shall not produce an annual dose equivalent to the total

body or any internal organ greater than 4 mRem/yr. The NRC derived concentration limit for Tc-99 is 3,790 pCi/l.

### Results Comparisons

The criteria in NRC Inspection Procedure 84525, "Quality Assurance and Confirmatory Measurements," was used for comparison of licensee and NRC results. The table that follows lists the criteria.

**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  $1\sigma$  uncertainty.

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

## 5.2 Observations and Findings

Table 2 summarizes the ESSAP and licensee's gross alpha and gross beta sample results. Five of the gross alpha and two gross beta analysis results were not in statistical agreement between ESSAP and the licensee's contract laboratory. This lack of agreement is not considered significant because, with the exception of one sample located on a known plume (1319 C1), the results were well below applicable release criteria and were near background. Table 3 summarizes the uranium alpha spectrum analysis results. At five locations the analytical results for total uranium exceeded the applicable release criteria of 180 pCi/l. These were locations within a known plume and adjacent to Burial Area 1. This plume is believed to be the result of radiological material that had been previously buried hydrologically up gradient from these wells. These wells were part of the licensee's characterization the plume.

Table 4 summarizes the technetium-99 analytical results. All measurement results for Tc-99, but one, were below the release criteria as determined by NRC. This location was at Seep 1208, where the licensee's contract laboratory measured a concentration of  $5,300 \pm 190$  pCi/l. This value was not in agreement with the value reported for this location by the NRC contract laboratory. For Tc-99, the NRC contract laboratory measured  $1,790 \pm 210$  pCi/l for this sample. The analytical results between the NRC

contractor laboratory and the licensee contract laboratory when compared using the criteria in NRC Inspection Procedure 84525, "Quality Assurance and Confirmatory Measurements," were all in agreement, except for Seep 1208.

**TABLE 2**  
**Kerr-McGee Cimarron Site**  
**Groundwater Samples Gross Alpha and Gross Beta Analysis Results**  
**Samples Collected on June 24-25, 2003**

Sample Location	ALPHA ACTIVITY pCi/L			BETA ACTIVITY pCi/L			Beta/Alpha Ratio	
	NRC (ESSAP) Results	K-M Results	Agree?	NRC (ESSAP) Results	K-M Results	Agree?	NRC	K-M
T-60	35.1 ± 7.9	16.7 ± 4.88	No	18.1 ± 4.2	26.8 ± 5.11	Yes	0.52	1.60
T-53	12.8 ± 4.6	15.8 ± 4.53	Yes	21.4 ± 3.7	21.3 ± 4.58	Yes	1.67	1.35
T-51	12.3 ± 3.4	27.7 ± 5.27	Yes	12.8 ± 2.9	21.3 ± 4.44	Yes	1.04	0.77
T-58	25.9 ± 3.6	34.3 ± 6.20	Yes	79.2 ± 7.3	64.1 ± 6.53	Yes	3.06	1.87
T-57	20.7 ± 3.5	49.9 ± 7.24	No	345 ± 31	287 ± 12.1	Yes	16.67	5.75
T-54	21.8 ± 5.5	26.6 ± 6.03	Yes	820 ± 81	678 ± 18.8	Yes	37.61	25.49
T-55 (Dup)	31.3 ± 6.6	12.9 ± 4.84	No	324 ± 34	343 ± 13.6	Yes	10.35	26.59
1208	151 ± 17	205 ± 10.9	No	1740 ± 170	1550 ± 17.7	Yes	11.52	7.56
T-55	27.8 ± 6.0	12.9 ± 4.84	No	351 ± 37	343 ± 13.6	Yes	12.63	26.59
T-56	11.5 ± 2.0	Not Analyzed	--	118 ± 11	Not Analyzed	--	10.26	--
1336A	74.1 ± 6.7	26.6 ± 2.71	No	554 ± 48	424 ± 7.28	Yes	7.48	15.94
1312	125 ± 12	59 ± 4.6	No	1080 ± 99	978 ± 11.5	Yes	8.64	16.58
1315R	1510 ± 90	1780 ± 21.5	Yes	455 ± 40	577 ± 8.72	Yes	0.30	0.32
TMW13	2070 ± 140	1550 ± 21.4	Yes	526 ± 49	576 ± 8.87	Yes	0.25	0.37
1352	322 ± 19	409 ± 9.53	Yes	146 ± 13	182 ± 5.06	Yes	0.45	0.44
1206	108.1 ± 7.8	95.1 ± 4.62	Yes	33.1 ± 3.4	33.1 ± 2.61	Yes	0.31	0.35
1350	62.8 ± 5.4	50.2 ± 3.41	Yes	46.4 ± 4.5	34.3 ± 2.65	No	0.74	0.68
1348	104.9 ± 6.9	129 ± 11.8	Yes	28.5 ± 2.9	31.5 ± 4.66	Yes	0.27	0.24
1349	44.2 ± 4.5	63.1 ± 9.67	No	10.7 ± 1.8	11.1 ± 3.16	Yes	0.24	0.18
1331	89.0 ± 7.0	91.3 ± 11.2	Yes	20.8 ± 2.5	18.5 ± 3.93	Yes	0.23	0.20
1326	7.5 ± 1.5	7.15 ± 3.4	Yes	16.7 ± 2.0	11.0 ± 2.97	No	2.23	1.54
1319C1	346 ± 34	225 ± 15.2	No	79 ± 10	60.3 ± 5.19	Yes	0.23	0.27
1319B1	163 ± 13	151 ± 14.6	Yes	49.2 ± 5.4	52.0 ± 5.97	Yes	0.30	0.34
1319A1	53.0 ± 4.9	53.3 ± 8.50	Yes	17.6 ± 2.1	14.3 ± 3.42	Yes	0.33	0.27

<sup>a</sup> Uncertainties are total propagated uncertainties at the 95% confidence level (two sigma).



**TABLE 3**  
**Kerr-McGee Cimarron Site**  
**Groundwater Samples Uranium Alpha Spectroscopy Analysis Results**  
**Samples Collected on June 24-25, 2003**

Sample Location	Radionuclide Concentration pCi/l								
	U-234		U-235		U-238		Total U		Agree?
	NRC	KM	NRC	KM	NRC	KM	NRC	KM	
T-60	12.9 ± 1.4	11.4 ± 3.11	0.52 ± 1.4	1.75 ± 1.21	6.98 ± 0.90	8.37 ± 2.59	20.4 ± 1.7	8.37	Yes
T-53	9.1 ± 1.0	9.19 ± 1.35	0.28 ± 0.18	1.13 ± 0.43	4.54 ± 0.67	4.56 ± 0.88	13.9 ± 1.3	14.9	Yes
T-51	14.3 ± 1.4	14.7 ± 1.93	0.72 ± 0.32	0.56 ± 0.34	8.23 ± 0.97	10.4 ± 1.52	23.3 ± 1.8	25.7	Yes
T-58	19.4 ± 1.7	20.3 ± 4.18	1.01 ± 0.29	3.21 ± 1.52	5.91 ± 0.74	5.09 ± 1.88	26.3 ± 1.9	28.6	Yes
T-57	14.4 ± 1.5	13.2 ± 3.18	0.75 ± 0.27	2.09 ± 1.19	4.48 ± 0.66	5.55 ± 1.94	19.6 ± 1.6	20.8	Yes
T-54	3.93 ± 0.67	4.47 ± 0.90	0.12 ± 0.17	0.55 ± 0.31	2.35 ± 0.48	1.87 ± 0.56	6.40 ± 0.84	6.89	Yes
T-55 (Dup.)	3.90 ± 0.61	2.93 ± 0.76	0.14 ± 0.11	0.08 ± 0.11	2.49 ± 0.47	2.21 ± 0.64	6.52 ± 0.78	5.22	Yes
1208	2.35 ± 0.48	1.63 ± 0.50	0.13 ± 0.14	0.28 ± 0.20	0.55 ± 0.22	0.80 ± 0.34	3.03 ± 0.55	2.72	Yes
T-55	2.78 ± 0.61	2.93 ± 0.76	0.10 ± 0.15	0.08 ± 0.11	2.17 ± 0.48	2.21 ± 0.64	5.05 ± 0.79	5.22	Yes
T-56	1.85 ± 0.50	2.73 ± 0.35	0.02 ± 0.19	0.11 ± 0.06	1.20 ± 0.36	1.07 ± 0.20	3.07 ± 0.65	3.91	Yes
1336A	18.1 ± 1.9	16.6 ± 3.94	0.72 ± 0.28	2.20 ± 1.23	6.20 ± 0.88	5.74 ± 2.06	25.0 ± 2.1	24.5	Yes
1312	23.9 ± 2.2	23.0 ± 2.54	1.03 ± 0.33	1.23 ± 0.46	8.6 ± 1.1	8.14 ± 1.27	33.5 ± 2.5	32.4	Yes
1315R	1,250 ± 94	1350 ± 203	72.0 ± 6.0	90.8 ± 21.6	803 ± 60	907 ± 141	2,130 ± 110	2348	Yes
TMW13	1,327 ± 98	1210 ± 179	78.2 ± 6.4	140 ± 28.4	820 ± 60	809 ± 123	2,230 ± 110	2159	Yes
1352	199 ± 16	178 ± 32.1	11.8 ± 1.5	33.3 ± 10.5	250 ± 20	236 ± 40.1	461 ± 25	447.3	Yes
1206	93.3 ± 7.3	80.5 ± 13.1	4.59 ± 0.74	8.72 ± 2.71	24.4 ± 2.2	23.8 ± 5.13	122.3 ± 7.7	113.03	Yes
1350	45.5 ± 3.8	42.7 ± 7.71	2.58 ± 0.54	3.23 ± 1.54	10.5 ± 1.2	10.3 ± 2.91	58.6 ± 4.1	56.2	Yes
1348	92.5 ± 6.9	90.2 ± 9.36	3.95 ± 0.65	8.98 ± 1.10	28.8 ± 2.5	28.8 ± 3.12	125.3 ± 7.4	128	Yes
1349	57.8 ± 4.6	58.8 ± 4.76	2.84 ± 0.55	3.69 ± 0.46	8.9 ± 1.0	9.55 ± 0.94	69.6 ± 4.7	72.04	Yes
1331	79.1 ± 6.4	72.9 ± 5.66	4.13 ± 0.76	6.78 ± 0.69	15.4 ± 1.6	14.0 ± 1.24	98.6 ± 6.6	93.68	Yes
1326	3.69 ± 0.60	3.95 ± 0.47	0.14 ± 0.11	0.16 ± 0.08	2.22 ± 0.44	1.64 ± 0.26	6.06 ± 0.76	5.75	Yes
1319C1	190 ± 14	190 ± 14.1	8.9 ± 1.1	11.6 ± 1.03	29.3 ± 2.6	30.6 ± 2.44	228 ± 15	232.2	Yes
1319B1	161 ± 12	165 ± 12.2	7.8 ± 1.0	9.78 ± 0.89	23.6 ± 2.2	25.7 ± 2.06	192 ± 12	200.48	Yes
1319A1	38.8 ± 3.4	36.6 ± 2.93	1.80 ± 0.46	4.67 ± 0.52	6.49 ± 0.88	6.74 ± 0.68	47.1 ± 3.5	48.01	Yes
NRC Release criteria							180 pCi/l		

<sup>a</sup> Uncertainties are total propagated uncertainties at the 95% confidence level (two sigma).

**TABLE 4**  
**Kerr-McGee Cimarron Site**  
**Groundwater Samples Technetium-99 Analysis Results**  
**Samples Collected on June 24-25, 2003**

Sample Locations	NRC (ESSAP) Results pCi/l	Kerr-McGee (GEL) Results pCi/l	Beta/Alpha Ratio		Agreement Status <sup>1</sup>
			NRC	Kerr- McGee	
T-60	14.4 ± 9.4	11.7 ± 9.21	0.52	1.60	Yes
T-53	20.6 ± 9.7	17.5 ± 9.97	1.67	1.35	Yes
T-51	9.4 ± 9.2	10.6 ± 9.27	1.04	0.77	Yes
T-58	125 ± 19	124 ± 16.8	3.06	1.87	Yes
T-57	615 ± 75	671 ± 35.9	16.67	5.75	Yes
T-54	1400 ± 170	1480 ± 52.0	37.61	25.49	Yes
T-55 (Duplicate)	659 ± 80	767 ± 38.5	10.35	26.59	Yes
1208	1790 ± 210	5300 ± 190	11.52	7.56	No
T-55	717 ± 87	767 ± 38.5	12.63	26.59	Yes
T-56	212 ± 28	220 ± 20.7	10.26	--	Yes
1336A	950 ± 120	952 ± 42.1	7.48	15.94	Yes
1312	1950 ± 230	2060 ± 61.8	8.64	16.58	Yes
1315R	18.6 ± 9.5	Not Analyzed	0.30	0.32	--
TMW13	13.0 ± 9.2	Not Analyzed	0.25	0.37	--
1352	26.5 ± 9.9	Not Analyzed	0.45	0.44	--
1206	12.0 ± 9.1	Not Analyzed	0.31	0.35	--
1350	52 ± 12	Not Analyzed	0.74	0.68	--
1348	6.5 ± 8.9	Not Analyzed	0.27	0.24	--
Equivalent to drinking water standard of 4 mRem/year criterion as determined by NRC	3,790 pCi/L				

<sup>1</sup> Agreement status determined from Table 1 Acceptance Criteria above.

<sup>2</sup> 1206 and 1208 are seeps. Therefore the 60,000 pCi/l Part 20 Appendix B effluent release criteria applies.

<sup>a</sup> Uncertainties are total propagated uncertainties at the 95% confidence level (two sigma).

### 5.3 Conclusions

The groundwater analytical result from five well locations exceeded the applicable release criteria of 180 pCi/l for total uranium. These samples were collected from wells located on a known groundwater plume. All measurements result for Tc-99, but one, were below 3,790 pCi/l. The one exception was at Seep 1208 as measured by the licensee's contract laboratory.

## **6 Follow-up (92701)**

### **6.1 (Closed) Inspection Follow-up Item 070-00925/0101-02: Lack of Agreement between NRC and Licensee analysis for Tc-99**

During the 2001 inspection, the inspectors noted that when the Tc-99 analysis results between the NRC contractor laboratory and the licensee contract laboratory were compared using the criteria in NRC Inspection Procedure 84525, "Quality Assurance and Confirmatory Measurements," four of the five analyses were not in agreement. Based on a series of quality tests conducted by an NRC contractor laboratory, the NRC regional and headquarters cognizant staff concluded that the lack of agreement in the TC-99 analysis results was not due to sampling nor analytical methods employed by the licensee's contractor laboratories. In addition, of the 11 split samples obtained during this inspection, 10 of the 11 samples were in statistical agreement and therefore the problem was not repetitive. The one sample comparison not in agreement showed the licensee's value was conservative in relationship to the NRC analytical result. This item is considered closed.

## **7 Exit Meeting Summary**

The inspectors presented the preliminary results of the inspection to licensee representatives at the conclusion of the site visit. After receipt and analysis of the last set of sample results, a telephonic exit meeting was conducted on September 11, 2003, between the lead inspector and the manager, planning and regulatory compliance, project manager. The licensee representatives acknowledged the findings as presented. The licensee did not identify as proprietary any information provided to, or reviewed by, the inspectors.

## **ATTACHMENT**

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

#### **Licensee Cimarron Corporation**

M. Logan, Vice President, Cimarron Corporation  
D. Finch, Program Manager  
J. Lux, Project Manager  
K. Morgan, Radiation Safety Officer

#### **NEXTEP Environmental (contractor)**

S. Marshall, Principal  
R. Callahan, Site Manager  
W. Rogers, Health Physics Technician  
L. Morgan, Health Physics Technician  
L. Smith, Quality Assurance Coordinator  
R. Williams, Hydrology Manager

### **INSPECTION PROCEDURES USED**

IP	83822 Radiation Protection
IP	88104 Decommissioning Inspection Procedure for Fuel Cycle Facilities
IP	88045 Environmental Protection
IP	83890 Closeout Inspection and Survey
IP	84850 Radioactive Waste Management and Waste Generator Requirements
IP	86740 Transportation Activities

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

#### **Closed**

070-00925/0101-02	IFI	Lack of Agreement between NRC and Licensee analysis for Tc-99.
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#### **Opened**

070-00925/0301-01	URI	Determine if the Cimarron ALARA Committee was required to approve changes to Radiation Protection Procedures.
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#### **Discussed**

None

**LIST OF ACRONYMS**

ALARA	As Low As Reasonably Achievable
Bq/l	Becquerels per liter
BTP	Branch Technical Position
CFR	Code of Federal Regulations
cpm	counts per minute
dpm/100 cm <sup>2</sup>	disintegrations per minute per 100 squared centimeters
ESSAP	Environmental Survey and Site Assessment Program
HP	health physics
HPS/RSO	Health Physics Supervisor/Radiation Safety Officer
IFI	Inspection Follow-up Item
MDA	minium detectable activity
mRem	milliRem
μR/hr	microRoentgen/hour
NVLAP	National Voluntary Laboratory Accreditation Program
pCi/l	picocuries per liter
QA	quality assurance
RPP	radiation protection plan
RSO	radiation safety officer
SARS	severe acute respiratory syndrome
SNM	special nuclear material
SOP	standard operating procedure
SWP	special work permits
TLD	thermoluminescence dosimeters
TMW	temporary monitoring well

## **DOCUMENTS REVIEWED**

### Audits

- Audit Report Number 02-09-005, KM-CI-RP-62 Soil Counter, October 10, 2002.
- Audit Report Number 02-09-006, Sampling & Analysis Plan Documentation Section 8.0 & CM-SAP-111, October 16, 2002.
- Audit Report Number 03-02-007, Sampling & Analysis Plan Documentation Section 8.0 & CM-SAP-111, October 16, 2002.
- Quality Assurance Surveillance Checklist and Inspection Form Report S-03-006, Installation of Wells for Investigations in the Vicinity of Well #1319 & area North of Former the U-Ponds 1 & 2, dated April 8, 2003.
- Quality Assurance Surveillance Checklist and Inspection Form Report S-02-059, Investigation of B. G #1 Groundwater Plume, dated August 7, 2002.

### Radiation Protection Procedures

- KM-CI-RP-1, Organization and Responsibilities, Revision 9, Approved December 4, 2002.
- KM-CI-RP-4, Radiological Control and Safety Audits, Revision 6, Approved December 19, 2002.
- KM-CI-RP-6, Procedure Generation, Review, and Approval, Revision 4, Approved March 26, 2002.
- KM-CI-RP-7 Control of HP Records & Documents, Rev 2, April 18, 2001.
- KM-CI-RP-11 ALARA Committee, Rev 7, March 26, 2002.
- KM-CI-RP-22 SWP Preparation, Review, Approval & Use, Rev 3, September 18, 2000.
- KM-CI-RP-23 Rad Waste Packaging and Shipping, Rev 1, April 25, 1997.
- KM-CI-RP-33, Decontamination of Tools, Equipment, Materials and Surfaces, Revision 4, approved December 12, 2002.
- KM-CI-RP-35 Source Receipt, Control, Inventory, Leak Testing & Disposal, Rev 5, March 26, 2002.
- KM-CI-RP-38, Survey Requirements and Frequencies, Revision 5, Approved July 12, 2002.
- KM-CI-RP-39 Performance of Radiation & Contamination Surveys, Rev 4, September 14, 2000.

- KM-CI-RP-46 Calibration & Use of Radiation Detection Instruments, Rev 2, April 18, 2001.
- KM-CI-RP-54 Environmental Air Samples, Rev 1, October 4, 1996.
- KM-CI-RP-43, Environmental Monitoring, Revision 5, approved October 18, 2002.
- KM-CI-RP-62, Cimarron Soil Counter Operation, Revision 5, approved December 18, 2002.

#### Other Documents

- File "Yec-Vdm-052 (757C-01 Drums 5850 thru 5859)"; "Letter to Jess Larsen from Leigh Barrington (Envirocare) dated November 3, 2000."
- "1-4-8 Analytical Results/ Soil Samples"; "Sample ID Logs-CF-1650"; "2-12-03 Field Radiation Survey and Sample Record."
- Site Quality Assurance Program, June 2003.
- Radiation Protection Plan, Vol I, II, April 21, 2003.

## IMAGES

