70-925

CIMARRON CORPORATION LETTER OF TRANSMITTAL

DATE: 06/26/98

TO: **M r. Ken Kalman, Project Manager**
Low Level Waste & Decommissioning Project Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
MAIL DROP T2F27

FROM: **Mickey Hodo, Quality Assurance Manager**
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CIMARRON CORPORATION

P.O. BOX 25861 • OKLAHOMA CITY, OKLAHOMA 73125

S. JESS LARSEN
VICE PRESIDENT

June 26, 1998

Mr. Ken Kalman, Project Manager
Facilities Decommissioning Section
Low-Level Waste & Decommissioning Projects Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: Docket No. 70-0925; License No. SNM-928
Cimarron Corporation Response to NRC Staff Comments Dated February 9, 1998
On the Phase III Final Status Survey Plan

Dear Mr. Kalman:

Cimarron Corporation submits herewith responses to NRC staff comments dated February 9, 1998 on the Phase III Final Status Survey Plan.

We believe that we have addressed the questions raised and clarifications requested. We are hopeful that the Phase III FSSP can now be approved in an expedient manner and that we can begin submitting the Phase III Final Status Survey Reports in the near future. We have the Sub-area "L" FSSR virtually ready for submission at this time.

Please advise if you have any further questions.

Sincerely,

Jess Larsen

Jess Larsen
Vice President
Enclosure

Jl062698.le1

Cimarron Responses
NRC Staff Comments Dated February 9, 1998
On the Phase III Final Status Survey Plan

1. **NRC Comment:**

Your response to General Comments 1 and 2 provided much greater insight into your calibration procedures. However, Cimarron did not address all of the detailed information identified in Section 5.4 of NUREG/CR-5849. In the last sentence on page 4, Cimarron indicated that "...(calibration) requirements (ANSI N323-1978) are incorporated into the written site calibration procedures...," but the Final Status Survey Plan (FSSP) does not contain a detailed summary of these procedures or the training of those persons who perform the calibrations. Based on the January 27, 1998, meeting between NRC and Cimarron, NRC anticipated that Cimarron will provide this information. Providing all this information in a single place will facilitate the NRC staff's review.

Cimarron Response:

Cimarron has responded to this comment in detail in its Sub-Area J responses forwarded to the NRC on May 13, 1998 by letter from Mr. Jess Larsen, Vice President, Cimarron Corporation to Mr. Ken Kalman. Please refer to the May 13 submittal, specifically Cimarron's response to NRC General Comment a. and b.

Selection, calibration and use of radiation detection instrumentation, used for final status survey release at Cimarron are directed by the facility's Radiation Safety Officer (RSO). The RSO is responsible for the calibration performed by Cimarron Health Physics staff, or by contract services. In addition to the equipment calibration records, the RSO maintains a file for each technician on staff as to their qualifications and training.

2. **NRC Comment:**

In responding to General Comment 3, Cimarron cited a number of references (on page 7 of the subject document) to illustrate how well the ORISE and contractor data confirm the accuracy of the soil counter measurements. Please provide measurement data to verify this claim.

Cimarron Response:

ORISE and other independent laboratories have split sampled and performed duplicate analyses on selected Cimarron soil samples. The ORISE report titled "Confirmatory Survey of South U-Yard Remediation, Kerr-McGee Corporation, Crescent, Oklahoma" dated November 13, 1995, and NRC Inspection Report #70-825/97-02, dated July 31, 1997, provide confirmation of the Cimarron Soil Counter accuracy and traceability. These data comparisons are included with Attachment A.

The most recent confirmatory sample results from NRC Region IV (March 18, 1998 NRC Inspection Report 70-925/97-03) continues to show excellent agreement. The comparison between Cimarron's results and the NRC's results are also included in Attachment A. The nine samples were sent to the NRC Region III laboratory for analysis, after first being analyzed by the on-site counter.

Numerous soil samples were collected from Subarea O for comparative analysis. These soil samples were counted first on-site and then sent to Core Laboratory for analysis. This data comparison is also included in Attachment A.

3. **NRC Comment:**

In responding to General Comment 3, Cimarron mentioned the use of "independent third-party review of analytical results." What documentation does Cimarron have in place that spells out when independent third-party reviews of analytical results will be conducted?

Cimarron Response:

In response to the referenced General Comment 3, Cimarron stated the following, "such quality controls allow independent, third-party review of analytical results." By this statement Cimarron did not intend to imply that it routinely schedules independent third-party reviews of analytical results. However, Cimarron's QA/QC program is structured to generate data that can be verified by a third-party (i.e., NRC, Kerr-McGee Corporation, or State of Oklahoma) should they desire to perform an audit of the data or obtain such review.

Kerr-McGee Corporation performs quarterly audits of Cimarron's Quality Assurance/Radiation Protection Program. Each audit emphasizes specific areas of the Program. Audit results are documented by the auditing personnel and Cimarron management reviews audit findings and

responses to verify that corrective action (if required) is scheduled and completed.

4. **NRC Comment:**

In responding to General Comment 4, Cimarron stated that it intends to identify elevated areas based on a response of "twice background" as indicated in Sections 6.4.5 and 8.4 of the FSSP. How does Cimarron justify this scan sensitivity? Does Cimarron have any performance correlation data for NaI count rate instrument surveys to justify the "twice background" limit?

Cimarron Response

Prior to the commencement of site-wide remediation, Cimarron evaluated several portable survey instruments for performing scan surveys including the 2" x 2" NaI detector. Based upon phone discussions and ensuing recommendations from Ludlum Instruments, Inc, Cimarron decided to use the 3" x 0.5" NaI detector for general area scans. This system was one of the more sensitive detection systems available to Cimarron. For the isotopes of interest at the Cimarron site the 3" x 0.5" NaI detector is approximately 1.5 times more efficient than the 2" x 2" detector. Cimarron has employed the 3" x 0.5" NaI detector for performing gamma scan surveys in both affected and unaffected open land areas for qualitative evaluations in identifying regions or areas of slightly elevated activity.

The twice background guideline has been used for scan surveys utilizing the 3" x 0.5" NaI detector since the inception of Cimarron site decommissioning. This guideline has been utilized as a standard in the nuclear industry for many years; and is discussed in Section 6.4.2 of NUREG/CR-5849 as quoted below. This qualitative guideline was included in the Phase I Final Status Survey Plan, Phase I Final Status Survey Report, and the Phase II Final Status Survey Plan just to name a few of the documents where this guideline was addressed and approved by NRC for this site.

As discussed in Section 6.4.2 "Scanning" of NUREG/CR-5849:

> "For optimum detection sensitivity, changes in the instrument response are monitored via the audible output (use of headphones is recommended), rather than by observing fluctuations in the analog meter reading. This use of an audible signal negates concern for the time constant related to the meter response. Locations of direct radiation, discernable above the ambient level

(typically 2 to 3 times the ambient count rate), are marked on facility maps and identified for further measurements and/or sampling."

Cimarron technicians utilize the audible output during scanning as an indication of changes in residual activity, and twice background is the guideline for recording of data and for future investigations of an area. This twice background (as noted by NUREG/CR-5849) is the low end of the range discernable for scanning instrumentation. During the scan survey the technician upon noting a "discernable" difference in the audio output from the meter will stop and attempt to locate the elevated area.

It is difficult to discriminate low levels of residual uranium contamination when other naturally occurring radionuclides are present which affect the gross count rate of the scan instrument. This twice guideline value seems to provide a sufficient margin for technicians when conducting a scan to conclude that residual contamination may be present when a signal exceeds the twice background level (i.e., a discernable audible increases above background). This discernable audible response alerts the surveyor to momentarily stop moving the probe (i.e., 2 to 3 seconds) and to investigate the response. The survey instruments utilized at Cimarron indicate increases in radioactivity levels via a higher or lower pitch. These changes in pitch are easier to detect than changes in the count rate.

In practice, surveyors **do not** make decisions on the basis of a single indication. Rather, upon noting an increased number of counts (i.e., change in pitch), they pause briefly and then decide whether to move on or take further measurements. Thus, this preliminary surveying consists of two components, i.e., continuous monitoring and stationary sampling. In the first component, characterized by continuous movement of the probe the surveyor has only a brief "look" at potential sources. The surveyor's criterion (i.e., willingness to decide that a signal is present) at this stage is likely to be liberal, in that the surveyor will respond positively on scant evidence, since the only "cost" of a false positive is a little added time. The second component occurs only after a positive response was made at the first stage. It is marked by the surveyor interrupting his scanning and holding the probe stationary for a period of time, while comparing the instrument output signal during that time to the background counting rate. For this decision, the criterion is more strict, since the cost of a "yes" decision is to spend considerably more time evaluating the location.

CIMARRON RESPONSES
NRC STAFF COMMENTS DATED FEBRUARY 9, 1998
ON THE PHASE III FINAL STATUS SURVEY PLAN

ATTACHMENT A

MARCH 18 NRC INSPECTION REPORT
DATA COMPARISON

Soil Sample and NRC Survey Results For Pit No. 3					
Location (Sample #)	Isotope	Cimarron pCi/g	Sample Size grams	NRC pCi/g	NRC µR/hr
1	U-234	10.2 +/- 3.06		5.86 +/- 1.5	
285N\510E	U-235	0.5 +/- 0.14		0.27 +/- 0.08	13
(137)	U-238	1.3 +/- 0.23		2.63 +/ - 0.7	
	Total U	11.9 +/- 3.44	661	8.8 +/ -2.2	
2	U-234	170 +/- 4.66		168.3 +/- 12.12	
370N\510E	U-235	8.0 +/- 0.22		7.58 +/- 0.63	12
(140)	U-238	54.0 +/- 0.45		60.76 +/- 4.47	
	Total U	232.3 +/- 5.33	684	233.12 +/- 16.59	
3	U-234	60.7 +/- 3.45		45.65 +/- 4.78	
340N\528E	U-235	2.8 +/- 0.16		2.1 +/- 0.19	14
(157)	U-238	17.5 +/- 0.3		16.95 +/- 1.78	
	Total U	81.1 +/- 3.91	691	62.6 +/- 6.57	
4	U-234	54.1 +/- 3.18		39.59 +/- 5.76	
296N\525E	U-235	2.5+/- 0.15		1.82 +/- 0.18	12
(178)	U-238	15.5 +/- 0.27		11.74 +/- 1.71	
	Total U	72.1 +/- 3.6	737	51.3 +/- 7.47	
5	U-234	26.1 +/- 2.64		19.35 +/- 4.15	
295N\526E	U-235	1.2 +/- 0.12		0.9 +/- 0.09	13
(180)	U-238	4.8 +/- 0.21		5.59 +/- 1.2	
	Total U	32.6 +/- 2.97	773	25.82 +/- 5.35	
6	U-234	44.6 +/- 2.99		33.26 +/- 4.08	
335N\520E	U-235	2.1 +/- 0.14		1.53 +/- 1.53	11
(182)	U-238	12.6 +/- 0.25		12.31 +/- 1.54	
	Total U	59.2 +/- 3.28	735	47.08 +/- 5.69	
7	U-234	36.9+/-2.73		24.35 +/- 4.05	
370N\510E	U-235	1.7 +/- 0.13		1.12 +/- 0.13	13
(183)	U-238	12.2 +/- 0.23		8.36 +/- 1.39	
	Total U	50.8 +/- 3.09	807	33.83 +/- 5.44	
8	U-234	53.1 +/- 3.05		45.43 +/- 5.64	
295N\525E	U-235	2.5 +/- 0.14		2.09 +/- 0.19	12
(184)	U-238	17.6 +/- 0.26		15.88 +/- 1.97	
	Total U	73.2 +/- 4.36	798	61.31 +/- 7.61	
9	U-234	42.5 +/- 2.69		30.25 +/- 3.48	
355N\520E	U-235	1.9 +/- 0.13		1.39 +/- 0.14	12
(185)	U-238	11.4 +/- 0.23		12.10 +/- 1.39	
	Total U	53.5 +/- 3.05	888	43.74 +/- 4.47	

URANIUM CONCENTRATIONS IN SOIL SAMPLES (USING GAMMA SPECTROMETRY) KERR-MCGEE CORPORATION, CIMARRON FACILITY CRESCENT, OKLAHOMA

Location	Uranium Concentration (pCi/g)			
	U-238	U-235	Total Uranium[a]	
			ESSAP	Licensee
Confirmatory Analyses				
#212	35.87 ± 1.39	7.69 ± 0.12	195.1	215
#153	21.30 ± 0.98	3.58 ± 0.07	95.4	99
#147	162.90 ± 1.91	30.75 ± 0.20	799.4	786
#457	8.46 ± 1.03	10.85 ± 0.15	233.1	249
#453	16.67 ± 0.64	4.79 ± 0.08	115.8	135
#420	21.67 ± 0.91	11.39 ± 0.12	257.4	197

[a]Total uranium was calculated by the sum of U-238, U-235, and U-234, using an U-234:U-235 activity ratio of 20, based on alpha spectrometry results.
[b]Refer to Figure 3.
[c]Uncertainties represent the 95% confidence level, based only on counting statistics.
[d]Refer to Figure 4.
[e]Refer to Figure 5.
[f]Total uranium concentrations for background samples are based on natural isotopic abundances.

SUBAREA "O" DATA COMPARISON

QA/QC URANIUM ANALYTICAL SAMPLE RESULTS (pCi/g)				
		Core Lab*	Cimarron Soil Counter**	
No.	Sample	Total -U	#1-Total-U	#2-Total U
1	A0-1984	221.7 ± 38.5	217.8 ± 7	
2	A0-2195	1.4 ± 0.8	5.0 ± 5	
3	A0-2110	165.5 ± 28.7	157.1 ± 8	
4	A0-2093	75.3 ± 13.2	82.1 ± 6	
5	A0-2024	104.3 ± 18.5	106.6 ± 6	
6	A0-1999	215.6 ± 42.3	194.4 ± 7	
7	A0-570	44.3 ± 7.9	44.5 ± 4.6	
8	A0-658	62.3 ± 11.9	46.8 ± 5.1	
9	A0-824	375.8 ± 75.6	333.2 ± 11.5	
10	MWP-1-1301	59.1 ± 7.6	48.0 ± 4.9	
11	MWP-1-1451	316.1 ± 57.2	312.6 ± 9.5	
12	MWP-1-456	44.8 ± 5.9	46.4 ± 7.8	
13	MWP-1-1422	76.7 ± 19.2	79.7 ±5.3	81.2 ± 3.2
14	MWP-1-1917	102.0 ± 24.8	106.1 ± 6.0	112.0 ± 3.1
15	MWP-1-1923	129.1 ± 31.4	123.1 ± 9.9	128.8 ± 4.0
16	MWP-1-1472	144.5 ± 42.8	123.7 ± 6.0	131.9 ± 3.8
17	MWP-1-1906	180.8 ± 51.1	158.0 ± 6.5	165.9 ± 4.4
18	MWP-1-1401	189.9 ± 45.5	175.0 ± 6.0	179.3 ± 3.5
19	MWP-1-1580	166.7 ± 38.5	164.3 ± 6.2	181.5 ± 4.3
20	MWP-1-1182	216.2 ± 50.9	189.5 ± 7.1	201.1 ± 4.3
21	MWP-1-1907	202.0 ± 50.8	194.3 ±6.8	207.0 ± 4.4
22	A0-523	39.6 ± 10.6	46.0 ± 4.6	46.7 ± 3.2
23	A0-1060	81.2 ± 21.5	70.3 ± 5.7	69.5 ± 3.9
24	A0-1047	97.7 ± 24.3	88.2 ± 6.4	90.7 ± 4.3
25	A0-1430	100.1 ± 25.1	101.1 ± 6.0	101.4 ± 4.1
26	A0-1402	142.0 ± 37.4	130.4 ± 6.2	138.1 ± 3.7
27	A0-3299	162.5 ± 39.8	146.8 ± 10.6	159.4 ± 3.8
28	A0-1426	151.8 ± 34.3	152.8 ± 9.9	160.8 ± 3.8
29	A0-3237	139.2 ± 34.0	154.3 ± 8.1	159.2 ± 4.5
30	A0-3294	229.7 ± 62.0	185.8 ± 7.9	201.3 ± 4.9
31	A0-3173	281.8 ± 73.7	232.5 ± 9.9	250.6 ± 5.3

*Core Lab analysis were alpha pulse height, with U-235/234/238 summed.

**Cimarron gamma spec performed on 600 to 1100 g soil samples.