# AIP Group at LANL Illustrates that Sampling Methodology is Crucial for Proper Site Characterization of Old Manhattan Project Site at Los Alamos: Department of Energy

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Yanicak, S., Dale, M., and Goering, D

# AIP Group at LANL Illustrates that Sampling Methodology is Crucial for Proper Site Characterization of Old Manhattan Project Site at Los Alamos

*Steve Yanicak, Los Alamos National Laboratory*

Between 1944 and 1964 Technical Area 45 discharged untreated and treated radioactive effluent generated by nuclear research at Los Alamos during the Manhattan Project era. The effluent was discharged to the canyon bottom. In 1967, the canyon-bottom area was turned over to Los Alamos County and was later designated as a recreational park. In the early '1990s, the LANL Environmental Restoration (ER) Project characterized the canyon-bottom and their data showed that DOE's dose limit was not exceeded and no further action was recommended. In 1999, the AIP collected one sample in the canyon in order to verify ER's findings. AIP followed ER's new methodology for sediment sampling in canyons which was first implemented in 1996. Results show contaminant values several orders of magnitude higher than previous ER data. In addition, PCBs not analyzed for previously, were also detected. One lesson learned here is that the sampling methodology and approach is crucial for assessing the presence and distribution of contaminants at a site that holds many unknowns. Additional characterization utilizing updated methods will be needed to determine a more accurate assessment of human health and ecological risk.

Steve Yanicak heads the AIP Program for the State of New Mexico at LANL. Mr. Yanicak has been employed with this group for six years and his expertise lies in geology/geochemistry and contaminant transport. Mr. Yanicak received his M.S. in Geology from New Mexico State University and a B.S. in Geology from California State Sonoma.



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# *Sampling Locations for Acid Canyon Tributary PRS 1-002 (Former TA-45 Radioactive Liquid Waste Treatment Plant)*

Pueblo Canyon

Acid Canyon

A

B

C

PRS 1-002 Drainage

Canyon Road

D

Former TA-45

Los Alamos Townsite

***Previous LANL cluster sampling location***

***NMED DOE OB sampling location***

**Unit Location A**
OB/A/0-18
OB/A/24-53
OB/A/59-69
OB/A/74-84

**Unit Location B**
OB/B/0-15
OB/B/15-36

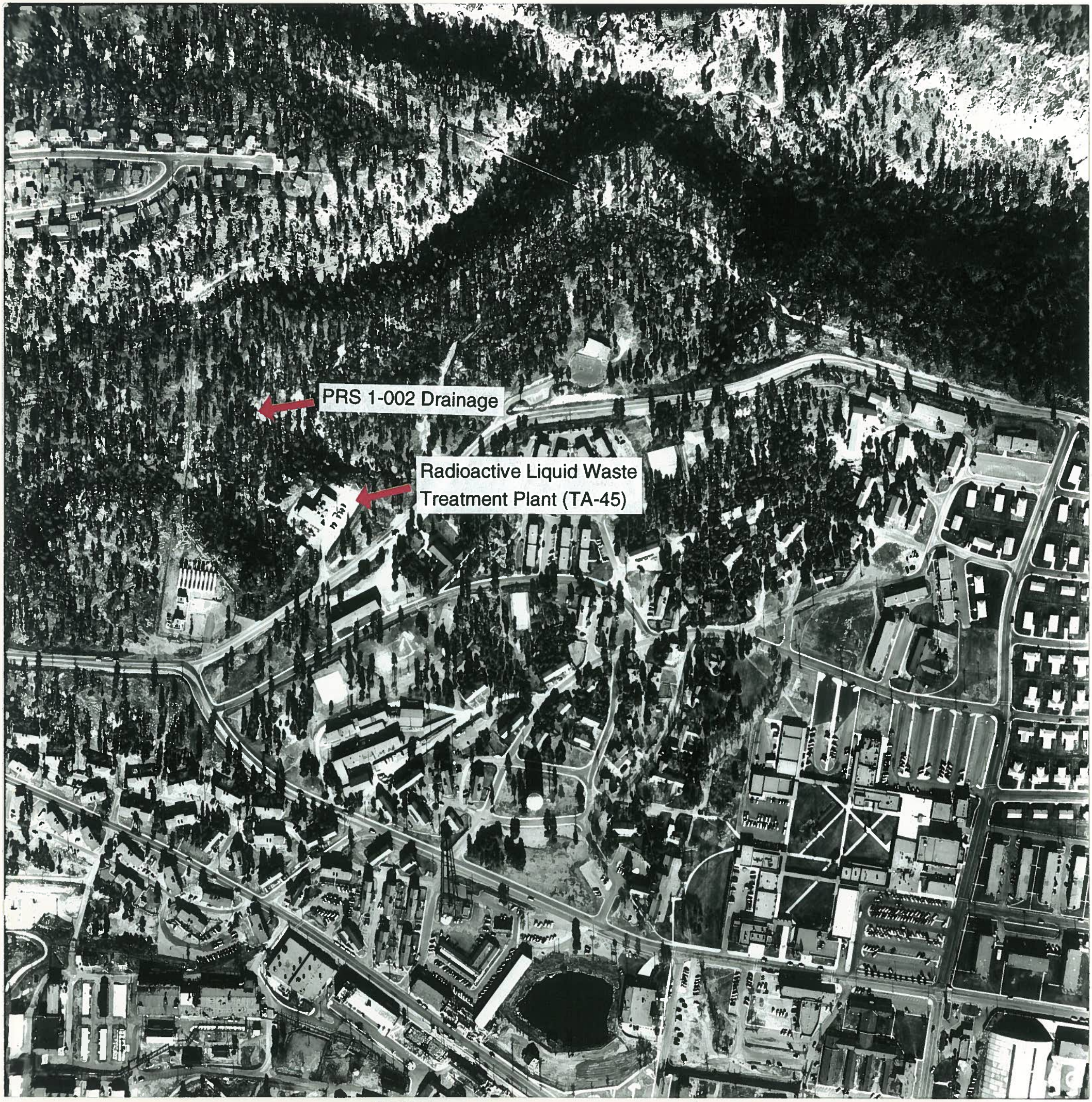
**Unit Location C**
OB/C/0-12
OB/C/12-24

**Unit Location D**
OB/D/0-14

N

NOTE:
Due to size and symbology, sampling locations are approximate.

Image furnished by Facility for Information Management, Analysis, and Display (FIMAD), Los Alamos National Laboratory (1974).


PRS 1-002 Drainage
Radioactive Liquid Waste
Treatment Plant (TA-45)

# Location Ids at TA-45

LEGEND

- Contours, 10 foot
- Contours, 100 foot
- Fence, Industrial
- Fence, Security
- Gate
- Roads, Dirt
- Roads, Paved
- Road/Trail
- Stream, Intermittent
- PRS
- Former Structure
- Permanent Structure
- Location Id
- DOE OB Sample

45-1019
45-1020
45-1018
45-1015
45-1016
45-1017
0–030(e)
OB/A/0–18
OB/A/24–53
OB/A/59–69
OB/A/74–84
45-1012
45-1021
45-1014
45-1013
1–002
45–004
OB/B/0–15
OB/B/15–36
OB/C/0–12
OB/C/12–24
45-1068
45-1066
45-1065
45-1064
45-1048
45-1045
45-1044
45-1035
45-1042
45-1037
45-1038
45-1039
45-1036
45-1040
45-1041
45-1034
45-1033
45-1032
45-1031
45-1123
45-1122
45-1049
45-1028
45-1027
45-1026
45-1025
45-1030
45-1056
45-1055
45-1029
45-1024
45-1062
45-1052
45-1011
45-1010
45-1009
OB/D/0–14
45-1072
45-1022
45-1003
45-1053
45-1054
45-1061
45-1006
45-1005
45-1003
45-1002
45-1121
45-1060
45-1059
45-1001
45-1004
45–001
45–002
0–030(f)
45–003
1–001(s)
1–006(s)

N

State Plane Coordinate System, New Mexico Central Zone.
1983 North American Datum

Grid provides NM State Plane coordinates in feet.
Grid interval, in feet: 200
Feet per inch on map = 100

SCALE 1:1200

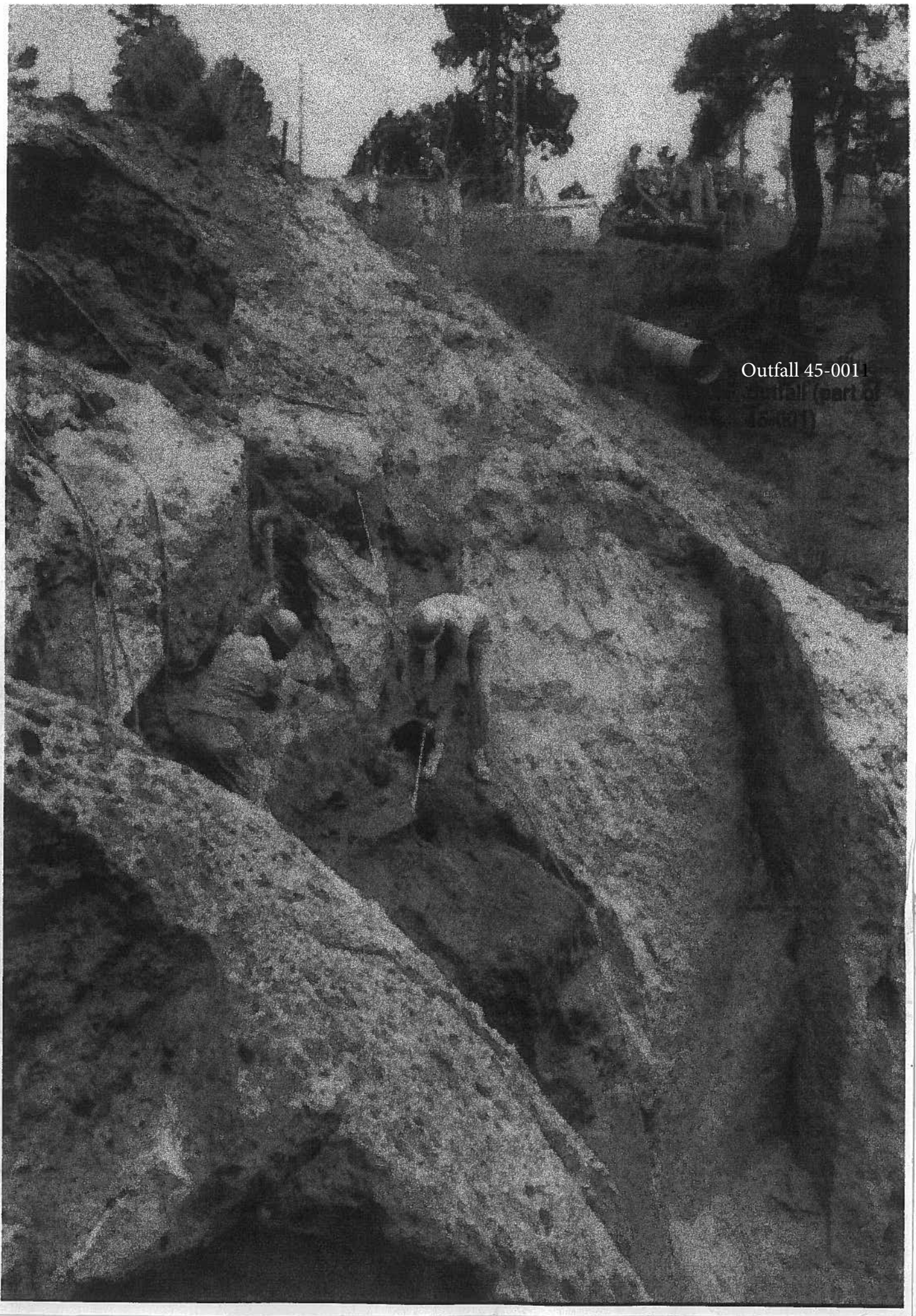
0 50 100 150
METERS
0 150 300 450 600
FEET

Notice: The information on this map is provisional and the accuracy has not been confirmed. Feature locations are dependent on scale and symbology and should not be relied upon to establish legal claims.
Basemap Sources: Boundary, structure and utility data are from Los Alamos National Laboratory Engineering Division and Los Alamos County Utility and Engineering Departments. Contour data is from Los Alamos National Laboratory Environmental Restoration Program aerial survey, September, 1991.


University of California
Los Alamos National Laboratory
Earth & Environmental Sciences Division


FIMAD Facility for Information Management, Analysis and Display
FIMAD is the electronic data repository for the Environmental Restoration Program at Los Alamos National Laboratory.


Produced by: Doug Walther
Date: January 03, 1995 FIMAD Plot ID: G102867


Outfall 45-0011


Outfall 1-002
Mailbox

# PLATE 1

**RADIONUCLIDE-CONTAMINANT COMPARISONS**

**All PRS Data Collected in the Canyon Area (Previous Investigations: FUSRAP and LANL RFI)**

| | Plutonium-239/240 (pCi/g) | Americium-241 (pCi/g) | Strontium-90 (pCi/g) | Cesium-137 (pCi/g) |
|---|---|---|---|---|
| No. of Samples | 60 | 5 | 40 | 49 |
| Concentration Range | -0.0163 - 629 | 0.33 - 43.4 | 0.169 - 5.8 | 0.09 - 14 |
| Mean | 30.31 | 9.53 | 0.81 | 1.26 |
| Standard Deviation | 101.46 | 16.95 | 1.1 | 2.82 |
| 1996 SAL | 18 | 17 | 5.9 | 4 |
| No. of Samples Exceeding SAL | 11 (18% of samples) | 1 (20% of samples) | 0 (0% of samples) | 3 (6% of samples) |

**NMED DOE OB Data Collected in the Canyon Area during 1999**

| | Plutonium-239/240 (pCi/g) | Americium-241 (pCi/g) | Strontium-90 (pCi/g) | Cesium-137 (pCi/g) |
|---|---|---|---|---|
| No. of Samples | 9 | 9 | 9 | 9 |
| Concentration Range | 2.25 - 1880 | 0.072 - 278 | 0.36 - 56 | <0.16 - 17.4 |
| Mean | 345.1 | 42.3 | 11.08 | 4.54 |
| Standard Deviation | 563.83 | 85.87 | 18.654 | 6.64 |
| 1996 SAL | 18 | 17 | 5.9 | 4 |
| No. of Samples Exceeding SAL | 7 (78% of samples) | 2 (22% of samples) | 2 (22% of samples) | 3 (33% of samples) |
| Mean LANL Specific Background1 | 0.025 | 0.026 | 0.229 | 0.211 |
| LANL Specific UTL1 | 0.068 | 0.04 | 1.04 | 0.9 |

*1 - Taken from Ryti, et al., 1998.*
*SAL - Screening Action Level (1996).*
*UTL - Upper Tolerance Limit.*

*Source for LANL Data: Los Alamos National Laboratory, March 1996, "Radiological Addendum to the RFI Report for Potential Release Sites" LANL Report LA-UR-95-3692, Los Alamos, New Mexico.*