

File

RES. CONTROL  
COMING LTR. NO.

0526 RF 90

United States Government

Department of Energy

Albuquerque Operations Office

Rocky Flats Area Office

# Memorandum

5-11-90

APR 24 1990

McKinley

DATE:

DIST.	LTR	ENCL
FF, F.H.		
J.M.		
KE, J.C.		
NGAME, A.H.		
J.G.		
RA, D.W.		
J.L.B.		
SIS, G.E.		
WIN, R.		
T.J.		
ER, E.H.		
I, J.M.	X	
W.A.		
TIC, J.R.	X	
LEY, K.B.	X	
N, J.B.	X	
ELL, R.F.		
ER, G.L.		
ES, J.L.	X	
R, V.L.		
RO, T.H.		
ION, W.W.		
UVEN, D.B.		
FR, B.P.		
R, E.R.		
ER, D.H.		
VAL, G.J.		
AN, L.K.		
ST, J.L.		
MAN, R.B.		
JAN, R.L.		
D.M.		
ENBERG, G.E.		
ON, E.R.		
Y, R.L.		
ER, H.L.		
SOUEZ, R.N.		
RES. CONTROL	X	X
TRACT ADMIN.		

REPLY TO  
ATTN OF:

EM/EPD:RJS:6103

SUBJECT:

Elevated Levels of Americium and Plutonium East of the 903 Pad Area

TO:

Jack Kersh, Associate General Manager  
Environmental Restoration & Waste Management  
EG&G Rocky Flats, Inc.

On February 26, 1990, your staff was notified through the Department of Energy Rocky Flats Office Safety Division that there was a concern about elevated levels of americium and plutonium east of the 903 Pad area. This area was identified based upon the EG&G Energy Measurements draft report entitled "An Aerial Radiological Survey of the United States Department of Energy's Rocky Flats Plant and Surrounding Area, Golden, Colorado." The preliminary soil data from this report identified areas of elevated radionuclide contamination that had no access control.

We would like a written summary of the status of verification sampling and actions taken to restrict access to the area of elevated radionuclide contamination. A current drive-by of the area east of the 903 Pad outside of the fence showed that postings were only in the areas of main driveways and not in the areas between.

Please provide this written summary to the Environmental Restoration Division within two weeks of the receipt of this memo.

If you or your staff have any questions, contact me or Scott Grace on Extension 7199.

Jack R. Roeder, Acting Assistant Manager  
for Environmental Management

CC:

- D. P. Simonson, DOE/RFO
- R. J. Schassburger, DOE/RFO
- R. M. Ostmeyer, DOE/RFO
- K. B. McKinley, EG&G/RF
- J. Majestic, EG&G/RF

Forward for Addressee  
Res. Control RFP

4-26-90

By

4-26-90

SUMMARY OF PLUTONIUM AND AMERICIUM LEVELS:  
903 PAD AREA

SOURCE: Remedial Investigation Report for 903 Pad, Mound, and East Trenches.

<u>Borehole</u>	<u>Location</u>	<u>Pu-239(pCi/g)</u>	<u>Am-241(pCi/g)</u>
BH30-87 (0-10')	300' E. of 903 Pad	180 ± 10	22 ± 10
BH24-87 (0-2')	250' S.E. of 903 Pad	96 ± 4	11 ± 2
BH26-87 (0-3')	1475' E. of 903 Pad	83 ± 2	12 ± 1
BH22-87 (0-9')	125' S. of 903 Pad	6.3 ± 1.4	0.93 ± 0.26

Accu-labs Research, Inc., Analysis of 9/13/85 Samples taken just West of East Guard Station and North of Central Avenue.

<u>Sample ID</u>	<u>Pu-239 (pCi/g)</u>
Central Avenue No. 1 (8890-20541-5-1)	82 ± 6
Central Avenue No. 2 (8890-20541-5-2)	280 ± 10
Duplicate	170 ± 10

**1988 Rocky Flats Plant Site Environmental Report**

Location: 1-108 (Southeast of 903 Pad and at midpoint between plant center and Indiana Street):

<u>Pu-239 (pCi/g)</u>			
<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>
13.0 ± 1.3	15.0 ± 1.4	2.4 ± .21	10.4 ± .94

Location: 1-090 (Due East of 903 Pad and at midpoint between plant center and Indiana Street):

<u>Pu-239 (pCi/g)</u>			
<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>
1.0 ± .09	7.4 ± .62	7.05 ± .77	10.6 ± .98

Location: 2-090 (Due East of 903 Pad at Indiana):

Pu-239 (pCi/g)

<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>
2.5 ± .25	5.3 ± .48	4.48 ± .52	7.12 ± .67

AEC Health and Safety Laboratory (HASL), Environmental Studies Group Progress Report for 1979, RFP-3115, RFP, January 1981.

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Laboratory results presented in Figure 1. Multiply  $\text{mCi/Km}^2$  by 0.1 to obtain pCi/g, assuming contamination depth of 1 cm and a soil density of  $1 \text{ g/cm}^3$ . Therefore, typical Pu-239 values east of 903 Pad outside of the fence range from 500 to 200 pCi/g. Pu-239 levels were on the order of  $150,000 \text{ mCi/Km}^2$  ( $15,000 \text{ pCi/g}$ ) adjacent to the 903 Pad.

Illsley, C. T., and Bistline, R. W., 1974. FIDLER and Soil Survey of Contaminated Area Southeast of Asphalt Pad.

Laboratory results presented in Figure 2. Plutonium levels from southeast corner of pad to southeast perimeter road range from  $81.5$  to  $59.2 \text{ uCi/m}^2$ . Assuming a contamination depth of 1 cm and a soil density of  $1 \text{ g/cm}^3$ ,  $\text{uCi/m}^2$  is multiplied by 100 to obtain pCi/g. Therefore, Pu-239 levels exceeded  $8,000 \text{ pCi/g}$  near the 903 Pad. Much of this soil was removed in 1976 and 1978. This is consistent with the levels adjacent to the 903 Pad reported by HASL. In-situ Am-241 data ranges from  $0.4$  to  $11.1 \text{ uCi/m}^2$  ( $40$  to  $1110 \text{ pCi/g}$ ).

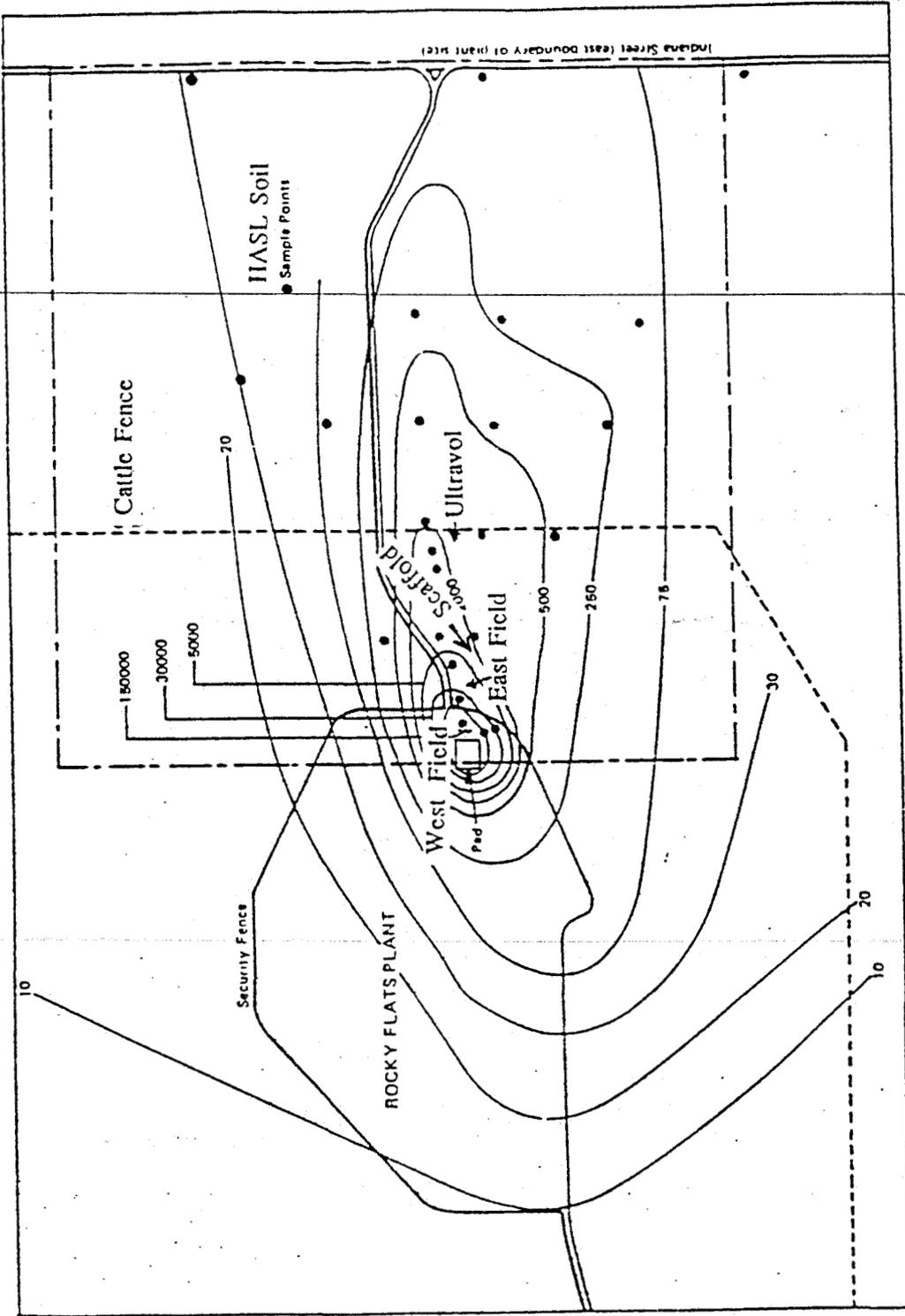


FIGURE 1. Plutonium-239 Deposition Contours in Millicuries Per Square Kilometer, According to HASL

Master

Fig 2. Soil Contamination SE of Pad

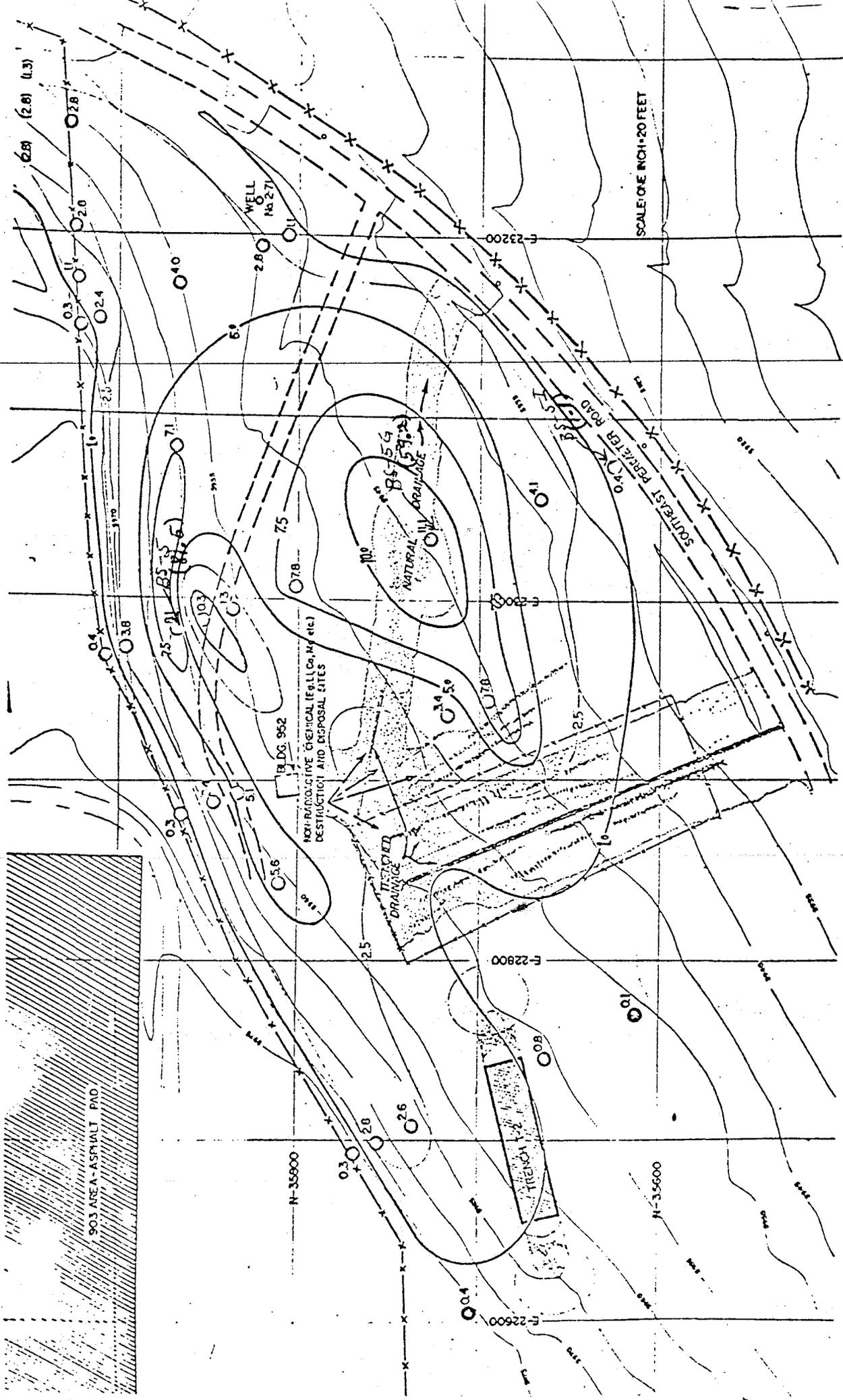


Figure 2.

241  $A_m$   $Mg/m^2$  (K.F. FIDLER) ( $Pu$  in  $G/m^2$ ) (bv soil)

SIMPLIFIED CONVERSION TABLE FOR THE VARIOUS UNITS USED IN THE  
LITERATURE TO EXPRESS THE ACTIVITY OF PLUTONIUM  
CONTAMINATION IN SOIL

	$\frac{\text{mCi}/\text{km}^2}{\mu\text{Ci}/\text{m}^2}$ *	$\frac{\text{d}/\text{m}/100 \text{ cm}^2}{\text{d}/\text{m}/\text{g}}$ *	$\frac{\text{pCi}/\text{g}}{\mu\text{Ci}/100 \text{ cm}^2}$ *
$\text{mCi}/\text{km}^2$	1.0	$2.22 \times 10^1$	$1.0 \times 10^{-1}$
$\mu\text{Ci}/\text{m}^2$	$1.0 \times 10^3$	$2.22 \times 10^4$	$1.0 \times 10^2$
$\text{d}/\text{m}/100 \text{ cm}^2$	$4.5 \times 10^{-2}$	1.0	$4.5 \times 10^{-3}$
$\text{d}/\text{m}/\text{g}$	4.5	$1.0 \times 10^2$	$4.5 \times 10^{-1}$
$\text{pCi}/\text{g}$	$1.0 \times 10^1$	$2.22 \times 10^2$	1.0
$\mu\text{Ci}/100 \text{ cm}^2$	$1.0 \times 10^5$	$2.22 \times 10^3$	$1.0 \times 10^4$

LEGEND:

- $\text{mCi}/\text{km}^2$  - Millicuries per square kilometer.
- $\mu\text{Ci}/\text{m}^2$  - Microcuries per square meter.
- $\text{d}/\text{m}/100 \text{ cm}^2$  - Disintegrations per minute per 100 square centimeters.
- $\text{d}/\text{m}/\text{g}$  - Disintegration per minute per gram of dry soil (the units in which the results of soil sample analyses are reported).
- $\text{pCi}/\text{g}$  - Picocuries per gram of dry soil.
- $\mu\text{Ci}/100 \text{ cm}^2$  - Microcuries per 100 square centimeters.

\*For a density of soil of  $1 \text{ g}/\text{cm}^3$  and a soil sample depth of 1 centimeter.