The last 1.5 hours of each Friday was used for a short work station safety meeting by the area supervisors, the remainder of the time was used for a total shop housekeeping detail. In addition, a monthly safety meeting with all personnel was conducted by the Health Physics Supervisor. All of this attention to safety and housekeeping was to emphasize the importance of minimizing contamination and personnel exposure.

DATA COLLECTION

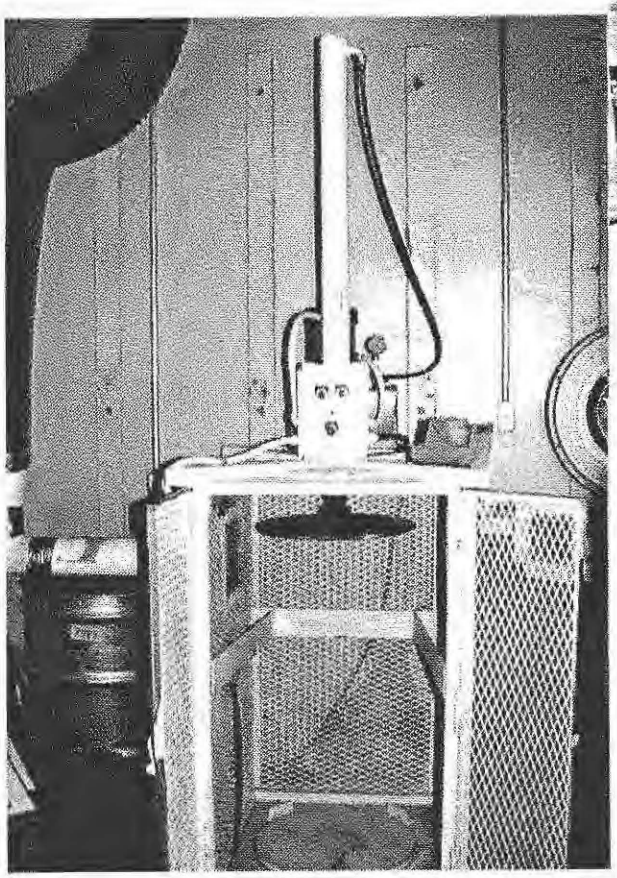
The following procedures are included in the Appendix of this report because they define the work that was performed, the way it was accomplished and the accuracy of the results.
These procedures were included in DOE Report No. 4, but are repeated here because they are examples of the way tasks and problems were solved at the Cimarron Facility. Data collection and the accuracy of the results are an important part of this final report.

Procedure KM-NC-10-83, Rev. 3 4-1-87
PLUTONIUM PLANT L.S.A. WASTE DRUM COUNTER.

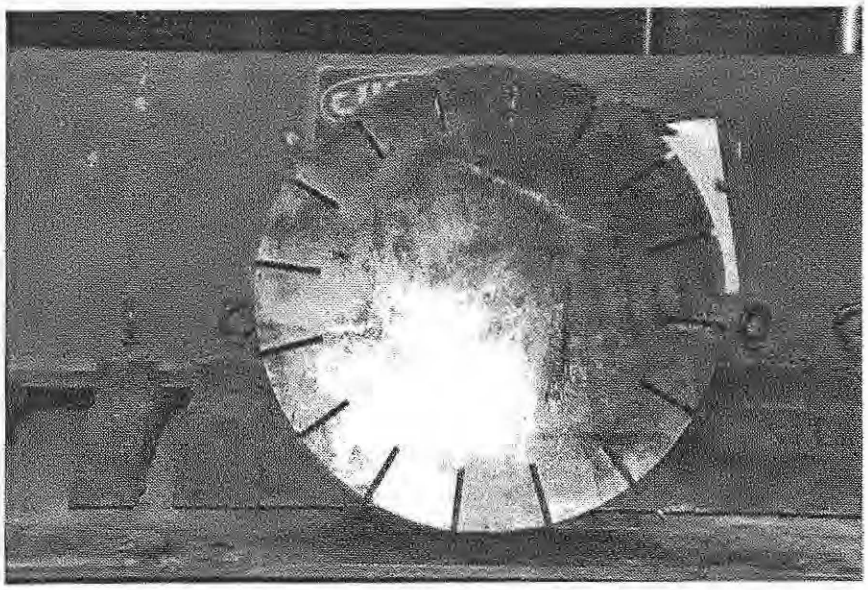
Procedure KM-NP-10-89, Rev. 0 4-12-84
PLUTONIUM PLANT N.D.A. COUNTING OF T.R.U. WASTE

DRUM LOADING - COMPACTION - SHIPPING CONTAINERS

L.S.A. drum loading are accomplished in the vault where a series of open top DOT 17-H drums are selectively filled with packages as they are accumulated from the decontamination operations. An inventory sheet is maintained on each drum. When several drums are filled and the materials contained are compressable, example: (wipes - rags - plastic, etc.) three or four drums full of this material are compacted into one drum using a shop made compactor. The Photos illustrate the 17H drums and the compactor cabinet.



Hold down discs were used during the compaction of plastic and wipes because the material being compacted will follow the ram back up to the top of the drum. The hold down disc peripheral fingers engage the convolutions in the sidewall of the drum and hold the contents compressed, usually two or three of these hold down discs are used in each drum.



T.R.U. WASTE PACKAGING

The T.R.U waste packaging system consists of the following:

A polyethylene drum liner .090" thick is placed inside a DOT galvanized and chromate treated drum. The drum liner is filled with assayed packages and the lid is glued shut. The drum lid is glued and gasketed down and the compression ring is bolted and sealed closed with a jam nut and wire cable seal.

The filled drum is transported in an N-55 shipping container. Kerr-McGee owns (38) thirty eight N-55 containers which have made (32) thirty two round trips to the Hanford T.R.U. waste repository.

The N-55 overpack is illustrated in the photos below.

HEALTH AND SAFETY PROGRAM

Safety Meetings and Related Subjects.

The weekly safety meeting consists of a topic of interest such as the use of ladders, or high-jackers when the next work week may contain tasks where a ladder or scaffold would be required. When a new tool is obtained, it becomes the topic of a safety meeting where proper use and operation are discussed and demonstrated. Safety meetings are also used to discuss shop problems where decommissioning operations may cause a temporary or permanent change in an established routine. Safety meetings are conducted by the area supervisor or a person he has designated to prepare a presentation on a specific topic. Safety meetings are also used to discuss near misses where quick thinking and evasive action prevented an accident.

The topic of the weekly safety meetings and the supervisor's observation of the effect of the meetings are reported in the supervisor's monthly progress report to management.

FIRE AND EMERGENCY EVACUATION

Each calendar quarter an emergency evacuation is conducted where everyone evacuates to the designated area. The attendance board is carried out by the first person leaving the building. When all personnel are accounted for and surveyed for contamination, the evacuation procedure is reviewed and a scenario of a potential emergency is discussed and a course of action is described which would apply to the emergency. Such topics as how to handle an injured contaminated person and the use of the emergency building and its facilities are typical of these sessions.

Photo shows air lock extension at the entrance to the emergency building.

The Cimarron Facility has developed the capability to cope with fire emergencys involving Class A, B and C fires plus the unique problems associated with radioactive materials.

Enriched Uranium and Plutonium pose problems from their radioactive contamination and toxicity potential plus the possibility of a criticality. A criticality incident may result from a fire or improper fire fighting techniques. Water, in some cases, can cause a nuclear reaction to occur. A change in shape by melting or settling due to fire is another criticality risk.

Work place fires are job and property loss potentials. Good housekeeping and the use of proper work procedures and maintenance, along with properly trained people and good emergency equipment are essential in a fire loss prevention program. The fire action plans of Kerr-McGee and the Cimarron Facility are designed for these contingencies.

Accidental Release of Radioactive Materials

Two large loose leaf binders full of health physics procdures, emergency procedures, and contingency plans all add to the ability to detect and cope with an accidental release of radioactive materials.

For brevity sake appropriate for this report Procedure KM,-NP-10-81 "Plutonium Out of Confinement - Leaks, Spilles, etc." is included. This procedure provides instruction in a summary form for proper response to situations involving accidental releases.

In addition, sections of our contingency plan and emergency procedures are attached which describe:

a. the ventilation containment system:
b. instrumentation and alarm systems for release detection;
c. emergency procedure training;
d. contingency classifications, notifications and actions;
e. recovery plans; and
f. administrative controls.

SUMMARY EXPOSURE DATA FOR OPERATING PERSONNEL

D & D of the Cimarron Facility plutonium plant resulted in a total whole body penetrating dose of 70 manRem spread over 26 people during a nine year period. The maximum total whole body penetrating dose received by any individual was 9.37 Rem for the entire nine years. The average total dose received for the nine year period was 2.69 Rem or an average of 0.3 Rem per year per individual. The administrative staff exposure was much lower and as a result was not factored in the average total dose of any of the charts as this would bias the averages low.

BIOASSAY REPORTS

Routine bioassay (urine) sample results were below the detection limit of .01 dpm/sample volume. Special samples, requested after detected releases of airborne contamination showed positive results in four cases, involving nine people

Maximum for a six day total voiding (fecal and urine) was 1245.2 dpm for one incident. The other totals for a six day voiding ranged from 7.32 dpm to 324.8 dpm. In all cases, subsequent samples have been 0.1 dpm per sample volume.

In-VIVO lung counts have never shown detectable depositions of Plutonium.

PERSONNEL FILM BADGE RESULTS FOR DECOMMISSIONING
PU-PLANT 10/79 to 9/88 EXPOSURES REPORTED IN REMS

MAX.	9.37
AVE.	2.69
MIN.	0.18

	BEGINNING		ENDING		
	LIFETIME	DATE	LIFETIME	DATE	TOTAL
1.	7.28	10/79	13.08	8/88	5.80
2.	4.72	10/79	7.73	8/88	3.02
3.	.17	10/79	4.99	4/84	4.82
4.	0	10/79	2.23	8/88	2.23
5.	0	10/79	1.22	6/81	1.22
6.	3.27	10/79	3.65	8/88	.38
7.	.23	10/79	3.87	8/88	3.64
8.	.19	10/79	1.12	8/88	.93
9.	3.99	10/79	5.81	8/88	1.82
10.	.11	10/79	2.65	8/88	2.54
11.	3.20	5/80	4.55	8/88	1.35
12.	7.37	5/80	10.25	8/88	2.88
13.	.12	9/80	7.76	8/88	7.64
14.	0	1/81	2.23	8/88	2.33
15.	0	7/81	2.60	8/88	2.60
16.	0	8/81	1.22	8/82	1.22
17.	0	9/81	.83	8/88	.83
18.	0	9/81	2.83	8/88	2.83
19.	0	9/81	.62	8/88	.62
20.	0	10/81	1.92	6/88	1.92
21.	0	10/81	9.31	8/88	9.37
22.	0	12/83	.18	4/85	.18
23.	0	2/85	1.91	8/88	1.91
24.	0	5/85	3.10	7/88	3.10
25.	0	5/85	2.69	8/88	2.69
26.	0	12/85	1.99	9/87	1.99
					69.86

INTERNAL EXPOSURE

The table below shows exposure estimate assignments, by year for the Cimarron Facility Plutonium Plant decommissioning.

YEAR	NUMBER OF PEOPLE	TOTAL MPC-HRS	AVERAGE MPC-HR PER PERSON FOR THE YEAR	AVERAGE MPC-HR PER PERSON PER WEEK
1979+	8	17.20	2.15	0.17
1980	9	179.72	19.97	0.38
1981	19	5.86	0.31	0.10
1982	21	534.30	25.44	0.49
1983	20	2200.47	110.02	2.12
1984	19	1563.60	82.29	2.74
1985	22	206.80	9.40	0.18
1986	19	420.70	22.14	0.43
1987	18	453.00	25.17	0.48
1988++	18	17.00	0.94	0.10

During the total time of 464 weeks, a total of 26 individuals received a total of 5,598.65 MPC hours resulting in an average of 215.33 MPC hours per individual for the 464 weeks or an average of 0.46 MPC hours per week.

+October through December (13 weeks)
++January through August (35 weeks)
* Exposure Estimates Assignments Based on Air Samples 0.1xMPC

The table below shows the total exposure estimate assignments for the 26 people engaged in the decommissioning activities over a nine year period.

Worker	MPC-HRS	Worker	MPC-HRS	Worker	MPC HRS
A	228.92	J	25.08	S	60.86
B	229.85	K	212.19	T	347.48
C	225.35	L	465.19	U	625.71
D	83.43	M	475.39	V	4.10
E	80.07	N	366.02	W	62.40
F	207.81	O	81.99	X	73.80
G	224.54	P	108.24	Y	47.80
H	14.40	Q	113.37	Z	54.50
I	194.90	R	985.26		

As can be seen, the maximum exposure estimate assignment to a single individual was 985.26 MPC-HRS.. This is an average of 2.12 MPC-HRS. per forty hour week over the total time.

This data compiled by Ronald L. Fine.

Air Effluent Monitoring

Exhaust stack sample results are shown below by calendar quarter. The table show the total gross alpha released as well as the concentration in microcuries per milliliter

1979	mCi/ml			1.28 E-14	8.8 E-15
	Total mCi			1.95	0.87
1980	mCi/ml	5.18 E-15	3.54 E-15	5.25 E-15	1.08 E-14
	Total mCi	0.81	0.66	1.04	2.17
1981	mCi/ml	2.59 E-14	6.59 E-15	3.03 E-15	5.80 E-15
	Total mCi	4.45	1.22	0.61	1.08
1982	mCi/ml	4.24 E-15	4.93 E-15	4.22 E-15	8.99 E-15
	Total mCi	0.73	0.92	0.79	1.67
1983	mCi/ml	1.51 E-14	7.57 E-15	3.59 E-15	1.28 E-14
	Total mCi	2.58	1.40	0.67	2.54
1984	mCi/ml	3.03 E-14	4.76 E-15	2.83 E-15	5.52 E-15
	Total mCi	4.76	0.89	0.53	1.03
1985	mCi/ml	1.15 E-15	3.95 E-15	9.72 E-16	2.11 E-15
	Total mCi	0.18	0.73	0.18	0.39
1986	mCi/ml	1.56 E-15	9.32 E-16	4.969 E-15	1.60 E-15
	Total mCi	0.25	0.17	0.93	0.30
1987	mCi/ml	4.06 E-15	2.24 E-15	1.67 E-15	3.13 E-15
	Total mCi	0.48	0.34	0.22	0.32
1988	mCi/ml	9.39 E-16	4.85 E-16		
	Total mCi	0.08	0.06		

Liquid Effulent

Decontamination solutions were cleaned up by filtration and ion exchange methods to < 0.1 MPC, or cemented for burial as LSA waste. No liquid effluent was released from the Facility. Domestic waste water and decontamination solutions < 0.1 MPC (< 4.0×10^{-7} mCi/ml) were pumped to sanitary lagoons (evaporation ponds with no outlet). Subsequently, the dry sludge was removed from the sanitary lagoons and shipped as LSA waste. Samples of the dry sludge showed a range of 2.89 to 17.7 picocuries of plutonium per gram with an average concentration of 10.79 picocuries/gram.

ANNUAL ENVIRONMENTAL SAMPLE RESULTS

The annual environmental sample results for the Cimarron Facility are included for review. These reports include both the Mixed Oxide Plutonium Plant and the Uranium Oxide Fuel Plant. The reports included are for the years 1983 through 1988 and include the analytical results of the weekly air samples and the locations where the samples were taken. Reports which show the results of the annual samples for surface water, well water, surface soil, subsurface soil and vegetation are also included. There were no appreciable variations in any of the results obtained during the decommissioning.

The reports for prior years when the plant was on standby are on file. They show no significant changes and were not considered pertinent to this report.

CIMARRON FACILITY
1983 ANNUAL ENVIRONMENTAL SAMPLES (AIR)

Analysis - Gross Alpha (μCi/ml E-14)

WEEK NUMBER	NORTHWEST ½ MILE SAMPLE NO. 1101	KN LAKE EAST SAMPLE NO. 1102	JUNCTION HWY 33/74 SAMPLE NO. 1103
1	0.57	0.64	1.0
2	1.6	2.4	1.9
3	2.8	2.8	1.4
4	2.7	2.1	1.2
5	*	*	*
6	2.2	2.1	1.4
7	3.9	4.0	2.7
8	1.6	1.8	1.2
9	1.0	1.2	1.6
10	1.3	1.7	1.2
11	1.8	2.3	1.0
12	1.1	1.6	1.1
13	1.1	3.8	1.2
14	*	*	*
15	1.2	1.5	0.74
16	1.2	1.1	*
17	1.3	1.6	1.1
18	0.60	1.7	0.97
19	1.6	1.4	*
20	0.75	0.69	*
21	0.75	1.1	1.4
22	0.88	0.66	0.69
23	1.4	1.1	0.93
24	1.3	1.3	0.68
25	0.41	0.78	0.44
26	1.0	0.79	0.89
27	1.0	1.5	*
28	0.90	0.86	1.3
29	1.0	1.2	0.93
30	1.3	0.53	1.1
31	*	0.87	*
32	1.0	1.4	1.0
33	1.2	1.8	1.1
34	0.64	0.84	0.75
35	1.4	1.3	1.7
36	1.5	1.9	1.5
37	0.63	0.58	0.79
38	1.2	0.89	0.28
39	1.2	1.1	1.4
40	1.5	1.7	1.8
41	1.8	1.6	1.3
42	*	*	*
43	0.52	0.64	0.48
44	1.4	1.3	1.4
45	0.76	0.88	0.80
46	0.94	2.8	1.1
47	3.0	0.53	0.73
48	0.58	0.70	0.39
49	0.24	0.67	1.0
50	0.42	0.56	0.76
51	*	*	*
52	0.16	0.36	0.35

* No Sample

CHEMRON FACILITY
1983 ANNUAL ENVIRONMENTAL SAMPLES

Revised 4-30-84

SAMPLE LOCATION	SAMPLE NUMBER	DATE (1983)	GROSS ALPHA (pCi/l)	GROSS BETA (pCi/l)	Pu-239 (pCi/l)	U (mg/l)	F (mg/l)	NO_3 (mg/l)
Surface Water								
River - Upstream	1201	06/15	<10	<20	0.015 ± 0.007	0.011	0.4	9
River - Downstream	1202	06/16	<10	<20	0.008 ± 0.011	0.005	0.4	4
Pond NW of Plant	1203	06/15	<10	<20	0.019 ± 0.013	0.014	0.3	1
Pond West of Plant	1204	06/24	<10	<20	0.006 ± 0.006	0.005	0.3	2
KM Lake East	1205	06/14	<10	<20	0.003 ± 0.004	0.004	0.4	2
Pond NW of Incinerator	1206	06/16	160	160	0.008 ± 0.007	0.106	3.0	220
Stream NW of Old Pond 2	1208	06/22	<10	<20	0.004 ± 0.004	0.004	1.3	2
KM Lake West	1209	06/14	<10	<20	0.009 ± 0.006	0.004	0.4	2
Sanitary Lagoon East	1212	06/14	90	<20	0.010 ± 0.008	0.028	0.8	6
Sanitary Lagoon West	1213	06/14	14	<20	0.004 ± 0.004	0.011	0.8	4
Well Water								
North of Plant	1301	06/17	<10	<20	0.017 ± 0.015	0.011	0.8	10
SW of Old Pond 1 (dry)	1302	06/15	---	---	---	---	---	---
Farm SE of Plant	1303	06/15	<10	<20	0.009 ± 0.006	0.004	0.4	8
NW of Old Pond 1 (dry)	1304	06/15	---	---	---	---	---	---
NW of Old Pond 2	1305	06/15	370	1350	0.007 ± 0.006	0.007	2.4	170
SE of Old Pond 2 (dry)	1306	06/15	---	---	---	---	---	---
Junction Hwy 33 and 74	1307	06/14	<10	<20	0.011 ± 0.007	0.004	0.5	10
NE of Old Pond 2 (dry)	1308	06/15	---	---	---	---	---	---
SW of Old Pond 2 (dry)	1309	06/15	---	---	---	---	---	---
South of Old Pond 2 (dry)	1310	06/15	---	---	---	---	---	---
Vegetation					(pCi/g)	(µg/g)	(µg/g)	
North ½ Mile	1501	06/16			0.0004 ± 0.0004	0.18	6.	
North U Fence Line	1502	06/14			0.001 ± 0.0004	0.08	<1.	
South U Fence Line	1503	06/25			0.0007 ± 0.0006	0.18	<1.	
South ½ Mile	1504	06/14			0.0009 ± 0.0004	0.19	<1.	
East ½ Mile	1505	06/21			0.0004 ± 0.0003	0.18	5.	
West ½ Mile	1506	06/24			0.0006 ± 0.0004	0.19	<1.	
Covered Pu Pond	1507	06/21			0.0006 ± 0.0004	0.08	<1.	
Covered Pond 1	1508	06/16			0.0004 ± 0.0003	0.16	<1.	
Covered Pond 2	1509	06/16			0.0007 ± 0.0004	0.04	<1.	
Old Burial Pit	1510	06/21			0.006 ± 0.004	0.13	<1.	
North Pu Fence Line	1511	06/25			0.001 ± 0.0005	0.18	11.	

CIMARRON FACILITY
1983 ANNUAL ENVIRONMENTAL SAMPLES

Revised 4-30-84

SAMPLE LOCATION	SAMPLE NUMBER	DATE (1983)	U-238 (µg/g)	Pu-239 (pCi/g)	F (µg/g)
Soil Surface					
North ½ Mile	1401	06/16	0.5	0.001 ± 0.001	130
North U Fence Line	1402	06/15	1.0	0.0008 ± 0.0007	130
South U Fence Line	1403	06/25	2.0	0.001 ± 0.001	130
South ½ Mile	1404	06/15	9.0	0.0008 ± 0.0005	350
East ½ Mile	1405	06/21	0.6	0.002 ± 0.001	78
West ½ Mile	1406	06/24	0.9	0.001 ± 0.0008	90
North 1 Mile	1407	06/21	0.3	0.0007 ± 0.0006	28
South 1 Mile	1408	06/25	9.0	0.0009 ± 0.0005	100
East 1 Mile	1409	06/16	0.9	0.0007 ± 0.0006	90
West 1 Mile	1410	06/26	1.0	0.0007 ± 0.0006	89
Northeast 1 Mile	1411	06/21	1.0	0.001 ± 0.0007	70
Northwest 2 Miles	1412	06/21	1.0	0.0008 ± 0.0007	88
Southwest 2 Miles	1413	06/21	1.0	0.0006 ± 0.0005	100
Southeast 2 Miles	1414	06/24	1.0	0.001 ± 0.0008	220
North 3.5 Miles	1415	06/21	1.0	0.0008 ± 0.0006	190
North 5 Miles	1416	06/21	1.0	0.0004 ± 0.0003	46
North 10 Miles	1417	06/21	0.6	0.001 ± 0.0007	67
North Pu Fence Line	1418	06/25	0.2	0.001 ± 0.0007	95
Soil Sub-Surface					
North ½ Mile	1401	06/16	0.6	0.0006 ± 0.0004	77
North U Fence Line	1402	06/15	2.0	0.0002 ± 0.001	160
South U Fence Line	1403	06/25	2.0	0.003 ± 0.0008	82
South ½ Mile	1404	06/15	0.6	0.003 ± 0.008	350
East ½ Mile	1405	06/21	0.6	0.001 ± 0.0007	45
West ½ Mile	1406	06/24	0.6	0.001 ± 0.0005	87
North 1 Mile	1407	06/21	0.3	0.0007 ± 0.0006	37
South 1 Mile	1408	06/25	9.0	0.001 ± 0.0007	130
East 1 Mile	1409	06/16	0.3	0.0008 ± 0.0006	90
West 1 Mile	1410	06/26	1.0	0.0006 ± 0.0005	87
Northeast 1 Mile	1411	06/21	1.0	0.0007 ± 0.0005	17
Northwest 2 Miles	1412	06/21	1.0	0.001 ± 0.0006	92
Southwest 2 Miles	1413	06/21	1.0	0.0007 ± 0.0005	92
Southeast 2 Miles	1414	06/24	1.0	0.0008 ± 0.0006	220
North 3.5 Miles	1415	06/21	1.0	0.001 ± 0.0006	25
North 5 Miles	1416	06/21	1.0	0.001 ± 0.0007	26
North 10 Miles	1417	06/21	1.0	0.0006 ± 0.0004	88
North Pu Fence Line	1418	06/25	1.0	0.0007 ± 0.0006	86

CIMARRON FACILITY
1984 ANNUAL ENVIRONMENTAL SAMPLES
(AIR)

Analysis - Gross Alpha
(μCi/ml E-14)

WEEK NUMBER	NORTHWEST ½ MILE SAMPLE NUMBER 1101	KM LAKE EAST SAMPLE NUMBER 1102	JUNCTION HWY 33/74 SAMPLE NUMBER 1103
1	0.35	0.67	0.55
2	1.1	3.3	1.6
3	*	*	*
4	0.75	5.5	2.6
5	0.53	1.5	0.93
6	1.1	0.45	1.5
7	0.70	*	1.2
8	4.6	1.6	1.4
9	4.8	8.3	1.2
10	6.3	1.5	1.7
11	9.1	1.5	9.3
12	6.7	5.9	9.3
13	0.29	1.1	0.83
14	0.86	1.2	0.72
15	0.36	0.63	1.0
16	0.38	0.79	0.74
17	0.55	1.1	0.78
18	0.79	1.3	0.93
19	1.1	1.2	1.1
20	0.57	0.70	1.4
21	0.54	0.52	0.52
22	0.64	0.83	*
23	1.0	1.2	0.88
24	0.75	1.0	1.4
25	0.71	1.3	0.96
26	0.67	1.1	1.2
27	1.2	1.2	*
28	1.0	1.1	0.85
29	*	*	*
30	0.40	1.2	1.4
31	1.5	1.9	0.50
32	0.65	1.1	0.73
33	0.81	1.5	0.81
34	1.8	1.7	2.6
35	0.86	1.1	1.4
36	0.57	*	0.87
37	0.61	0.95	1.0
38	0.61	0.90	0.65
39	0.98	0.91	0.95
40	0.50	1.1	1.4
41	2.4	1.1	1.0
42	1.2	*	0.57
43	*	*	*
44	0.12	*	0.36
45	0.48	0.46	0.68
46	0.80	0.91	0.52
47	0.50	0.55	0.32
48	0.56	0.59	0.31
49	0.67	0.92	0.55
50	0.49	1.2	0.42
51	0.51	*	0.24
52	0.28	0.43	0.37

* No Sample.

CIMARRON FACILITY
1984 ANNUAL ENVIRONMENTAL SAMPLES

SAMPLE LOCATION	SAMPLE NUMBER	DATE (1984)	GROSS ALPHA (pCi/l)	GROSS BETA (pCi/l)	Pu-239 (pCi/l)	U (mg/l)	F (mg/l)	NO_3 (mg/l)
Surface Water								
River - Upstream	1201	6/22	17	<20	0.007 ± 0.006	0.018	8	<1
River - Downstream	1202	6/22	38	<20	0.007 ± 0.006	0.048	<1	12
Pond Northwest of Plant	1203	6/22	16	<20	0.021 ± 0.009	0.010	8	2
Pond West of Plant	1204	6/22	14	<20	0.003 ± 0.004	0.009	<1	1
Kerr-McGee Lake East	1205	6/22	<10	<20	0.006 ± 0.005	0.008	<1	<1
Pond NW of Incinerator	1206	6/22	Dry	---	Dry	-----	Dry	---
Stream NW of Old Pond 2	1208	6/22	Dry	---	Dry	-----	Dry	---
Kerr-McGee Lake West	1209	6/22	<10	<20	0.021 ± 0.009	0.008	<1	<1
Sanitary Lagoon East	1212	6/22	33	<20	0.004 ± 0.005	0.010	<1	1
Sanitary Lagoon West	1213	6/22	35	<20	0.007 ± 0.006	0.008	<1	<1
Well Water								
North of Plant	1301	6/22	10	<20	0.015 ± 0.007	0.009	15	2
SW of Old Pond 1 (dry)	1302	6/22	---	---	---	-----	---	---
Farm Southeast of Plant	1303	6/22	<10	<20	0.009 ± 0.006	0.008	<1	<1
NW of Old Pond 1 (dry)	1304	6/22	---	---	---	-----	---	---
NW of Old Pond 2	1305	6/22	260	790	0.012 ± 0.007	0.007	<1	120
SE of Old Pond 2 (dry)	1306	6/22	---	---	---	-----	---	---
Junction Hwy 33 and 74	1307	6/22	<10	<20	0.008 ± 0.007	0.002	<1	2
NE of Old Pond 2 (dry)	1308	6/22	---	---	---	-----	---	---
SW of Old Pond 2 (dry)	1309	6/22	---	---	---	-----	---	---
South of Old Pond 2 (dry)	1310	6/22	---	---	---	-----	---	---
Vegetation					(pCi/g)	(µg/g)	(µg/g)	
North ½ Mile	1501	6/20			0.0011 ± 0.0009	0.52	8	
North U Fence Line	1502	6/22			0.0003 ± 0.0004	0.62	31	
South U Fence Line	1503	6/21			0.0044 ± 0.0019	0.29	11	
South ½ Mile	1504	6/21			0.0003 ± 0.0004	0.29	<5	
East ½ Mile	1505	6/21			0.0012 ± 0.0007	1.0	<5	
West ½ Mile	1506	6/21			0.0003 ± 0.0003	0.24	<5	
Covered Pu Pond	1507	6/22			0.0018 ± 0.0008	0.05	<5	
Covered Pond 1	1508	6/22			0.0003 ± 0.0004	0.24	11	
Covered Pond 2	1509	6/22			0.0003 ± 0.0004	0.05	12	
Old Burial Pit	1510	6/22			0.0003 ± 0.0004	0.14	11	
North Pu Fence Line	1511	6/22			0.0003 ± 0.0004	0.34	28	

CIMARRON FACILITY

1984 ANNUAL ENVIRONMENTAL SAMPLES

SAMPLE LOCATION	SAMPLE NUMBER	DATE (1984)	U-238 (µg/g)	Pu-239 (pCi/g)	F (µg/g)
Soil Surface					
North ½ Mile	1401	6/20	0.88	0.002 ± 0.001	470
North U Fence Line	1402	6/22	4.8	0.002 ± 0.001	380
South U Fence Line	1403	6/21	4.7	0.001 ± 0.0007	230
South ½ Mile	1404	6/21	0.68	0.001 ± 0.0006	530
East ½ Mile	1405	6/21	0.71	0.001 ± 0.0007	170
West ½ Mile	1406	6/21	0.58	0.007 ± 0.001	320
North 1 Mile	1407	6/20	0.49	0.006 ± 0.002	180
South 1 Mile	1408	6/21	1.3	0.012 ± 0.002	250
East 1 Mile	1409	6/21	0.97	0.009 ± 0.002	240
West 1 Mile	1410	6/20	0.83	0.001 ± 0.001	180
Northeast 1 Mile	1411	6/20	0.74	0.007 ± 0.002	190
Northwest 2 Miles	1412	6/20	0.78	0.005 ± 0.004	240
Southwest 2 Miles	1413	6/21	0.48	0.004 ± 0.002	240
Southeast 2 Miles	1414	6/21	0.90	0.002 ± 0.001	260
North 3.5 Miles	1415	6/20	1.3	0.004 ± 0.002	81
North 5 Miles	1416	6/20	0.53	0.003 ± 0.001	140
North 10 Miles	1417	6/20	0.62	0.009 ± 0.003	160
North Pu Fence Line	1418	6/22	1.3	0.003 ± 0.001	150
Soil Sub-Surface					
North ½ Mile	1401	6/20	0.94	0.002 ± 0.001	280
North U Fence Line	1402	6/22	3.8	0.003 ± 0.003	250
South U Fence Line	1403	6/21	1.0	0.002 ± 0.002	200
South ½ Mile	1404	6/21	1.1	0.010 ± 0.003	440
East ½ Mile	1405	6/21	1.2	0.005 ± 0.002	140
West ½ Mile	1406	6/21	1.2	0.002 ± 0.002	230
North 1 Mile	1407	6/20	0.56	0.003 ± 0.001	110
South 1 Mile	1408	6/21	1.2	0.005 ± 0.002	150
East 1 Mile	1409	6/21	0.60	0.006 ± 0.003	120
West 1 Mile	1410	6/20	0.32	0.006 ± 0.002	140
Northeast 1 Mile	1411	6/20	0.69	0.008 ± 0.003	110
Northwest 2 Miles	1412	6/20	0.69	0.009 ± 0.003	120
Southwest 2 Miles	1413	6/21	1.1	0.002 ± 0.002	210
Southeast 2 Miles	1414	6/21	1.0	0.002 ± 0.002	250
North 3.5 Miles	1415	6/20	1.1	0.002 ± 0.002	76
North 5 Miles	1416	6/20	0.63	0.011 ± 0.004	73
North 10 Miles	1417	6/20	0.74	0.001 ± 0.001	140
North Pu Fence Line	1418	6/22	1.2	0.005 ± 0.002	220

CIMARRON FACILITY
1985 ANNUAL ENVIRONMENTAL SAMPLES
(AIR)

Analysis - Gross Alpha
(uCi/ml x E-14)

Week Number	Northwest ½ Mile Sample 1101	KM Lake East Sample 1102	Junction Hwy 33/74 Sample 1103	Week Number	Northwest ½ Mile Sample 1101	KM Lake East Sample 1102	Junction Hwy 33/74 Sample 1103
01	0.89	2.1	0.86	27	0.79	0.90	1.1
02	1.8	2.5	2.2	28	0.96	0.90	1.9
03	0.84	1.5	0.91	29	1.0	1.0	1.5
04	1.9	1.2	1.7	30	0.69	1.0	0.93
05	*	*	*	31	0.56	1.2	0.58
06	3.0	1.5	0.54	32	0.83	0.90	0.63
07	0.9	0.99	0.42	33	0.27	0.64	0.66
08	0.99	0.56	0.93	34	0.27	0.75	0.70
09	2.3	0.84	0.96	35	0.15	0.79	0.77
10	0.94	5.0	0.60	36	2.0	0.75	0.93
11	0.84	1.2	0.77	37	0.27	0.28	0.97
12	0.80	1.2	0.49	38	0.24	0.39	0.27
13	0.81	1.3	0.52	39	0.29	1.8	0.29
14	0.82	0.85	0.66	40	0.27	0.68	0.47
15	0.76	1.0	0.46	41	0.20	0.36	0.79
16	1.1	1.5	0.27	42	0.35	0.36	0.28
17	0.64	0.43	1.1	43	0.15	1.2	0.67
18	0.63	1.0	1.9	44	0.18	0.39	0.40
19	2.4	8.9	1.1	45	0.10	0.42	0.41
20	0.42	0.66	0.15	46	0.25	0.10	0.20
21	0.53	2.8	*	47	0.10	0.50	0.69
22	*	*	*	48	0.20	0.14	0.61
23	2.3	0.52	*	49	0.20	0.64	0.41
24	0.48	0.86	1.5	50	0.41	0.34	0.45
25	1.2	0.78	1.8	51	0.27	0.32	0.38
26	*	*	*	52	0.15	1.1	0.41

* No Sample.

CIMARRON FACILITY
1985 ANNUAL ENVIRONMENTAL SAMPLES

Surface Water

Sample Location	Sample Number	Date (1985)	Gross Alpha (pCi/l)	Gross Beta (pCi/l)	Pu-239 (pCi/l)	U (mg/l)	F (mg/l)	NO_3 (mg/l)
River - Upstream	1201	06/22	<10	<20	0.007 ± 0.005	0.005	<0.2	<5.
River - Downstream	1202	06/22	23	22	0.003 ± 0.002	<0.002	<0.2	<5.
Pond Northwest of Plant	1203	06/22	18	<20	0.003 ± 0.002	<0.002	<0.2	<5.
Pond West of Plant	1204	06/22	22	<20	0.007 ± 0.004	<0.002	0.4	2.
Kerr-McGee Lake East	1205	06/22	16	<20	0.005 ± 0.003	<0.002	0.3	<0.2
Pond NW of Incinerator	1206	06/22	195	216	0.002 ± 0.002	0.15	4.	130.
Stream NW of Old Pond 2	1208	06/22	<10	<20	0.002 ± 0.002	<0.002	0.6	0.6
Kerr-McGee Lake West	1209	06/22	<10	<20	0.008 ± 0.004	<0.002	8.1	43.
Sanitary Lagoon East	1212	06/22	<10	<20	0.009 ± 0.004	0.005	0.6	0.8
Sanitary Lagoon West	1213	06/22	18	<20	0.007 ± 0.003	0.011	2.	0.7

CIMARRON FACILITY
1985 ANNUAL ENVIRONMENTAL SAMPLES

Well Water

Sample Location	Sample Number	Date (1985)	Gross Alpha (pCi/l)	Gross Beta (pCi/l)	Pu-239 (pCi/l)	U (mg/l)	F (mg/l)	NO_3 (mg/l)
North of Plant	1301	06/23	<10	<20	0.015 ± 0.008	0.009	0.1	<0.2
Southwest of Old Pond 2	1302	07/02	Dry	Dry	Dry	Dry	Dry	Dry
Farm Southeast of Plant	1303	06/27	<10	<20	0.003 ± 0.002	<0.002	0.9	2
Northwest of Old Pond 1	1304	07/02	Dry	Dry	Dry	Dry	Dry	Dry
Northwest of Old Pond 2	1305	07/02	37	124	0.008 ± 0.005	0.006	9.	23.
Southeast of Old Pond 2	1306	07/02	Dry	Dry	Dry	Dry	Dry	Dry
Junction Hwy 33/74	1307	06/23	<10	<20	0.014 ± 0.007	<0.002	0.3	5.
Northeast of Old Pond 2	1308	07/02	Dry	Dry	Dry	Dry	Dry	Dry
Southwest of Old Pond 2	1309	07/02	Dry	Dry	Dry	Dry	Dry	Dry
South of Old Pond 2	1310	07/02	Dry	Dry	Dry	Dry	Dry	Dry
South of Landfill	1311	06/21	10	31	0.015 ± 0.007	<0.002	<0.2	57.
West of Landfill	1312	06/21	2,200	8,275	0.020 ± 0.008	0.26	83	<20.
North of Landfill	1313	06/21	453	1,512	0.003 ± 0.003	0.070	120.	<5.
South of Burial Pit	1314	07/02	<10	<20	0.007 ± 0.003	<0.002	0.4	2.
North of Burial Pit	1315	07/02	3,125	189	0.019 ± 0.008	5.56	<0.2	11.
Northwest of Burial Pit	1316	07/02	200	<20	0.020 ± 0.008	0.19	<0.2	11.
North of Burial Pit	1317	07/02	20	27	0.003 ± 0.003	<0.002	<0.1	25.

CIMARRON FACILITY
1985 ANNUAL ENVIRONMENTAL SAMPLES

Surface Soil

Sample Location	Sample Number	Date (1985)	Pu-239 (pCi/g)	U (ug/g)	F (ug/g)
North ½ Mile	1401	07/02	0.01 ± 0.001	0.59	150.
North Fence	1402	06/26	0.012 ± 0.002	6.6	150.
South Fence	1403	07/03	0.002 ± 0.001	0.85	100.
South ½ Mile	1404	06/22	0.005 ± 0.001	<0.03	360.
East ½ Mile	1405	06/26	0.007 ± 0.001	0.07	110.
West ½ Mile	1406	07/02	0.014 ± 0.002	0.29	120.
North 1 Mile	1407	06/27	0.005 ± 0.001	0.42	73.
South 1 Mile	1408	06/27	0.003 ± 0.001	0.03	160.
East 1 Mile	1409	07/02	0.003 ± 0.001	0.16	94.
West 1 Mile	1410	07/03	0.008 ± 0.003	0.20	130.
Northeast 1 Mile	1411	06/29	0.006 ± 0.002	0.27	89.
Northwest 2 Miles	1412	06/29	0.004 ± 0.001	0.63	130.
Southwest 2 Miles	1413	06/29	0.003 ± 0.001	<0.03	170.
Southeast 2 Miles	1414	07/02	0.006 ± 0.001	0.13	290.
North 3.5 Miles	1415	06/29	0.001 ± 0.001	<0.03	63.
North 5 Miles	1416	06/29	0.002 ± 0.001	0.45	33.
North 10 Miles	1417	06/29	0.004 ± 0.001	0.13	120.
North Pu Fence	1418	07/03	0.003 ± 0.001	0.33	120.

CIMARRON FACILITY
1985 ANNUAL ENVIRONMENTAL SAMPLES

Subsurface Soil

Sample Location	Sample Number	Date (1985)	Pu-239 (pCi/g)	U (ug/g)	F (ug/g)
North ½ Mile	1401	07/02	0.001 ± 0.001	0.85	200.
North Fence	1402	06/26	0.001 ± 0.001	3.5	160.
South Fence	1403	07/03	0.003 ± 0.001	1.2	120.
South ½ Mile	1404	06/22	0.010 ± 0.002	0.98	330.
East ½ Mile	1405	06/26	0.006 ± 0.001	<0.03	110.
West ½ Mile	1406	07/02	0.008 ± 0.002	0.53	130.
North 1 Mile	1407	06/27	0.005 ± 0.002	0.71	78.
South 1 Mile	1408	06/27	0.003 ± 0.001	0.21	160.
East 1 Mile	1409	07/02	0.004 ± 0.001	1.2	120.
West 1 Mile	1410	07/03	0.006 ± 0.001	0.36	130.
Northeast 1 Mile	1411	06/29	0.002 ± 0.001	0.72	64.
Northwest 2 Miles	1412	06/29	0.002 ± 0.001	0.86	97.
Southwest 2 Miles	1413	06/29	0.009 ± 0.003	<0.04	130.
Southeast 2 Miles	1414	07/02	0.003 ± 0.001	1.14	260.
North 3.5 Miles	1415	06/29	0.001 ± 0.001	<0.03	51.
North 5 Miles	1416	06/29	0.02 ± 0.001	0.16	42.
North 10 Miles	1417	06/29	0.0010 ± 0.0005	<0.03	160.
North Pu Fence	1418	07/03	0.002 ± 0.001	0.33	120.

CIMARRON FACILITY
1985 ANNUAL ENVIRONMENTAL SAMPLES

Vegetation

Sample Location	Sample Number	Date (1985)	Pu-239 (pCi/g)	U (ug/g)	F (ug/g)
North ½ Mile	1501	06/23	0.0002 ± 0.0002	0.02	6.
North Fence	1502	06/26	0.0002 ± 0.0002	0.07	5.
South Fence	1503	07/03	0.002 ± 0.001	0.03	1.
South ½ Mile	1504	06/23	0.0003 ± 0.0002	0.05	5.
East ½ Mile	1505	06/23	0.0002 ± 0.0002	0.03	4.
West ½ Mile	1506	06/23	0.0005 ± 0.0003	0.04	5.
Covered Pu Pond	1507	07/03	0.0005 ± 0.0003	0.05	4.
Covered Pond 1	1508	06/26	0.0011 ± 0.0004	0.03	5.
Covered Pond 2	1509	06/26	0.0005 ± 0.0003	0.04	6.
Old Burial Ground	1510	06/23	0.003 ± 0.001	0.07	3.
North Pu Fence	1511	07/03	0.0003 ± 0.0002	0.06	6.

:IMA FACI
1986 ANNUAL ENVIRONMENTAL SAMPLES
AIR
Analysis - Gross Alpha
(uCi/ml x E-14)

Week Number	Northwest 1/2 Mile Sample 1101	KM Lake East Sample 1102	Junction Hwy. 33/74 Sample 1103	Week Number	Northwest 1/2 Mile Sample 1101	KM Lake East Sample 1102	Junction Hwy 33/74 Sample 1103
01	1.2	1.5	<0.1	27	*	*	*
02	0.14	1.4	1.1	28	0.50	0.67	0.66
03	<0.1	2.7	1.8	29	0.80	0.37	0.57
04	*	1.2	1.2	30	0.47	0.28	0.53
05	1.2	1.5	0.92	31	0.75	0.73	0.81
06	*	*	*	32	1.2	0.28	0.57
07	0.52	1.1	1.2	33	0.54	0.55	0.32
08	0.48	1.4	1.6	34	0.30	1.2	0.55
09	1.0	1.2	1.5	35	0.48	0.34	0.36
10	1.0	1.0	1.0	36	0.21	0.16	0.44
11	0.48	0.56	0.56	37	0.22	0.26	0.52
12	0.84	0.84	1.4	38	0.51	0.29	0.34
13	1.3	*	1.3	39	*	*	*
14	1.2	0.76	0.96	40	0.47	0.41	0.59
15	0.92	0.84	1.2	41	0.92	0.79	0.74
16	0.72	0.96	0.80	42	1.2	1.6	1.7
17	0.84	0.84	1.1	43	0.83	0.74	1.0
18	*	1.2	0.88	44	0.71	0.86	0.63
19	*	0.80	*	45	0.20	0.70	0.54
20	0.96	0.52	0.68	46	0.47	0.87	1.0
21	1.4	0.72	0.52	47	0.37	0.94	0.58
22	0.64	0.68	0.88	48	0.91	0.44	0.94
23	0.55	0.64	0.82	49	0.42	0.42	0.23
24	0.78	0.60	0.63	50	0.65	0.38	0.34
25	0.83	0.64	0.42	51	0.27	0.34	0.34
26	0.62	0.56	0.80	52	0.26	0.52	0.36

*No Sample.

0613E

CIMARRON FACILITY
1986 ANNUAL ENVIRONMENTAL SAMPLES
SURFACE WATER

Sample Location	Sample Number	Date (1986)	Gross Alpha (pCi/l)	Gross Beta (pCi/l)	Pu-239 (pCi/l)	U (mg/l)	F (mg/l)	NO_3 (mg/l)
River - Upstream	1201	06/28	<10	21	<0.1	0.004	0.3	4
River - Downstream	1202	06/28	<10	<20	<0.1	0.004	0.3	4
Pond Northwest of Plant	1203	06/28	<10	<20	<0.1	0.005	0.3	<1
Pond West of Plant	1204	06/28	<10	<20	<0.1	0.006	0.4	1
Kerr-McGee Lake East	1205	06/10	<10	<20	<0.1	0.002	0.3	<1
Pond NW of incinerator	1206	06/28	130	199	<0.1	0.11	3.4	21
Stream NW of Old Pond 2	1208	06/28	46	600	<0.1	0.008	18	15
Kerr-McGee Lake West	1209	06/10	<10	<20	<0.1	0.002	0.4	2
Sanitary Lagoon East*	1212	--	--	--	--	--	--	--
Sanitary Lagoon West*	1213	--	--	--	--	--	--	--
New Sanitary Lagoon	1214	06/28	230	72	<0.1	0.21	1.1	1

*Lagoon not in use

0613E

CIMARRON FACILITY
1986 ANNUAL ENVIRONMENTAL SAMPLES

WELL WATER

Sample Location	Sample Number	Date (1986)	Gross Alpha (pCi/l)	Gross Beta (pCi/l)	Pu-239 (pCi/l)	U (mg/l)	F (mg/l)	NO_3 (mg/l)
North of Plant	1301	06/26	<20	<50	<0.1	0.016	1.0	17
Southwest of Old Pond 2	1302	06/28*	--	--	--	--	--	--
Farm Southeast of Plant	1303	06/28**	--	--	--	--	--	--
Northwest of Old Pond 1	1304	06/28*	--	--	--	--	--	--
Northwest of Old Pond 2	1305	06/26	36	396	<0.1	0.007	2.4	57
Southeast of Old Pond 2	1306	06/26*	--	--	--	--	--	--
Junction Hwy 33/74	1307	06/28	15	<20	<0.1	0.002	0.2	1
Northeast of Old Pond 2	1308	06/26*	--	--	--	--	--	--
Southwest of Old Pond 2	1309	06/26*	--	--	--	--	--	--
South of Old Pond 2	1310	06/26*	--	--	--	--	--	--
South of Landfill	1311	06/26	<10	<20	<0.1	0.003	0.4	87
West of Landfill	1312	06/28	94	7300	<0.1	0.017	59	1310
North of Landfill	1313	06/28	230	3000	<0.1	0.077	157	690
South of Burial Pit	1314	06/26	<10	<20	<0.1	0.002	1.5	9
North of Burial Pit	1315	06/26	5400	740	<0.1	7.0	0.5	5
Northwest of Burial Pit	1316	06/26	608	140	<0.1	1.6	0.8	4
North of Burial Pit	1317	06/26	<10	21	<0.1	0.02	0.4	8
Leo's Corral	1318	06/25	<10	<20	<0.1	0.004	0.4	2

*Dry well

**Well out of service

0613E

CIMARRON FACILITY

1986 ANNUAL ENVIRONMENTAL SAMPLES

SURFACE SOIL

Sample Location	Sample Number	Date (1986)	Pu-239 (pCi/1)	U (ug/g)	F (ug/g)
North 1/2 Mile	1401	06/28	<0.1	0.70	100
North Fence	1402	06/30	<0.1	35	350
South Fence	1403	07/02	<0.1	4.5	118
South 1/2 Mile	1404	06/28	<0.1	0.92	363
East 1/2 Mile	1405	07/02	<0.1	0.68	117
West 1/2 Mile	1406	06/28	<0.1	0.98	135
North 1 Mile	1407	06/28	<0.1	0.59	98
South 1 Mile	1408	06/27	<0.1	0.91	167
East 1 Mile	1409	06/28	<0.1	0.85	97
West 1 Mile	1410	07/02	<0.1	0.72	116
Northeast 1 Mile	1411	06/27	<0.1	0.88	80
Northwest 2 Miles	1412	06/28	<0.1	0.78	117
Southwest 2 Miles	1413	06/27	<0.1	1.0	169
Southeast 2 Miles	1414	06/27	<0.1	0.85	291
North 3.5 Miles	1415	06/27	<0.1	0.51	78
North 5 Miles	1416	06/27	<0.1	0.75	60
North 10 Miles	1417	06/27	<0.1	0.92	82
North Pu Fence	1418	06/30	<0.1	0.82	111

CIMARRON FACILITY

1986 ANNUAL ENVIRONMENTAL SAMPLES

SUBSURFACE SOIL

Sample Location	Sample Number	Date (1986)	Pu-239 (pCi/1)	U (ug/g)	F (ug/g)
North 1/2 Mile	1401	06/28	<0.1	0.58	117
North Fence	1402	06/30	<0.1	14	401
South Fence	1403	07/02	<0.1	2.0	142
South 1/2 Mile	1404	06/28	<0.1	0.72	369
East 1/2 Mile	1405	07/02	<0.1	1.6	164
West 1/2 Mile	1406	06/28	<0.1	0.76	136
North 1 Mile	1407	06/28	<0.1	0.58	93
South 1 Mile	1408	06/27	<0.1	0.96	160
East 1 Mile	1409	06/28	<0.1	0.89	98
West 1 Mile	1410	07/02	<0.1	0.72	129
Northeast 1 Mile	1411	06/27	<0.1	0.91	89
Northwest 2 Miles	1412	06/28	<0.1	0.95	117
Southwest 2 Miles	1413	06/27	<0.1	1.3	118
Southeast 2 Miles	1414	06/27	<0.1	0.85	291
North 3.5 Miles	1415	06/27	<0.1	0.67	79
North 5 Miles	1416	06/27	<0.1	0.72	68
North 10 Miles	1417	06/27	<0.1	0.92	80
North Pu Fence	1418	06/30	<0.1	1.2	118

CIMARRON FACILITY

1986 ANNUAL ENVIRONMENTAL SAMPLES

VEGETATION

Sample Location	Sample Number	Date (1986)	Pu-239 (pCi/l)	U (ug/g)	F (ug/g)
North 1/2 Mile	1501	06/28	<0.1	0.02	0.9
North Fence	1502	06/30	<0.1	0.41	1.5
South Fence	1503	07/02	<0.1	0.11	2.5
South 1/2 Mile	1504	06/28	<0.1	0.11	26
East 1/2 Mile	1505	07/02	<0.1	0.03	0.4
West 1/2 Mile	1506	06/28	<0.1	0.07	0.9
Covered Pu Pond*	1507	--	--	--	--
Covered Pond 1	1508	07/02	<0.1	0.10	1.3
Covered Pond 2	1509	07/02	<0.1	0.14	1.1
Old Burial Ground	1510	07/02	<0.1	0.14	1.1
North Pu Fence	1511	06/30	<0.1	0.14	1.0

*Location of New Sanitary Lagoon

CIMARRON FACILITY
1987 ANNUAL ENVIRONMENTAL SAMPLES
AIR
Analysis - Gross Alpha
(uCi/ml x E-14)

Week Number	Northwest 1/2 Mile Sample 1101	KM Lake East Sample 1102	Junction Hwy. 33/74 Sample 1103	Week Number	Northwest 1/2 Mile Sample 1101	KM Lake East Sample 1102	Junction Hwy 33/74 Sample 1103
01	*	1.5	1.1	27	0.62	0.49	0.41
02	1.7	2.2	1.9	28	0.85	0.86	0.53
03	*	*	*	29	0.32	0.77	0.62
04	1.3	1.3	0.94	30	0.27	0.73	0.65
05	0.79	0.91	1.0	31	0.35	0.59	0.22
06	0.95	0.82	0.71	32	0.45	0.27	0.26
07	1.2	1.5	1.1	33	1.2	1.3	0.76
08	1.2	1.3	1.1	34	1.1	1.1	0.89
09	1.2	1.3	1.1	35	1.0	1.8	1.0
10	1.3	1.3	1.2	36	1.4	2.2	1.7
11	2.2	1.7	0.84	37	0.59	1.2	1.0
12	1.6	1.3	1.1	38	1.7	0.89	0.50
13	0.81	0.75	1.0	39	1.5	1.5	0.53
14	1.1	1.1	0.63	40	0.36	0.58	1.1
15	1.0	0.86	0.67	41	0.72	2.3	1.4
16	1.5	1.2	0.88	42	0.46	0.87	1.2
17	1.8	1.1	1.3	43	<0.29	0.56	0.66
18	1.4	1.2	1.6	44	0.51	0.69	0.81
19	0.97	1.3	1.1	45	0.45	0.37	0.59
20	0.91	0.69	1.4	46	0.44	0.74	0.62
21	0.58	0.85	0.31	47	0.50	0.51	0.33
22	0.52	0.32	0.21	48	0.38	0.36	0.49
23	0.78	0.44	*	49	0.53	1.4	0.62
24	0.31	0.40	0.28	50	*	*	*
25	0.45	0.18	0.43	51	0.34	0.43	0.38
26	0.55	0.48	0.71	52	0.09	0.30	0.18

*No Sample.

0613E

CIMARRON FACILITY
1987 ANNUAL ENVIRONMENTAL SAMPLES
SURFACE WATER

Sample Location	Sample Number	Date (1987)	Gross Alpha (pCi/l)	Gross Beta (pCi/l)	Pu-239 (pCi/l)	U (mg/l)	F (mg/l)	NO_3 (mg/l)	Ra-224 (pCi/l)	Ra-226 (pCi/l)
River - Upstream	1201	06/16	<10	<20	0.002 ± 0.002	0.010	0.4	<1	0.025 ± 0.035	0.12 ± 0.04
River - Downstream	1202	06/16	14	<20	0.019 ± 0.005	0.021	0.4	1.1	0.56 ± 0.15	0.15 ± 0.15
Pond Northwest of Plant*	1203	--	--	--	--	--	--	--	--	--
Pond West of Plant	1204	06/16	<10	<20	0.004 ± 0.003	<0.005	0.3	2.4	0.027 ± 0.014	0.060 ± 0.014
Kerr-McGee Lake East	1205	06/16	<10	<20	0.011 ± 0.004	<0.005	0.3	2.0	0 ± 0.071	0.24 ± 0.05
Pond NW of incinerator	1206	06/16	27	<20	0.002 ± 0.002	0.039	1.4	5.7	0.072 ± 0.044	0.077 ± 0.041
Stream NW of Old Pond 2	1208	06/16	<10	<20	0.013 ± 0.007	<0.005	0.8	2.6	0.025 ± 0.022	0.052 ± 0.021
Kerr-McGee Lake West	1209	06/16	<10	<20	0.012 ± 0.004	<0.005	0.2	1.0	0.061 ± 0.070	0.06 ± 0.006
Sanitary Lagoon East*	1212	--	180	99	0.002 ± 0.002	0.18	0.9	1.0	0.019 ± 0.006	0.06 ± 0.006
Sanitary Lagoon West*	1213	--	170	98	0.022 ± 0.006	0.15	0.9	<1	0.047 ± 0.078	0.16 ± 0.09
New Sanitary Lagoon	1214	06/16	170	93	0.014 ± 0.005	0.17	1.1	<1	0.059 ± 0.12	0.025 ± 0.13

* Pond washed out in October 1986 flood.

CIMARRON FACILITY
1987 ANNUAL ENVIRONMENTAL SAMPLES

WELL WATER

Sample Location	Sample Number	Date (1987)	Gross Alpha (pCi/l)	Gross Beta (pCi/l)	Pu-239 (pCi/l)	Ra-224 (pCi/l)	Ra-226 (pCi/l)	U (mg/l)	F (mg/l)	NO_3 (mg/l)
North of Plant	1301	06/16	<10	<20	0.003 ± 0.002	0.13 ± 0.02	0.08 ± 0.022	<0.005	0.4	<1
Southwest of Old Pond 2	1302*	--	--	--	--	--	--	--	--	--
Farm Southeast of Plant	1303**	--	--	--	--	--	--	--	--	--
Northwest of Old Pond 1	1304*	--	--	--	--	--	--	--	--	--
Northwest of Old Pond 2	1305	06/15	<10	<20	0.008 ± 0.004	0.008 ± 0.028	0.27 ± 0.04	0.06	3.2	11
Southeast of Old Pond 2	1306	06/15	<10	<20	0.002 ± 0.002	0.034 ± 0.043	0.16 ± 0.06	0.006	0.2	1.7
Junction Hwy 33/74	1307	06/16	<10	<20	0.009 ± 0.004	0.007 ± 0.018	0.061 ± 0.025	0.005	0.2	2.8
Northeast of Old Pond 2	1308*	--	--	--	--	--	--	--	--	--
Southwest of Old Pond 2	1309	06/15	<10	<20	0.002 ± 0.002	0.13 ± 0.12	0.24 ± 0.15	0.006	0.5	19
South of Old Pond 2	1310*	--	--	--	--	--	--	--	--	--
South of Landfill	1311	06/16	<10	<20	0.010 ± 0.005	0.010 ± 0.005	0.28 ± 0.06	0.005	0.4	34
West of Landfill	1312	06/16	41	65	0.002 ± 0.002	0.29 ± 0.012	0.58 ± 0.02	0.045	18	620
North of Landfill	1313	06/16	84	25	0.004 ± 0.003	0.35 ± 0.12	0.18 ± 0.13	0.078	120	450
South of Burial Pit	1314	06/15	<10	<20	0.029 ± 0.067	0.057 ± 0.019	0.20 ± 0.02	0.005	1.3	4.8
North of Burial Pit	1315	06/16	3850	2450	0.005 ± 0.003	0.036 ± 0.13	0.12 ± 0.15	4.9	0.6	6.7
Northwest of Burial Pit	1316	06/15	420	300	0.002 + 0.002	0.10 ± 0.033	0.03 ± 0.03	0.54	0.6	4.6
North of Burial Pit	1317	06/15	13	<20	0.002 ± 0.002	0.10 ± 0.01	0.22 ± 0.01	0.010	0.3	2.2
Leo's Corral	1318	06/30	11	<20	0.003 + 0.002	0.079 ± 0.006	0.09 ± 0.007		<0.005	0.2

1.2

*Dry well

**Well out of service

0613E

CIMARRON FACILITY
1987 ANNUAL ENVIRONMENTAL SAMPLES
SURFACE SOIL

Sample Location	Sample Number	Date (1987)	Pu-239 (pCi/g)	U (ug/g)	F (ug/g)
North 1/2 Mile	1401	06/09	0.011 ± 0.002	0.80	180
North Fence	1402	06/15	0.013 ± 0.006	21.3	310
South Fence	1403	06/12	0.002 ± 0.001	2.5	140
South 1/2 Mile	1404	06/12	<0.001	1.6	330
East 1/2 Mile	1405	06/12	0.003 ± 0.001	1.4	110
West 1/2 Mile	1406	06/09	0.015 ± 0.002	1.5	150
North 1 Mile	1407	06/09	0.001 ± 0.001	0.36	53
South 1 Mile	1408	06/12	0.001 ± 0.001	1.2	170
East 1 Mile	1409	06/12	0.002 ± 0.001	0.96	130
West 1 Mile	1410	06/09	0.004 ± 0.001	1.1	130
Northeast 1 Mile	1411	06/09	0.001 ± 0.001	1.0	56
Northwest 2 Miles	1412	06/09	0.002 ± 0.001	1.5	94
Southwest 2 Miles	1413	06/12	0.001 ± 0.001	1.6	215
Southeast 2 Miles	1414	06/12	0.002 ± 0.001	1.5	270
North 3.5 Miles	1415	06/09	0.002 ± 0.001	0.68	36
North 5 Miles	1416	06/09	0.015 ± 0.002	0.56	49
North 10 Miles	1417	06/09	0.002 ± 0.001	0.79	165
North Pu Fence	1418	06/15	0.001 ± 0.001	1.1	120

CIMARRON FACILITY
1987 ANNUAL ENVIRONMENTAL SAMPLES
SUBSURFACE SOIL

Sample Location	Sample Number	Date (1987)	Pu-239 (pCi/g)	U (ug/g)	F (ug/g)
North 1/2 Mile	1401	06/09	0.003 ± 0.002	4.8	130
North Fence	1402	06/15	0.005 ± 0.001	3.4	440
South Fence	1403	06/12	0.002 ± 0.001	2.4	190
South 1/2 Mile	1404	06/12	0.013 ± 0.002	1.2	320
East 1/2 Mile	1405	06/12	0.015 ± 0.002	1.2	130
West 1/2 Mile	1406	06/09	0.001 ± 0.001	1.4	160
North 1 Mile	1407	06/09	0.002 ± 0.001	0.98	100
South 1 Mile	1408	06/12	0.002 ± 0.001	1.3	155
East 1 Mile	1409	06/12	0.002 ± 0.001	0.88	160
West 1 Mile	1410	06/09	0.001 ± 0.001	1.4	140
Northeast 1 Mile	1411	06/09	0.007 ± 0.002	0.82	51
Northwest 2 Miles	1412	06/09	<0.001	0.91	84
Southwest 2 Miles	1413	06/12	0.001 ± 0.001	1.7	280
Southeast 2 Miles	1414	06/12	0.006 ± 0.002	1.3	250
North 3.5 Miles	1415	06/09	0.002 ± 0.001	0.67	45
North 5 Miles	1416	06/09	0.003 ± 0.001	0.61	52
North 10 Miles	1417	06/09	0.002 ± 0.002	0.89	160
North Pu Fence	1418	06/15	0.005 ± 0.001	1.4	115

CIMARRON FACILITY
1987 ANNUAL ENVIRONMENTAL SAMPLES
VEGETATION

Sample Location	Sample Number	Date (1987)	Pu-239 (pCi/g)	U (ug/g)	F (ug/g)
North 1/2 Mile	1501	06/09	0.0014 ± 0.0004	1.0	<10
North Fence	1502	06/15	0.0004 ± 0.0002	<0.2	88
South Fence	1503	06/12	0.0005 ± 0.0003	<0.2	68
South 1/2 Mile	1504	06/12	0.0022 ± 0.0007	<0.2	39
East 1/2 Mile	1505	06/12	0.0012 ± 0.0004	<0.2	110
West 1/2 Mile	1506	06/09	0.001 ± 0.0004	<0.2	200
Covered Pu Pond*	1507	--	--	--	--
Covered Pond 1	1508	06/12	0.002 ± 0.001	0.24	60
Covered Pond 2	1509	06/12	0.0003 ± 0.0002	<0.2	34
Old Burial Ground	1510	06/12	0.003 ± 0.001	<0.2	49
North Pu Fence	1511	06/15	0.0015 ± 0.0005	<0.2	16

*Location of New Sanitary Lagoon

CIMARRON FACILITY
1988 ANNUAL ENVIRONMENTAL SAMPLES
AIR

Analysis - Gross Alpha
(uCi/ml x E-14)

Week of 1988	NW 1/2 Mile Sample 1101	KM Lake East Sample 1102	Jct.Hwy. 33/74 No. Sample 1103
01*	--	--	--
02	2.4	09	1.1
03	1.5	1.9	1.2
04	1.1	1.1	.74
05	1.7	.88	.45
06	1.5	2.7	1.8
07	1.6	9.8	.95
08	.42	1.1	1.1
09	1.1	11.5	1.4
10	.50	.90	.23
11	.97	1.7	.13
12	1.3	2.0	.88
13	1.1	.84	.40
14	.91	.85	.61
15	.48	1.5	.41
16	.86	1.6	.98
17	.62	.91	.49
18	.47	1.1	.52
19	.75	.85	.76
20	.69	.78	.93
21	.55	.40	.38
22	.6	.37	.59
23	.36	.30	.80
24	.46	.7	.55
25	.26	.45	.45
26	.51	.31	.42
27	.05	.35	.21

Samples not collected due to inclimate weather

CIMARRON FACILITY

1988 ANNUAL ENVIRONMENTAL SAMPLES

SURFACE WATER

Sample Location	Sample No	Date (1988)	Gross Alpha (pCi/l)	Gross Beta (pCi/l)	Pu-239 (pCi/l)	U-238 (mg/l)	F (mg/l)	NO_3 (mg/l)	Ra-224 (pCi/l)	Ra-226 (pCi/l)
River - Upstream	1201	06/24	11	<20	0.009±0.004	0.018	< 1	<1	0.021±0.037	0.117±0.034
River - Downstream	1202	06/24	14	<20	0.003±0.002	0.018	< 1	<1	0.021±0.066	0.088±0.060
Pond-NW of Plant*	1203	06/24	--	--	--		--	--	--	--
Pond - W of Plant	1204	06/24	23	<20	0.002±0.002	0.029	< 1	1.7	0.010±0.002	0.025±0.001
KM Lake - East	1205	06/24	< 10	<20	0.003±0.002	0.005	< 1	<1	0 ±0.13	0.211±0.594
Pond - NW of Inc.	1206	06/24	330	150	0.003±0.002	0.39	2.7	36	0.143±0.064	0.035±0.040
Stream NW Old #2	1208	06/24	< 10	<20	0.004±0.003	0.007	< 1	<1	0.020±0.079	0.039±0.088
KM Lake - West	1209	06/24	< 10	<20	0.003±0.002	0.005	< 1	<1	0.008±0.013	0.070±0.015
Sanitary Lagoon-E	1212	06/24	170	40	0.003±0.002	0.13	1.3	<1	0.006±0.027	0.024±0.031
Sanitary Lagoon-W	1213	06/24	110	80	0.002±0.002	0.130	1.2	14	0.072±0.013	0.072±0.014
New Sanitary Lagoon	1214	06/24	200	<20	0.006±0.003	0.11	1.3	<1	0.014±0.074	0.064±0.084

*Pond washed out in October 1986 flood.

CIMARRON FACILITY

1988 ANNUAL ENVIRONMENTAL SAMPLES

WELL WATER

Sample Location	Sample No.	Date (1988)	Gross Alpha (pCi/l)	Gross Beta (pCi/l)	Pu-239 (pCi/l)	Ra-224 (pCi/l)	Ra-226 (pCi/l)	U (mg/l)	F (mg/l)	NO_3 (mg/l)
North of Plant	1301	06/30	< 10	< 20	0.002± 0.0020	0.22 ± 0.08	0.37 ± 0.08	0.006	< 1	< 1
SW of Old Pond #1	1302	06/30	WELL	DRY						
NW of Old Pond #1	1304	06/30	WELL	DRY						
NW of Old Pond #2	1305	06/30	< 10	< 20	0.010 ± 0.004	0.01 ± 0.19	0.16 ± 0.22	0.007	2.7	25
SE of Old Pond #2	1306	06/30	12	< 20	0.010 ± 0.006	0.23 ± 0.25	0.29 ± 0.26	0.009	< 1	< 1
Jct HWYS & 74 & 33	1307	09/06	< 10	< 20	0.004 ± 0.003	0.079 ± 0.002	0 ± 0.002	0.005	< 1	< 10
NE of Old Pond #2	1308		WELL	DRY						
SW Of Old Pond #2	1309	06/30	< 10	< 20	0.002 ± 0.007	0.35 ± 0.24	0.23 ± 0.24	0.005	< 1	24
S of Old Pond #2	1310	06/30	WELL	DRY						
S of Landfill	1311	06/30	< 10	< 20	0.008 ± 0.004	0.04 ± 0.10	0.21 ± 0.11	0.005	< 1	38
W of Landfill	1312	06/30	90	231	0.012 ± 0.005	0.41 ± 0.02	1.09 ± 0.02	0.144	22	480
N of Landfill	1313	06/30	61	24	0.006 ± 0.003	0.12 ± 0.12	0.29 ± 0.11	0.128	3.1	570
S of Burial Pit	1314	06/30	< 10	< 20	0.002 ± 0.002	0.07 ± 0.12	0.23 ± 0.11	0.007	1.8	12
N of Burial Pit	1315	06/30	3800	989	0.002 ± 0.002	0.21 ± 0.40	0.18 ± 0.44	4.83	< 1	< 2
NW of Burial Pit	1316	06/30	378	116	0.012 ± 0.005	0.06 ± 0.05	0.06 ± 0.04	0.30	< 1	12
N of Burial Pit	1317	06/30	105	< 20	0.002 ± 0.002	0.03 ± 0.13	0.11 ± 0.12	0.128	< 1	< 1
Leo's Corral	1318	06/30	< 10	< 20	0.012 ± 0.005	0.28 ± 0.22	0.20 ± 0.17	0.009	< 1	4.5
U Plant Yard	1319									

CIMARRON FACILITY

1988 ANNUAL ENVIRONMENTAL SAMPLES

SURFACE SOIL

Sample Location	Sample Number	Date (1988)	Pu-239 (pCi/g)	U (Ug/g)	F (Ug/g)
North 1/2 Mile	1401	07/05	0 ± 0.01	0.83	250
North Fence	1402	07/05	0 ± 0.01	9.2	260
South Fence	1403	07/05	0.02 ± 0.01	0.76	160
South 1/2 Mile	1404	07/05	0 ± 0.01	1.3	310
East 1/2 Mile	1405	07/05	0 ± 0.01	0.99	150
West 1/2 Mile	1406	07/05	0 ± 0.01	0.67	160
North 1 Mile	1407	07/05	0 ± 0.01	0.44	70
South 1 Mile	1408	07/05	0 ± 0.01	1.0	170
East 1 Mile	1409	07/05	0 ± 0.01	1.2	150
West 1 Mile	1410	07/05	0 ± 0.01	1.2	140
Northeast 1 Mile	1411	07/05	0 ± 0.01	0.61	70
Northwest 2 Miles	1412	07/05	0 ± 0.01	0.98	70
Southwest 2 Miles	1413	07/05	0 ± 0.01	1.8	320
Southeast 2 Miles	1414	07/05	0 ± 0.01	1.4	300
North 3.5 Miles	1415	07/05	0 ± 0.01	0.72	80
North 5 Miles	1416	07/05	0 ± 0.01	0.40	50
North 10 Miles	1417	07/05	0 ± 0.01	1.1	95
North Pu Fence	1418	07/05	0 ± 0.01	1.9	140

CIMARRON FACILITY
1988 ANNUAL ENVIRONMENTAL SAMPLES
SUBSURFACE SOIL

Sample Location	Sample Number	Date (1987)	Pu-239 (pCi/g)	U-238 (Ug/g)	F (Ug/g)
North 1/2 Mile	1401	7-5-88	0 ± 0.01	0.64	100
North Fence	1402	7-5-88	0 ± 0.01	4.9	390
South Fence	1403	7-5-88	0 ± 0.01	2.0	150
South 1/2 Mile	1404	7-5-88	0.± 0.01	2.0	270
East 1/2 Mile	1405	7-5-88	0 ± 0.01	0.98	140
West 1/2 Mile	1406	7-5-88	0 ± 0.01	1.2	160
North 1 Mile	1407	7-5-88	0.02 ± 0.01	0.83	80
South 1 Mile	1408	7-5-88	0 ± 0.01	1.3	160
East 1 Mile	1409	7-5-88	0 ± 0.01	1.5	220
West 1 Mile	1410	7-5-88	0 ± 0.01	1.2	145
Northeast 1 Mile	1411	7-5-88	0 ± 0.01	0.82	60
Northwest 2 Miles	1412	7-5-88	0 ± 0.01	0.97	80
Southwest 2 Miles	1413	7-5-88	0 ± 0.01	1.5	210
Southeast 2 Miles	1414	7-5-88	0 ± 0.01	1.5	310
North 3.5 Miles	1415	7-5-88	0 ± 0.01	0.60	70
North 5 Miles	1416	7-5-88	0 ± 0.01	0.39	50
North 10 Miles	1417	7-5-88	0 ± 0.01	0.78	130
North Pu Fence	1418	7-5-88	0 ± 0.01	1.4	140

CIMARRON FACILITY
1988 ANNUAL ENVIRONMENTAL SAMPLES
VEGETATION

Sample Location	Sample Number	Date (1988)	Pu-239 (pCi/g)	U (Ug/g)	F (Ug/g)
North 1/2 Mile	1501	06/24	0.002 ± 0.002	0.049	< 10
North Fence	1502	06/24	0.0002 ± 0.0002	0.110	< 10
South Fence	1503	06/24	0.0002 ± 0.0002	0.049	< 10
South 1/2 Mile	1504	06/24	0.0002 ± 0.0002	0.013	< 10
East 1/2 Mile	1505	06/24	0.0002 ± 0.0002	0.026	< 10
West 1/2 Mile	1506	06/24	0.0002 ± 0.0002	0.005	< 10
Covered Pu Pond*	1507	--	--	--	--
Covered Pond 1	1508	06/24	0.0003 ± 0.0001	.065	< 10
Covered Pond 2	1509	06/24	0.0006 ± 0.0003	0.044	< 10
Old Burial Ground	1510	06/24	0.0005 ± 0.0003	0.069	< 10
North Pu Fence	1511	06/24	0.0009 ± 0.0004	0.048	< 10

*Location of New Sanitary Lagoon

CONCLUSIONS AND RECOMMENDATIONS

1. As the decontamination and decommissioning operations progressed it became clear that we should have scheduled the decommissionings at a faster pace to take advantage of lower burial costs. Burial costs and change in packaging requirements have grown progressively more expensive since 1979 when the price for L.S.A. waste was $7.50 per cu. ft., the current burial cost is $52.50 cu. ft.

   The burial costs for T.R.U. waste was estimated at $100/ft. early in the program, but when we obtained approval to start shipping the burial cost had risen to $207 cu. ft. and climbed to $265 cu. ft. by mid 1987 when we shipped our last load. The current price is approximately $400 per cu. ft. Cimarron shipped 9,035.4 cu. ft. of T.R.U. waste and 15,188 cu. ft. of L.S.A. waste We have commited $6,846,244 to date, our estimated total amount will be $7,480,361. Early estimates indicated we would spend $111 per sq. ft. for the D & D, however since then burial costs have escalated which raised our costs to $288 per sq. ft..

2. We should have taken advantage of computer data collection and retrieval methods early in the program which would have improved our record keeping by simplification, plus it would have made more data available by computer retrieval. This was recognized too late to be cost effective after the program was well under way and manual methods had been established.
3. Decontamination of the glove boxes would have been less difficult if the building had been designed with more floor space. The building should have been large enough to allow installation of the glove boxes with access to all sides. In same cases it was necessary to combine operations during production in one glove box as well as place one side of a glove box against the wall, this made housekeeping difficult and decontamination more difficult, it also made decommissioning much more difficult because of the restricted access.
4. The piping system proved to be a problem, during production it was discovered this system contained low spots that were difficult to drain. This made N.D.A.(non-destructive assay) difficult. During decommissioning these low spots became a bigger problem that required very careful planning to prevent contamination spread and excessive exposure to decommissioning personnel.
5. This plant was equipped with good tooling, the process was sound and the product produced was of excellent quality. It has been very difficult and disheartening to decommission this plant and dispose of equipment that was nearly new in condition, yet obsolete by 10 years of age.

PLUTONIUM OUT OF CONFINEMENT - LEAKS, SPILLS, etc.

I. INTRODUCTION

Uncontained plutonium, outside the confinement of gloveboxes and slot hoods, is a potential hazard to persons in a room with such a condition. Inhalation, ingestion, injection or absorption of plutonium into the body can cause radiation damage to the body tissues, fluids, organs and bone.

The detection of plutonium in the working environment can be by visually seeing a spill of material, or by finding an opening in the confinement system. An automatic air sampler alarm or a liquid level alarm may be heard. The use of survey instruments is one of the best means of detection. Air sample counting is another means to discover plutonium out-of-control. Air pressure gauges and air flow indicators on the confinement systems can indicate the possibility that a leak of plutonium contamination has occurred.

Upon detection of plutonium out of confinement, it is important that personnel promptly protect themselves, obtain Health Physics service and rid themselves of any personal contamination. Investigation of the cause and evaluation

of the extent of the problem with subsequent correction, clean-up, and final recovery must then be accomplished. If the incident or spill is of great enough severity, formal reports to Company Management and the Nuclear Regulatory Commission are required.

It is the purpose of these instructions to provide plutonium plant personnel, particularly Health Physics personnel, with guidance for proper response to situations involving plutonium "out-of-confinement." This guide does not give instructions concerning releases of hazardous materials where total building evacuation is necessary, where the general public would be potentially exposed or other such serious incidents as are covered in our Emergency Manual.

II. THE INSTRUCTION TABLES

Tables, Nos. 1, 2 and 3, are included which show a list of actions to consider depending upon the contamination problem encountered. The problem(s) are defined in the scope of each table. In the columns marked "Priority" there are 4 categories, as follows:

1. Very prompt action - 1st priority
2. Within minutes after 1st priority action
3. Within hours after 1st priority action
4. Within days after 1st priority action

II. THE INSTRUCTION TABLES - continued

An attempt has been made to list the actions with the 1st priority at the top of the list and the least priority at the bottom. In many incidents not every action listed will need to be done. Each should be considered, however.

The "Responsibility" columns includes the "1st person." The "1st person" may be more than one person, however he is usually the first to detect a problem and spread the alarm. The "H.P." column lists actions or duties H.P. technicians can be expected to perform as well as duties other health and safety personnel may perform. Persons other than the 1st person or H.P. personnel are also listed. These may be persons involved in an incident or they may be persons used for the recovery from an incident.

The final column includes special qualifying "notes" or instructions and references to procedures. These "notes" are numbered and the numbers correspond to numbers in the "priority" columns adjacent to the specific action listed in the 1st column.

TABLE #1

Scope: Contamination found on body or clothing >500 <5,000 d/m - Probe

Actions to Consider When Applicable	Priority 1	2	3	4	1st person	H.P.	Responsibility Others as Listed	Notes and References
Call H.P. for Assistance	x				x			1. KM-NP-10-67
Personnel Survey	x				x	x	Others Involved	
Remove & bag contam. clothes	x				x		" "	2. Use Table II if
Obtain Nose Swipes	1				x	x	" "	contamination
Personnel Decontamination	x				x	x	" "	>5,000 d/m is found.
Locate Contamination Source		2				x		
Quick fix of cause		x				x	Person(s) assigned	3. Give DTPA if Nose
DTPA Treatment		3				x	Person(s) in need	Swipe >50 d/m
Wound Count		4				x	Person(s) in need	KM-NP-10-90
Decontaminate Surfaces if Needed			x			x	Person(s) assigned	
Complete Location Cards			x		x		Others Involved	4. KM-NP-10-67, Use
Interview for more Details			x		x	x	" "	emergency manual if
Bio-Assay Sampling				5	x	x	Person(s) in need	medical help is
Particle Size of Contaminant				6		x		needed
Solubility of Contaminant				6		x		5. If positive Nose
"In-Vivo" Count (Schedule)				7	x	x	Person(s) in need	Swipes were found
Final Fix of Cause				x			Person(s) assigned	KM-NP-10-67
Final Survey(s)				x		x		
Compile Data				x		x		6. (If possible) when
Write & Distribute Report(s)				x		x		positive Nose Swipes
								are found
								7. Do if DTPA was given.

TABLE #2

Scope:
1. A valid automatic air sampler alarm sounds, or
2. A visible spill is seen, or
3. Smoke is noticed, or
4. An opening or void in the confinement system is easily seen, or
5. A survey shows >5,000 d/m (smearable on equipment) or on a person (direct).

Actions to Consider When Applicable	Priority 1	2	3	4	1st Person	H.P.	Responsibility Others as Listed	Notes and References
Alert Others in Room	x				x			1. Give DTPA if:
Put on Respirator	x				x		All Others Involved	Nose Swipes > 50 d/m
Call H.P.	x				x			or Air = 2 x 10^{-10}
Quicktape or stop leak if found	x				x		Others Cooperate	uci/ml-hr. or smoke
Evacuate and stand outside of door	x				x		All Others Involved	inhaled; see
Personnel Survey	x				x	x	" " "	KM-HP-10-90
Remove & bag contaminated clothes	x				x	x	" " "	
Nose Swipes	x				x	x	" " "	2. Count Wounds - Use
Personnel Decontamination & Survey	x				x	x	" " "	KM-HP-10-67. If
Don special clothes & air pac		x				x	and at least one helper	medical attention is
Quick fix of cause		x					helper(s)	needed use Emergency
Cover contamination w/tape/plastic		x					helper(s)	Manual Procedures.
Turn on spill switch		x					helper(s)	
Collect Air Samples		x				x		
Seal off room and/or post signs		x				x	helper(s)	3. Use criteria in
Count Air Samples (1st count)		x				x		Bioassay sampling
DTPA Treatment		1				x	Person(s) in need	procedure KM-HP-10-67
Wound Count		2				x	" " "	
Investigate & Survey Record Findings			x			x		
Decide further action with Mgmt			x			x	Appropriate Mgmt	4. Use criteria in
Greenhouse for contamination contro			x			x	Person(s) Assigned	KM-HP-10-67 and also

TABLE #2 CONTINUED

Scope:

Actions to Consider When Applicable	Priority 1	2	3	4	1st Person	H.P.	Responsibility Others as Listed	Notes and References
Clean up visible spill(s)			x				Person(s) Assigned	schedule In-Vivo
Complete Location Cards			x		x		Person(s) Involved	if the DTPA treat-
Interview Personnel			x			x	" "	ment was needed.
Notification List			x			x	HP&IS Mgr/Coordinator	
Determine Exposure Time			x			x		
Determine Respirator Factor			x			x		5. Use criteria in
Determine Final Air Concentration			x			x		KM-NP-10-65 when
Bioassay Sampling				3	x	x	Person(s) in need	>32 MPC-hr. Use
Particle Size of Aerosol				x		x	Lab	KM-NP-10-67 for high
Solubility of Contaminant				x		x	Lab	Bioassay results.
Begin Bldg & Equip. Decontamination				x			Person(s) Assigned	
Begin Permanent Fix				x			" "	
Final Survey after Fix				x		x		6. Incident report by HP
In-Vivo				4		x		& operations Supervisors.
Impose Work Restrictions				5	x	x	Supervision of &	Report to NRC by Cor-
							Person(s) involved	porate Staff Health
Compile Data and Write Report(s)				6		x	See Note 6.	Physicist & Vice Presi-
								dent, Nuclear Licensing
								& Regulation.

TASLE #3

Scope: Detection of Pu by Stationary Air Sample Results Only - Air Concentration >1 MPC

Actions to Consider When Applicable	Priority 1	2	3	4	H.P.	Responsibility	Notes and References
Notify Supervision	x				x	1. As instructed by H&S Supervisor	
Post Room Requiring Respirators	x				x	2. (a) <32 MPC-hrs/wk - caution employees to	
Collect Additional Air Samples	1				x	minimize further exposure (b) >32 MPC-hrs/wk,	
Survey & Search for Cause		x			x	impose work restriction (c) 40 MPC-hrs/wk,	
Obtain location cards - exposure period		x			x	notify Corporate Staff Health Physicist.	
Determine Respirator Factor			x		x	3. For exposures >2 x 10^{-10} uci/ml-hr., see	
Particle Size of Aerosol			1		x	KM-NP-10-90	
Solubility of Aerosol			3		x	4. Use procedure KM-NP-10-67	
Interview involved persons			x	x	x	5. Compile data from surveys, interviews and	
Determine MPC-hrs/wk exposure			2		x	investigations	
Give DTPA treatment			3		x	6. Correct problem as soon as possible. Shut	
Issue Bioassay Sample Kits			4		x	down offending operations if a "fix" cannot	
Complete Investigation of Cause			5		x	be made and subsequent air samples continue	
Correct Cause of Problem		6	6	6		above 3 MPC.	
Schedule In-Vivo Counting				7	x		
Write and Distribute Reports				8	x	7. Use criteria in KM-NP-10-67	
						8. KM incident reports by H.P. and operations	
						supervisor. Reports to NRC by Corporate Staff Health	
						Physicist and Vice President, Nuclear Licensing &	
						Regulation.	

1.3.1 Ventilating, Heating and Air Conditioning

Basic System

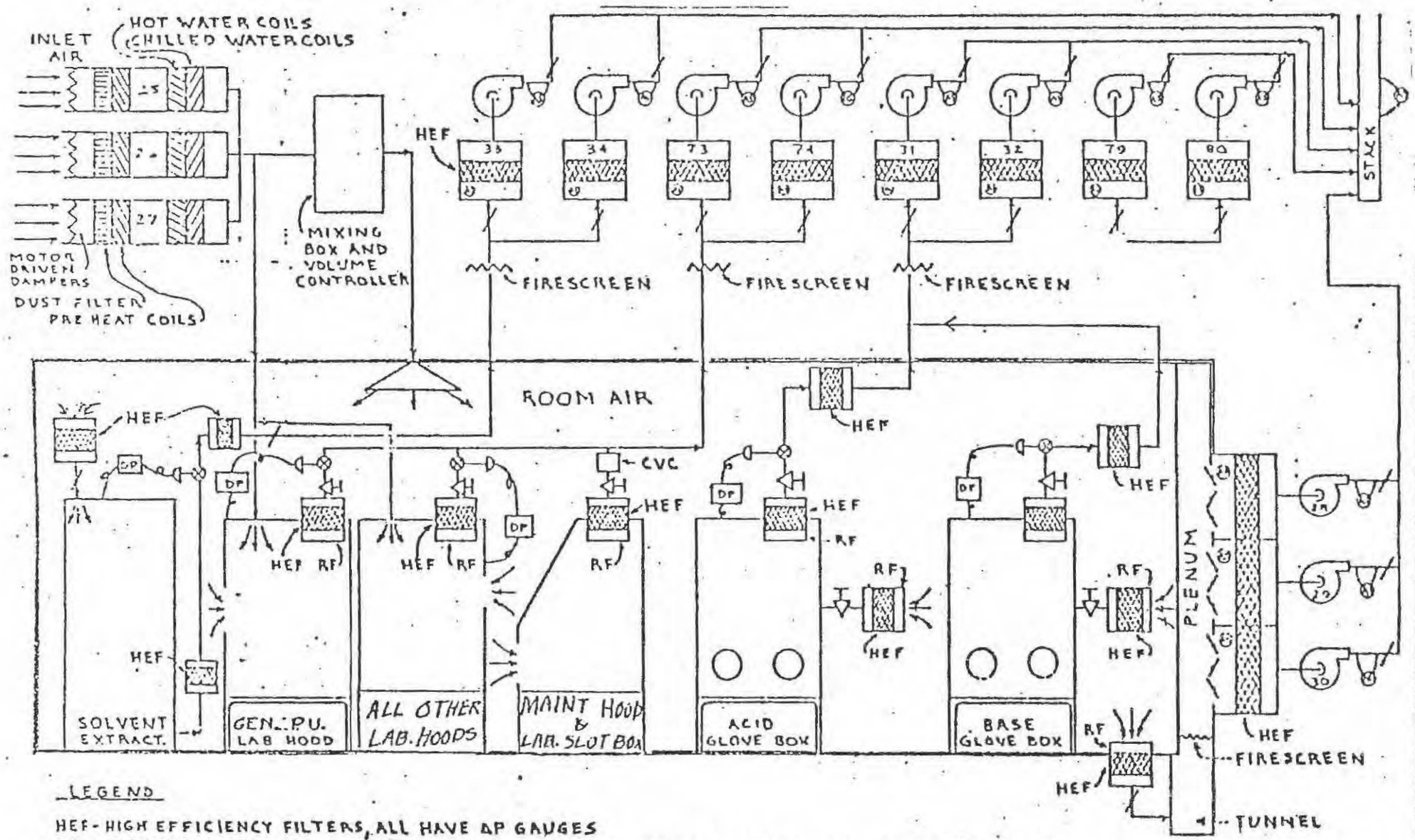
The building ventilation system is divided into three different sub-systems. The first consists of the building supply air fans and contains the heating and cooling coils. The second consists of the room air exhaust fans. The third system consists of the process exhaust fans. The process exhaust fans are further divided into four systems: the first exhausts the air from the acid glovebox; the second exhausts the air from the solvent extraction plant gloveboxes only; the third exhausts the air from all laboratory hoods and slot boxes; and the fourth exhausts the air from the gloveboxes handling basic solutions. A schematic ventilation flow diagram for the Cimarron Plutonium Plant is shown on Figure 6. During standby, the acid and basic glovebox ventilation systems are joined together.

General Design Features

Supply air and room exhaust air fan systems consist of three fans each, any two of which will supply and exhaust the required air through the interior of the building. The third fan serves as a standby fan in each system and also as an emergency fan to increase the air flow in any given area when required. The ventilation system is designed for 8 air changes per hour, minimum, and for an emergency of 12 air changes per hour.

The supply and exhaust air fans are interlocked so that a failure of a fan in either system will shut down the corresponding fan in the other system. All supply and exhaust fans are installed with back flow preventers. An emergency generator is provided to power the glovebox exhaust fans and one each of the supply and room air exhaust fans in case of power failure.

The entire ventilation system is equipped with instrumentation to detect abnormal operating conditions, such as excessive pressure drop through the absolute filters, loss of negative pressure in the spaces within the building,



LEGEND

HEF - HIGH EFFICIENCY FILTERS, ALL HAVE ΔP GAUGES
RF - ROUGHING FILTERS
AS - AIR SAMPLING
DP - DIFFERENTIAL PRESSURE CONTROLLER
CVC - CONSTANT VOLUME CONTROLLER

SCHEMATIC VENTILATION FLOW DIAGRAM

Figure 6