

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-35575-RS  
ADDRESS: 3018 D 1/2 ROAD

JUNE 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

BENDIX FIELD ENGINEERING CORPORATION  
P.O. Box 1569  
Grand Junction, Colorado 81502

APPROVED BY

*Michael K. Tucker*  
M. TUCKER  
DOE PROJECT ENGINEER

DATE

*June 19, 1985*

REA35575:REA-KL009

8507080408 850619  
PDR WASTE  
WM-54 PDR

## TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 EXECUTIVE SUMMARY . . . . .	1
1.1 Introduction . . . . .	1
1.2 Evaluation and Recommendation . . . . .	1
2.0 PROPERTY DESCRIPTION . . . . .	2
2.1 General Description . . . . .	2
2.2 Existing Facilities and Structures . . . . .	2
3.0 RADIOLOGIC SURVEY . . . . .	4
3.1 Introduction . . . . .	4
3.2 Gamma Exposure-Rate Surveys . . . . .	4
3.2.1 Exterior Findings . . . . .	4
3.2.2 Interior Findings . . . . .	4
3.3 Boreholes, Soil Samples, and Other Measurements . . . . .	5
3.4 Radon/Radon Daughter Concentration . . . . .	5
3.5 Extent of Contamination . . . . .	5
4.0 RECOMMENDED REMEDIAL ACTION . . . . .	8
4.1 Decontamination and Restoration . . . . .	8
4.2 Evaluation of Recommended Remedial Action . . . . .	8
5.0 REFERENCES . . . . .	9
6.0 APPENDIX . . . . .	10

## **1.0 EXECUTIVE SUMMARY**

### **1.1 Introduction**

The location, DOE ID No. GJ-35575-RS, is a single-family residence located at 3018 D 1/2 Road, Grand Junction, Colorado.

The purpose of this assessment is to evaluate the extent of uranium millsite contamination at this property. This assessment includes recommended remedial action, estimated volume of material to be removed, and estimated cost of the proposed action.

### **1.2 Evaluation and Recommendation**

The action recommended is the removal of contaminated material and restoration of the property to its original condition. The identified residual radioactive material found on this property is tailings; the estimated volume is: exterior, 382 cu. yd.; interior, 0 cu. yd.

Approximately 10 days are required for completion of design work. Estimated cost to perform remedial action, including dislocation when applicable, is \$20,110. Remedial action on this property will take approximately 10 days to complete.

## 2.0 PROPERTY DESCRIPTION

### 2.1 General Description

Address: 3018 D 1/2 Road, Grand Junction, Colorado

Zoning: Agricultural Forest Transition (AFT)

Lot Size: Approximately 43,560 sf (1.0 acres)

Legal Description: Beg 396 ft W of SE Cor SW4NW4 Sec 16 1S 1E  
W 198 ft N 220 ft E 198 ft S to Beg., County of  
Mesa, State of Colorado.

Point of Reference: This property is located approximately 3  
miles northeast of the State of Colorado  
Tailings Repository. Appendix Figure 2.1 shows  
the property location relative to its surround-  
ings.

Utilities: Utility locations are shown in Appendix Figure 2.2.

Electrical:	Overhead
Gas:	Underground
Telephone:	Underground
Sewer:	Underground
Water:	Underground
Cable TV:	Overhead

Bordering Properties:

North:	Single-family residence
South:	D 1/2 Road
East:	Single-family residence
West:	Single-family residence

### 2.2 Existing Facilities and Structures

Primary Structure:

Type:	One-story, single-family residence
Size:	Approximately 2,529 sf
Construction Date:	1957
Construction:	Wood-frame
Foundation:	Concrete stemwall on spread footing, family room and garage are slab-on-grade
Footing Depth:	Approximately 14" to bottom of footing from grade
Basement:	None
Crawl Space:	Under original structure
Condition:	Good



Other Structures:

Type:	Shed
Size:	Approximately 256 sf
Construction:	Fiberglass siding over steel frame
Foundation:	18" high masonry piers above dirt floor
Condition:	Poor

General Remarks:

Miscellaneous stored metal and wood materials are scattered on north side of property. Some of it is located on areas designated for remedial action. Structures, utilities, landscaping, and other special features of this property are included in Appendix Figure 2.2.

Historical Data:

This structure is not over 50 years old. Therefore, it does not meet the eligibility criteria for consideration of inclusion on the National Register of Historic Places.

### 3.0 RADIOLOGIC SURVEY

#### 3.1 Introduction

Radiologic data were collected by Bendix at DOE ID No. GJ-35575-RS on March 15, 1985. Data collection methods were performed in accordance with procedures fully described in the Radiologic Support Operations Procedures Manual GJ-07(84) (Bendix Field Engineering Corporation, 1984). These data were evaluated to determine the areal and vertical extent of uranium mill tailings contamination at this property as well as any other contaminated material that may have originated from the millsite.

A review of historical information from the files of the Colorado Department of Health (CDH) and the inclusion data from Oak Ridge National Laboratory (ORNL) was conducted. These records indicate that contamination is located in areas north and west of the primary structure.

The Bendix radiologic survey was designed to investigate the entire property, with emphasis on previously identified areas of contamination. Conclusions based upon data analyses are discussed in Section 3.5, Extent of Contamination. Photocopies of the Official Survey Report, Memo of Understanding, team leader notes, and deconvolution graphs are included in the Appendix (Section 6.0).

#### 3.2 Gamma Exposure-Rate Surveys

##### 3.2.1 Exterior Findings

Background Readings: 12 to 14 uR/h  
Highest Outside Gamma Reading (HOG): 67 uR/h

Exterior radium-concentration measurements are presented in Appendix Tables 3.1a and 3.1b. Grid-point survey results are shown in Appendix Figures 3.1a and 3.1b. Appendix Figures 3.2a and 3.2b present the ranges of elevated gamma readings and indicate areas of possible contamination.

##### 3.2.2 Interior Findings

Background Readings: 10 to 15 uR/h  
Highest Inside Gamma Reading (HIG): 24 uR/h

Interior radium-concentration measurements are presented in Appendix Table 3.2. Interior gamma exposure-rate measurements are summarized in Appendix Table 3.3. Appendix Figures 3.3a and 3.3b show interior exposure rates and locations of these measurements.

### 3.3 Boreholes, Soil Samples, and Other Measurements

Areas which displayed elevated gamma levels were further investigated; these areas are shown in Appendix Figures 3.3a, 3.3b, 3.4a, and 3.4b. Data from these investigations are included in Appendix Tables 3.1a, 3.1b, and 3.2.

### 3.4 Radon/Radon Daughter Concentration (RDC)

Determined by CDH: 0.007 gross working level (WL). No additional RDC measurements were taken by Bendix.

### 3.5 Extent of Contamination

Appendix Figures 3.5a, 3.5b, and 3.5c show identified areas and estimated depths of contamination on this property, based on assessments of all measurements taken. As noted in these figures, areas recommended for remedial action that contain identified residual radioactive materials are:

- (AREA A) A deposit inside the shed is contaminated to a depth of 6 inches. This shed is moveable and has a dirt floor (approximately 108 sf).
- (AREA B) The soil directly east of Area AA is contaminated to a depth of 3 inches (approximately 6 sf).
- (AREA C) A deposit at the east property line is contaminated to a depth of 6 inches (approximately 25 sf).
- (AREA D) The soil south of Area C is contaminated to a depth of 12 inches (approximately 52 sf).
- (AREA E) A deposit that surrounds, but does not include the concrete cistern, is contaminated to a depth of 6 inches (approximately 20 sf).
- (AREA F) A flower bed that is adjacent to the east side of the primary structure is contaminated to an estimated depth of 6 inches, based on information collected in Area E (approximately 12 sf).
- (AREA G) A flower bed that is adjacent to the south side of the primary structure is contaminated to a depth of 6 inches (approximately 8 sf).
- (AREA H) There is a small deposit at the water meter, south of the primary structure. The estimated depth of contamination is 6 inches, based on information collected in Area J (approximately 12 sf).
- (AREA I) A deposit that is directly north of D 1/2 Road is contaminated to a depth of 9 inches (approximately 216 sf).

- (AREA J) A section of lawn, southwest of the primary structure, is contaminated to a depth of 6 inches (approximately 468 sf).
- (AREA K) There is a deposit in a portion of the lawn that lays between Area J and the driveway. The depth of contamination is 12 inches (approximately 440 sf).
- (AREA L) This section of the south gravel driveway is contaminated to a depth of 12 inches (approximately 432 sf).
- (AREA M) A portion of the garden that is west of Area L is contaminated to a depth of 12 inches (approximately 330 sf).
- (AREA N) This large section of garden abuts Area M. The depth of contamination is 6 inches (approximately 4,034 sf).
- (AREA O) This small portion of the gravel driveway is contaminated to an estimated depth of 6 inches, based on data collected in Area N (approximately 50 sf).
- (AREA P) A section of lawn that is contiguous to the west side of the primary structure is contaminated to a depth of 15 inches (approximately 2,470 sf).
- (AREA Q) A portion of the gravel driveway that is contiguous to Area P is contaminated to a depth of 15 inches (approximately 180 sf).
- (AREA R) A deposit that is surrounded by Area P is contaminated to a depth of 39 inches (approximately 108 sf).
- (AREA S) The soil beneath the uncontaminated 4-inch-thick concrete patio is contaminated to a total estimated depth of 19 inches, based on data collected in Area P (approximately 51 sf).
- (AREA T) A section of lawn, adjacent to Area P, is contaminated to a depth of 12 inches (approximately 940 sf).
- (AREA U) A small portion of lawn that is adjacent to Area T is contaminated to a depth of 6 inches (approximately 35 sf).
- (AREA V) A group of small deposits at the "Y" of the gravel driveway is contaminated to a depth of 6 inches (approximately 214 sf).
- (AREA W) A small portion of soil north of Area V is contaminated to a depth of 6 inches (approximately 32 sf).
- (AREA X) A small section of soil in the north yard is contaminated to a depth of 12 inches (approximately 45 sf).

- (AREA Y) A deposit that is contiguous to the northeast portion of the gravel driveway is contaminated to a depth of 6 inches (approximately 360 sf).
- (AREA Z) A large section of the northeast gravel driveway has contamination to a depth of 12 inches (approximately 1,080 sf).
- (AREA AA) A deposit east of the shed is contaminated to a depth of 6 inches (approximately 280 sf).
- (AREA BB) A portion of the gravel driveway which lays between Areas Z and AA is contaminated to a depth of 6 inches (approximately 140 sf).

#### 4.0 RECOMMENDED REMEDIAL ACTION

##### 4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-35575-RS, includes removal of all areas identified as containing radioactive material (as discussed in Section 3.5 and shown in Appendix Figures 3.5a, 3.5b, and 3.5c) and transport of removed material to the disposal site.

After remedial action is completed, the areas involved will be restored to original condition in accordance with the Bendix drawings, Vicinity Properties General Construction Specification (Bendix Field Engineering Corporation, 1984), and Statement of Work for Construction Subcontractor.

Dislocation of the occupants will not be required for this remedial action.

##### 4.2 Evaluation of Recommended Remedial Action

Volume calculations of the areas included for remedial action are presented in Appendix Table 4.1. Cost estimates are presented in Appendix Table 4.2.

Estimated cost of remedial action is \$20,110.

This remedial action will result in removal of the identified residual radioactive materials.

There is no owner preference with respect to remedial action and no legal or other complications are foreseen at this time.



## 5.0 REFERENCES

ARIX, A Professional Corporation, Procedures Manual for the Grand Junction Remedial Action Program, for Colorado Department of Health, Radiation Control Division, and the U.S. Department of Energy, 1983.

Bendix Field Engineering Corporation, Procedures Manual Radiologic Support Operations Grand Junction Vicinity Properties, (GJ-07), for U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, 1984.

Bendix Field Engineering Corporation, Engineering, Construction, and Land Support Manual Grand Junction Vicinity Properties Project, (GJ-08), for U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, 1984.

Bendix Field Engineering Corporation, Grand Junction Vicinity Properties Operating Manual, (GJ-16) for U.S. Department of Energy, Nuclear Energy Programs, Division of Remedial Action Projects, UMTRA, 1984.

Bendix Field Engineering Corporation, Vicinity Properties General Construction Specification, for U.S. Department of Energy, Nuclear Energy Programs, Division of Remedial Action Projects, UMTRA, 1984.

Bendix Field Engineering Corporation, Environmental Assessment of Preliminary Cleanup Activities at Offsite Properties Contaminated by Tailings from the Grand Junction Inactive Uranium Millsite, (GJ-04), for U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations, Albuquerque, New Mexico, 1983.

U.S. Department of Energy, Programmatic Memorandum of Agreement (DOE No. DE-GM04-84AL28460) between the U.S. Department of Energy, the Advisory Council on Historic Preservation, and the Colorado State Historic Preservation Officer, for UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, 1984.

U.S. Department of Energy, Vicinity Properties Management and Implementation Manual, for UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, 1984.

U.S. Environmental Protection Agency, Standards for Remedial Action at Inactive Uranium Processing Sites (40 CFR Part 192), Washington, D.C., 1983.

## 6.0 APPENDIX

This Appendix contains the following:

### Appendix Tables:

Table 3.1a	Radium Concentrations at Exterior Locations
Table 3.1b	Radium Concentrations at Exterior Locations
Table 3.2	Radium Concentrations at Interior Locations
Table 3.3	Summary of Interior Gamma Exposure Rates
Table 4.1	Area and Volume Calculations
Table 4.2	Estimated Cost of Decontamination and Restoration

### Appendix Figures:

Figure 2.1	Vicinity Map
Figure 2.2	Site Plan
Figure 3.1a	Exterior Grid-Point Exposure Rates
Figure 3.1b	Exterior Grid-Point Exposure Rates
Figure 3.2a	Exterior Gamma Scan
Figure 3.2b	Exterior Gamma Scan
Figure 3.3a	Interior Gamma Exposure Rates and Sample Locations - Crawl Space
Figure 3.3b	Interior Gamma Exposure Rates and Sample Locations - Ground Floor
Figure 3.4a	Exterior Sample Locations
Figure 3.4b	Exterior Sample Locations
Figure 3.5a	Interior Estimated Extent of Contamination
Figure 3.5b	Exterior Estimated Extent of Contamination
Figure 3.5c	Exterior Estimated Extent of Contamination

Official Survey Report

Memo of Understanding

Team Leader Notes

Deconvolution Graphs (Apparent Radium-226 Concentration)



## Radium Concentrations at Exterior Locations

DOE ID #GJ-35575-RS

3018 D 1/2 Road

Page 1 of 7

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
7	150228	00	DS	4.4		*	North of house
		06	DS	1.7		*	
8	160270	00	DS	3.3		*	East of shed
		06	DS	1.5		*	
9	162215	00	DS	3.4		*	North of driveway
		06	DS	4.2		*	
		12	DS	1.7		*	
10	162244	00	DS	3.5		*	West of shed
		06	DS	<1.0		*	
11	170275	00	DS	4.0		*	East of shed
		06	DS	<1.0		*	
12	171245	00	DS	8.4		*	Top of buried electrical line
		06	DS	7.6		*	
		12	DS	3.9		*	
13	172265	03	TC	5.4		*	By shed DC = 6 inches Based on the deconvolution graph
		06	TC	4.7		*	
		09	TC	4.2		*	
		12	TC	4.0		*	
		15	TC	3.8		*	
		18	TC	3.7		*	
		21	TC	3.6		*	
		24	TC	3.5		*	
		27	TC	3.4		*	
		30	TC	3.5		*	
		33	TC	3.6		*	
14	174289	00	DS	2.5		*	By east property line
		06	DS	<1.0		*	
15	175235	03	TC	11.0		*	North driveway DC = 12 inches Based on the deconvolution graph
		06	BH	10.0	8.8	*	
		09	TC	7.3		*	
		12	BH	5.6	4.6	*	
		15	TC	4.7		*	
		18	TC	4.3		*	
		21	TC	4.0		*	
		24	TC	3.8		*	
		27	TC	3.8		*	

## Radium Concentrations at Exterior Locations

DOE ID #GJ-35575-RS

3018 D 1/2 Road

Page 2 of 7

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
15	175235	30	TC	3.7		*	
		33	TC	3.8		*	
		36	TC	3.6		*	
16	192260	00	DS	4.6		*	
		06	DS	15.5		*	
		12	DS	1.5		*	
17	200225	03	TC	3.5		*	Against side of garage DC = 0 inches
		06	TC	3.8		*	
		09	TC	3.7		*	
		12	TC	3.7		*	
		15	TC	3.6		*	
18	200288	00	DS	2.4		*	
		06	DS	1.0		*	
19	215215	03	TC	16.7		*	West side yard DC = 15 inches Based on the deconvolution graph
		06	BH	20.2	17.9	*	
		09	TC	17.2		*	
		12	BH	11.1	11.9	*	
		15	TC	7.3		*	
		18	BH	5.5	3.0	*	
		21	TC	4.7		*	
		24	TC	4.2		*	
		27	TC	4.1		*	
20	220218	00	DS	1.8		*	Patio
21	220251	03	TC	4.0		*	East of house DC = 0 inches
		06	TC	4.0		*	
		09	TC	4.1		*	
		12	TC	4.1		*	
		15	TC	4.2		*	
		18	TC	4.1		*	
		21	TC	3.9		*	
		24	TC	3.7		*	
		27	TC	3.6		*	
22	225251	30	TC	3.5		*	
		00	DS	4.8		*	

Could not do 6 inch  
due to road base

## Radium Concentrations at Exterior Locations

DOE ID #GJ-35575-RS

3018 D 1/2 Road

Page 3 of 7

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
23	230290	00	DS	4.7		*	East of cistern
		06	DS	12.5		*	DC = 12 inches
		03	TC	8.2		*	Based on the
		06	BH	9.5	5.6	*	deconvolution graph
		09	TC	7.4		*	
		12	BH	5.7	4.8	*	
		15	TC	4.5		*	
		18	TC	4.0		*	
		21	TC	3.8		*	
		24	TC	3.8		*	
		27	TC	3.6		*	
		30	TC	3.6		*	
		33	TC	3.6		*	
		36	TC	3.5		*	
		39	TC	3.6		*	
24	234215	00	DS	2.0		*	Sidewalk by house
25	240204	00	DS	<1.0		*	Sidewalk
26	240263	03	TC	3.2		*	East of house
		06	TC	3.5		*	DC = 0 inches
		09	TC	3.6		*	
		12	TC	3.6		*	
		15	TC	3.5		*	
		18	TC	3.4		*	
		21	TC	3.4		*	
		24	TC	3.5		*	
		27	TC	3.4		*	
		30	TC	3.5		*	
27	240266	00	DS	6.3		*	By cistern
		03	DS	8.5		*	Hit concrete
28	240268	00	GS		1.6	*	
29	241275	03	TC	4.9		*	By cistern
		06	TC	4.4		*	DC = 6 inches
		09	TC	4.0		*	Based on all
		12	TC	3.8		*	data available
		15	TC	3.6		*	
		18	TC	3.6		*	
		21	TC	3.5		*	

## Radium Concentrations at Exterior Locations

DOE ID #GJ-35575-RS

3018 D 1/2 Road

Page 4 of 7

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
29	241275	24	TC	3.5		*	
		27	TC	3.5		*	
		30	TC	3.4		*	
30	244270	03	TC	5.0		*	By cistern
		06	TC	4.6		*	DC = 6 inches
		09	TC	4.0		*	Based on the
		12	TC	3.9		*	deconvolution graph
		15	TC	3.6		*	
		18	TC	3.6		*	
		21	TC	3.5		*	
		24	TC	3.5		*	
		27	TC	3.5		*	
		30	TC	3.4		*	
		33	TC	3.4		*	
31	255208	00	DS	9.1		*	West of house
		06	DS	7.6		*	Hit concrete
32	255209	00	DS	10.6		*	West of house in
		06	DS	9.8		*	flower garden
		12	DS	2.9		*	
		12-18	SS			5.8	
33	258209	03	TC	8.4		*	Southwest corner
		06	BH	7.7	6.2	*	of house
		09	TC	6.0		*	DC = 15 inches
		12	BH	4.8	3.1	*	Based on all
		15	TC	4.1		*	data available
		18	TC	3.7		*	
		21	TC	3.7		*	
		24	TC	3.6		*	
		27	TC	3.5		*	
		30	TC	3.5		*	
34	259252	00	DS	2.8		*	Telephone line
		06	DS	1.7		*	
35	260219	03	TC	3.5		*	Sewer line
		06	TC	3.7		*	DC = 0 inches
		09	TC	3.7		*	
		12	TC	3.7		*	
		15	TC	3.7		*	
		18	TC	3.6		*	

## Radium Concentrations at Exterior Locations

DOE ID #GJ-35575-RS

3018 D 1/2 Road

Page 5 of 7

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
35	260219	21	TC	3.6		*	
		24	TC	3.5		*	
		27	TC	3.5		*	
		30	TC	3.5		*	
		33	TC	3.4		*	
		36	TC	3.5		*	
		39	TC	3.5		*	
		42	TC	3.5		*	
		45	TC	3.5		*	
		48	TC	3.4		*	
		51	TC	3.4		*	
		54	TC	3.3		*	
		57	TC	3.2		*	
		60	TC	3.2		*	
		63	TC	3.2		*	
		66	TC	3.1		*	
		69	TC	3.1		*	
36	261228	03	TC	3.5		*	Water line DC = 0 inches
		06	TC	3.8		*	
		09	TC	3.8		*	
		12	TC	3.7		*	
		15	TC	3.6		*	
		18	TC	3.6		*	
		21	TC	3.4		*	
		24	TC	3.5		*	
		27	TC	3.5		*	
		30	TC	3.5		*	
		33	TC	3.5		*	
		36	TC	3.4		*	
		39	TC	3.3		*	
		42	TC	3.4		*	
		45	TC	3.4		*	
		48	TC	3.4		*	
		51	TC	3.4		*	
		54	TC	3.4		*	
		57	TC	3.4		*	
37	261251	03	TC	3.6		*	Gas line DC = 0 inches
		06	TC	3.6		*	
		09	TC	3.5		*	

## Radium Concentrations at Exterior Locations

DOE ID #GJ-35575-RS

3018 D 1/2 Road

Page 6 of 7

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
37	261251	12	TC	3.5		*	
		15	TC	3.4		*	
		18	TC	3.4		*	
		21	TC	3.4		*	
		24	TC	3.4		*	
		27	TC	3.4		*	
		30	TC	3.4		*	
		33	TC	3.3		*	
		36	TC	3.4		*	
		39	TC	3.4		*	
		42	TC	3.3		*	
		45	TC	3.3		*	
		48	TC	3.3		*	
		51	TC	3.3		*	
		54	TC	3.2		*	
		57	TC	3.3		*	
		60	TC	3.3		*	
		63	TC	3.2		*	
		66	TC	3.2		*	
38	262242	00	DS	7.2		*	South of house
		06	DS	1.6		*	
39	268215	00	DS	1.4		*	South of house
40	273205	00	DS	2.6		*	Southwest corner
		06	DS	1.2		*	of house
41	280290	00	DS	<1.0		*	Background
		00-06	SS			2.6	DC = 0 inches
		03	TC	3.3		*	
		06	TC	3.4		*	
		09	TC	3.5		*	
		12	BH	3.6	1.4	*	
		15	TC	3.6		*	
		18	TC	3.5		*	
		21	TC	3.5		*	
		24	BH	3.5	<1.0	*	
		27	TC	3.6		*	
		30	BH	3.5	1.4	*	
		33	TC	3.5		*	
42	307215	00	DS	1.5		*	By irrigation ditch



## Radium Concentrations at Exterior Locations

DOE ID #GJ-35575-RS

3018 D 1/2 Road

Page 7 of 7

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
43	310204	03	TC	7.7		*	Front yard
		06	TC	6.4		*	DC = 9 inches
		09	TC	5.1		*	Based on the
		12	TC	4.4		*	deconvolution graph
		15	TC	4.0		*	
		18	TC	3.9		*	
		21	TC	3.9		*	
		24	TC	3.8		*	
		27	TC	3.8		*	
44	313203	00	DS	1.7		*	Front yard

Tool Types: GB = GAD-6 Borehole  
 GS = GAD-6 Surface  
 DS = Delta Scintillometer  
 TC = Total Count Borehole  
 SS = Soil Sample  
 BH = Combined GAD-6 and  
 Total Count Borehole

Notes: DC = Depth of Contamination  
 \* = No Soil Sample Taken  
 [n] = Reading Taken n-Inches  
 Above Floor or Ground  
 Date of Survey = 03-15-85  
 Team Leader = TRU

## Radium Concentrations at Exterior Locations

DOE ID #GJ-35575-RS

3018 D 1/2 Road

Page 1 of 6

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
45	159269	00	DS	3.0		*	North of driveway
		06	DS	1.4		*	
46	167257	00	DS	2.1		*	Driveway
		06	DS	1.4		*	
47	168269	00	DS	2.3		*	Backyard Middle of driveway
48	169261	00	DS	3.1		*	Driveway
		06	DS	1.4		*	
49	177257	03	TC	4.1		*	Driveway DC = 6 inches Based on all data available
		06	TC	4.0		*	
		09	TC	3.7		*	
		12	TC	3.7		*	
		15	TC	3.7		*	
		18	TC	3.6		*	
		21	TC	3.6		*	
		24	TC	3.4		*	
		27	TC	3.4		*	
		30	TC	3.4		*	
50	178268	00	DS	1.9		*	Backyard Side of driveway
51	179240	00	DS	2.1		*	Driveway
		06	DS	<1.0		*	
52	185268	00	DS	2.2		*	South of driveway
		06	DS	<1.0		*	
53	187179	00	DS	1.6		*	
54	190240	00	DS	2.9		*	Driveway
		06	DS	1.4		*	
55	195251	00	DS	2.5		*	Northwest of house
		06	DS	2.4		*	
56	199179	00	DS	2.2		*	Garden
		06	DS	1.5		*	



## Radium Concentrations at Exterior Locations

DOE ID #GJ-35575-RS

3018 D 1/2 Road

Page 2 of 6

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
57	200265	03	TC	6.6		*	West of house
		06	TC	6.5		*	DC = 12 inches
		09	TC	5.6		*	Based on the
		12	TC	4.7		*	deconvolution graph
		15	TC	4.1		*	
		18	TC	3.9		*	
		21	TC	3.7		*	
		24	TC	3.6		*	
		27	TC	3.6		*	
58	214195	00	DS	1.8		*	Garden
59	215242	00	DS	4.0		*	Driveway
		06	DS	3.5		*	
		12	DS	2.4		*	
		12-18	SS			4.1	By driveway
60	215267	03	TC	10.3		*	West of house
		06	TC	11.4		*	Water in hole
		09	TC	11.9		*	DC = 39 inches
		12	TC	11.6		*	Based on the
		15	TC	10.7		*	deconvolution graph
		18	TC	9.4		*	
		21	TC	8.0		*	
		24	TC	7.2		*	
		27	TC	6.8		*	
		30	TC	6.5		*	
		33	TC	6.2		*	
		36	TC	5.4		*	
		39	TC	4.8		*	
		42	TC	4.2		*	
		45	TC	3.9		*	
		48	TC	3.6		*	
		51	TC	3.5		*	
		54	TC	3.4		*	
		57	TC	3.3		*	
		60	TC	3.4		*	
		63	TC	3.4		*	
		66	TC	3.4		*	
		69	TC	3.4		*	
		72	TC	3.3		*	
		75	TC	3.3		*	

## Radium Concentrations at Exterior Locations

DOE ID #GJ-35575-RS

3018 D 1/2 Road

Page 3 of 6

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
61	223190	00	DS	2.6		*	Garden
		06	DS	<1.0		*	
62	224257	03	TC	29.0		*	Old sewer line DC = 15 inches Based on the deconvolution graph
		06	BH	31.9	30.0	*	
		09	TC	24.2		*	
		12	BH	15.2	18.9	*	
		15	TC	9.4		*	
		18	TC	6.6		*	
		21	TC	5.0		*	
		24	BH	4.4	2.2	*	
		27	TC	4.0		*	
		30	TC	3.8		*	
		33	TC	3.5		*	
		36	TC	3.4		*	
63	225205	00	DS	1.5		*	Garden
64	228176	00	DS	3.8		*	
		06	DS	1.9		*	
65	235235	00	DS	2.0		*	Driveway
66	240210	03	TC	3.8		*	Garden DC = 6 inches Based on all data available
		06	TC	3.9		*	
		09	TC	3.8		*	
		12	TC	3.8		*	
		15	TC	3.7		*	
		18	TC	3.6		*	
		21	TC	3.7		*	
		24	TC	3.6		*	
		27	TC	3.7		*	
		30	TC	3.6		*	
		33	TC	3.6		*	
67	242262	03	TC	18.7		*	West of house DC = 15 inches Based on the deconvolution graph
		06	BH	15.7	13.4	*	
		09	TC	10.0		*	
		12	BH	6.6	4.0	*	
		15	TC	4.9		*	
		18	TC	4.1		*	
		21	TC	3.5		*	
		24	TC	3.5		*	
		27	TC	3.5		*	

## Radium Concentrations at Exterior Locations

DOE ID #GJ-35575-RS

3018 D 1/2 Road

Page 4 of 6

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
67	242262	30	TC	3.5		*	
		33	TC	3.4		*	
		36	TC	3.3		*	
		39	TC	3.3		*	
68	255172	00	DS	2.2		*	
		06	DS	1.2		*	
69	255228	00	DS	3.4		*	Driveway
		06	DS	1.6		*	
70	260210	00	GS		7.0	*	
71	265215	03	TC	4.4		*	Garden DC = 6 inches Based on all data available
		06	TC	4.3		*	
		09	TC	4.1		*	
		12	TC	4.0		*	
		15	TC	3.9		*	
		18	TC	3.9		*	
		21	TC	3.8		*	
		24	TC	3.7		*	
		27	TC	3.7		*	
		30	TC	3.7		*	
		33	TC	3.8		*	
		36	TC	3.8		*	
72	265225	00-06	SS			5.9	Garden
73	271263	00	DS	4.0		*	Southwest of house
		06	DS	1.9		*	
74	275172	00	DS	3.4		*	Garden
		06	DS	1.9		*	
75	275180	00-06	SS			7.9	Garden
76	275195	00	GS		5.1	*	
77	275255	03	TC	3.7		*	West side yard DC = 6 inches Based on all data available
		06	TC	3.7		*	
		09	TC	3.6		*	
		12	TC	3.6		*	
		15	TC	3.5		*	
		18	TC	3.6		*	

## Radium Concentrations at Exterior Locations

DOE ID #GJ-35575-RS

3018 D 1/2 Road

Page 5 of 6

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
77	275255	21	TC	3.7		*	
		24	TC	3.7		*	
		27	TC	3.7		*	
		30	TC	3.7		*	
		33	TC	3.7		*	
		36	TC	3.6		*	
78	278183	00	GS		6.0	*	Garden
		03	TC	4.4		*	DC = 6 inches
		06	BH	4.3	1.6	*	Based on all
		09	TC	4.0		*	data available
		12	BH	3.9	1.5	*	
		15	TC	3.8		*	
		18	TC	3.7		*	
		21	TC	3.7		*	
		24	BH	3.8	1.1	*	
		27	TC	3.7		*	
		30	TC	3.6		*	
		33	TC	3.6		*	
		36	TC	3.6		*	
79	288235	00	DS	2.4		*	Driveway
		06	DS	6.3		*	DC = 12 inches
		03	TC	5.1		*	Based on the
		06	TC	5.9		*	deconvolution graph
		09	TC	5.4		*	
		12	TC	4.7		*	
		15	TC	4.4		*	
		18	TC	4.2		*	
		21	TC	4.0		*	
		24	TC	4.0		*	
		27	TC	3.9		*	
		30	TC	3.8		*	
		33	TC	3.8		*	
80	292225	00	DS	2.8		*	Garden
		06	DS	2.3		*	
		12	DS	1.6		*	
81	295172	00	DS	2.4		*	Garden
		06	DS	1.4		*	
82	295263	00	DS	1.6		*	Front yard

## Radium Concentrations at Exterior Locations

DOE ID #GJ-35575-RS

3018 D 1/2 Road

Page 6 of 6

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
83	296244	00	DS	6.2		*	By driveway
		06	DS	5.7		*	
		12	DS	1.0		*	
84	302262	00	DS	<1.0		*	By D 1/2 Road
85	310268	00	DS	5.2		*	South of house near street
		06	DS	6.3		*	
		12	DS	1.4		*	

Tool Types: GB = GAD-6 Borehole  
 GS = GAD-6 Surface  
 DS = Delta Scintillometer  
 TC = Total Count Borehole  
 SS = Soil Sample  
 BH = Combined GAD-6 and  
 Total Count Borehole

Notes: DC = Depth of Contamination  
 \* = No Soil Sample Taken  
 [n] = Reading Taken n-Inches  
 Above Floor or Ground  
 Date of Survey = 03-15-85  
 Team Leader = TRU

## Radium Concentrations at Interior Locations

DOE ID #GJ-35575-RS

3018 D 1/2 Road

Page 1 of 1

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
1		00-06	SS			1.7	Crawl space
2		00-06	SS			1.7	Crawl space
3		00	DS	6.7		*	In big shed behind garage
		06	DS	<1.0		*	
4		00	DS	3.0		*	Shed
		06	DS	1.8		*	
5		00	DS	4.4		*	Shed
		06	DS	<1.0		*	
6		00	DS	2.6		*	Shed
		06	DS	1.4		*	

Tool Types: GB = GAD-6 Borehole  
 GS = GAD-6 Surface  
 DS = Delta Scintillometer  
 TC = Total Count Borehole  
 SS = Soil Sample  
 BH = Combined GAD-6 and  
 Total Count Borehole

Notes: DC = Depth of Contamination  
 \* = No Soil Sample Taken  
 [n] = Reading Taken n-Inches  
 Above Floor or Ground  
 Date of Survey = 03-15-35  
 Team Leader = TRU

Location *	Number of Readings Taken at Waist Level	Range at Waist Level (uR/h)	Mean at Waist Level (uR/h)	Number of Readings Taken at Surface	Range at Surface (uR/h)	Mean Surface (uR/h)
CRAWL SPACE	00	-	-	18	13-15	14
GROUND FLOOR	*	*	*	*	10-13	*
SHED	09	10-14	12	09	13-24	16

=====

\* The CDH and ORNL data indicated the absence of interior contamination at this property. This information was investigated by performing a walking gamma scan in the primary structure. These areas and the ranges of gamma measurements are shown in Appendix Figure 3.3b. Exposure rates in the crawl space and shed are shown in Appendix Figures 3.3a and 3.3b.



Table 4.1  
Area and Volume Calculations  
DOE ID No. GJ-35575-RS

Page 1 of 3

<u>AREA</u>	<u>CALCULATIONS(ft)</u>	<u>SF</u>	<u>DEPTH(ft)</u>	<u>CF</u>	<u>CUBIC YARDS</u>
EXTERIOR					
Concrete					
S	8 x 17 =	136	x 0.3 =	41	
Volume of Concrete				41 =	41/27 = 2
Contaminated Fill					
A	18 x 6 =	108	x 0.5 =	54	
B	2 x 3 =	6	x 0.3 =	2	
C	5 x 5 =	25	x 0.5 =	13	
D	4 x 13 =	52	x 1.0 =	52	
E	4 x 5 =	20	x 0.5 =	10	
F	2 x 6 =	12	x 0.5 =	6	
G	2 x 4 =	8	x 0.5 =	4	
H	3 x 4 =	12	x 0.5 =	6	
I	24 x 9 =	216	x 0.8 =	173	
J	29 x 8 =	232			
	28 x 8 =	224			
	3 x 4 =	12			
		468	x 0.5 =	234	
K	40 x 11 =	440	x 1.0 =	440	
L	36 x 12 =	432	x 1.0 =	432	
M	10 x 33 =	330	x 1.0 =	330	



Table 4.1  
Area and Volume Calculations  
DOE ID No. GJ-35575-RS

Page 2 of 3

<u>AREA</u>	<u>CALCULATIONS(ft)</u>	<u>SF</u>	<u>DEPTH(ft)</u>	<u>CF</u>	<u>CUBIC YARDS</u>
N	77 x 51 6 x 10 3 x 4 3 x 5 2 x 5 2 x 5	= 3,927 = 60 = 12 = 15 = 10 = 10			
		<u>4,034</u>	x 0.5	= 2,017	
O	10 x 5	= 50	x 0.5	= 25	
P	65 x 38	= 2,470	x 1.3	= 3,211	
Q	4 x 45	= 180	x 1.3	= 234	
R	9 x 12	= 108	x 3.3	= 356	
S	17 x 3	= 51	x 1.3	= 66	
T	47 x 20	= 940	x 1.0	= 940	
U	4 x 5 3 x 5	= 20 = 15			
		<u>35</u>	x 0.5	= 18	
V	15 x 5 3 x 4 3 x 4 3 x 3 4 x 4 6 x 15	= 75 = 12 = 12 = 9 = 16 = 90			
		<u>214</u>	x 0.5	= 107	
W	4 x 5 3 x 4	= 20 = 12			
		<u>32</u>	x 0.5	= 16	
X	3 x 15	= 45	x 1.0	= 45	
Y	18 x 20	= 360	x 0.5	= 180	
Z	18 x 60	= 1,080	x 1.0	= 1,080	
AA	14 x 20	= 280	x 0.5	= 140	

Table 4.1  
Area and Volume Calculations  
DOE ID No. GJ-35575-RS

Page 3 of 3

<u>AREA</u>	<u>CALCULATIONS(ft)</u>	<u>SF</u>	<u>DEPTH(ft)</u>	<u>CF</u>	<u>CUBIC YARDS</u>
BB	4 x 35 =	140	x 0.5 =	70	
	Volume of Contaminated Fill			= 10,261	= 10,261/27 = 380
	TOTAL VOLUME - EXTERIOR				= 382

See Appendix Figures 3.5a, 3.5b, and 3.5c For Areas

=====

Table 4.2  
Estimated Cost of Decontamination and Restoration  
DOE ID No. GJ-35575-RS

Page 1 of 2

---

EXTERIOR

Remove identified residual radioactive material	
362 cy @ \$14.50/cy (machine)	\$ 5,249
18 cy @ \$44/cy (manual)	792
Remove two large trees	
2 ea @ \$100 ea	200
Remove concrete patio	
136 sf @ \$1.48/sf	201
Replace compacted roadbase	
101 cy @ \$11.50/cy	1,162
Replace topsoil	
179 cy @ \$9.50/cy	1,701
Replace 3/4" crushed rock	
13 cy @ \$13.50/cy	176
Replace soil/compost (weed free)	
87 cy @ \$12.50/cy	1,088
Replace concrete patio, 4"	
136 sf @ \$1.52/sf	207
Replace sod	
4,461 sf @ \$.50/sf	2,231
Replace landscaping	
5 trees @ \$30/ea	150
1 shrub @ \$50/ea	50
	<hr/>
TOTAL EXTERIOR	\$ 13,207

TOTAL EXTERIOR	\$ 13,207
TOTAL INTERIOR	0
ACCESS CONTROL	200
	<hr/>
SUBTOTAL	\$ 13,407
CONTINGENCY @ 20%	2,681
	<hr/>
SUBTOTAL	\$ 16,088
CONTRACTOR OVERHEAD & PROFIT @ 25%	4,022
	<hr/>
GRAND TOTAL	\$ 20,110

=====

VD/061485  
REA35575/REA-KL009/LAJ

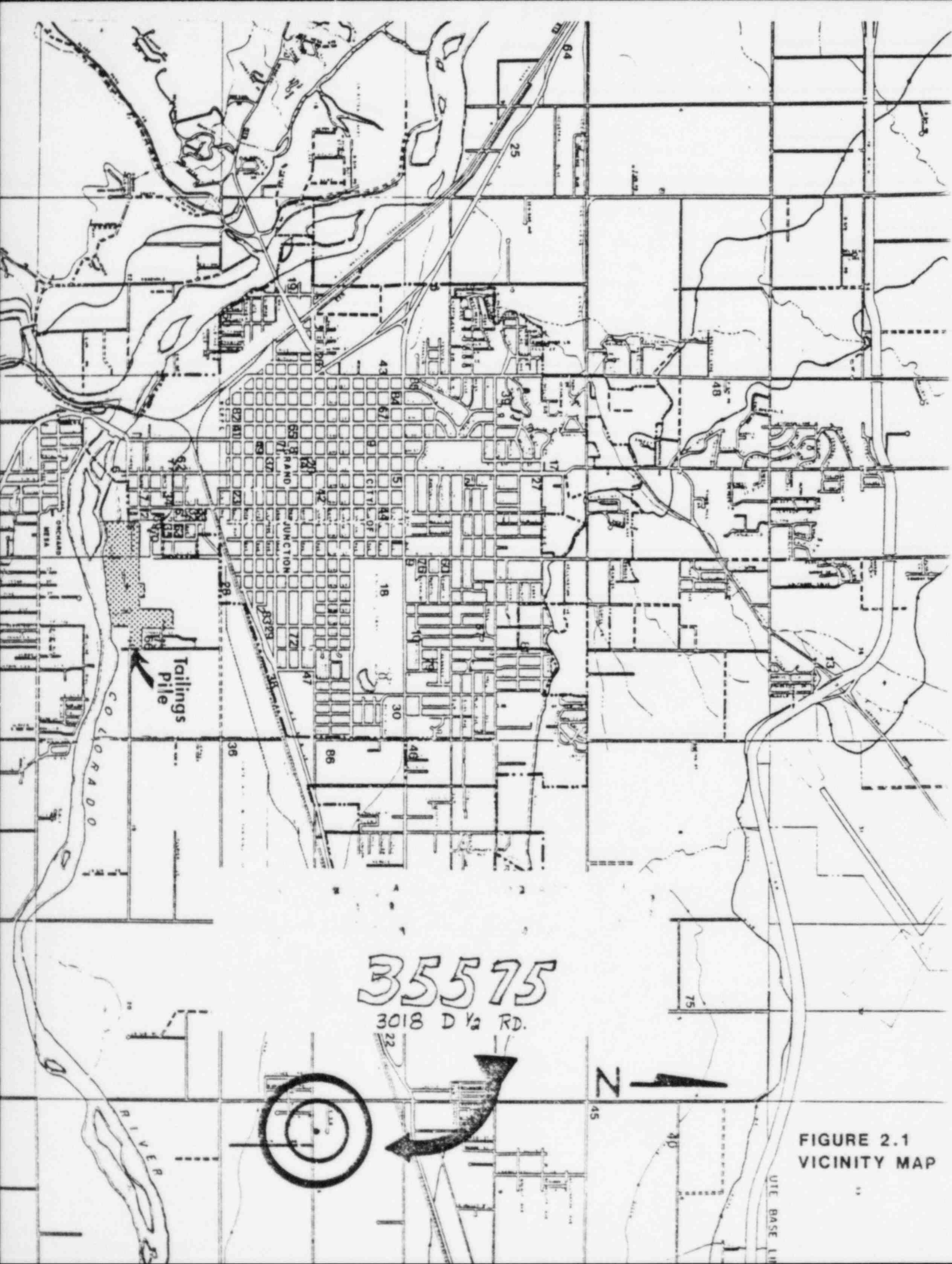
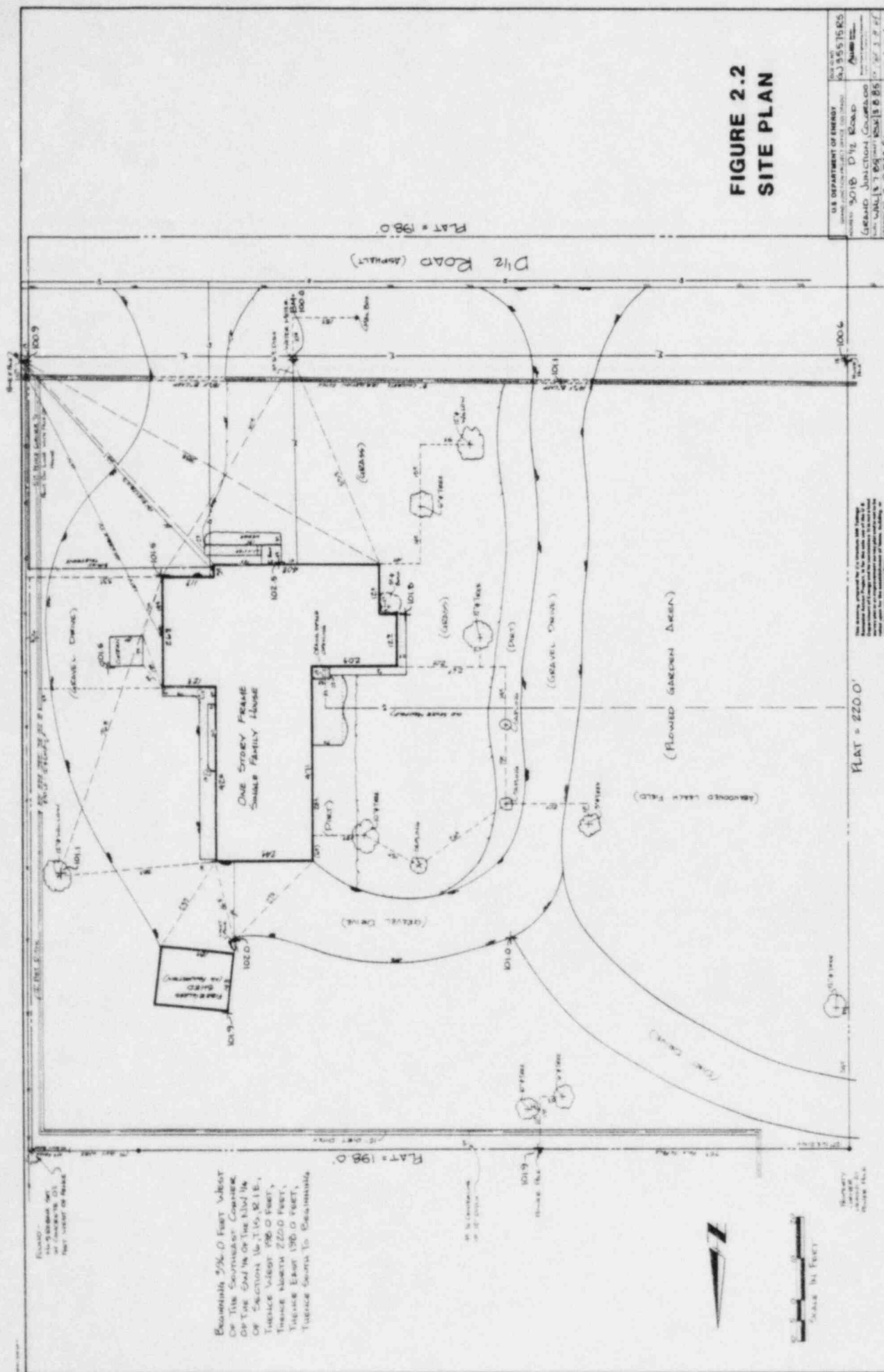
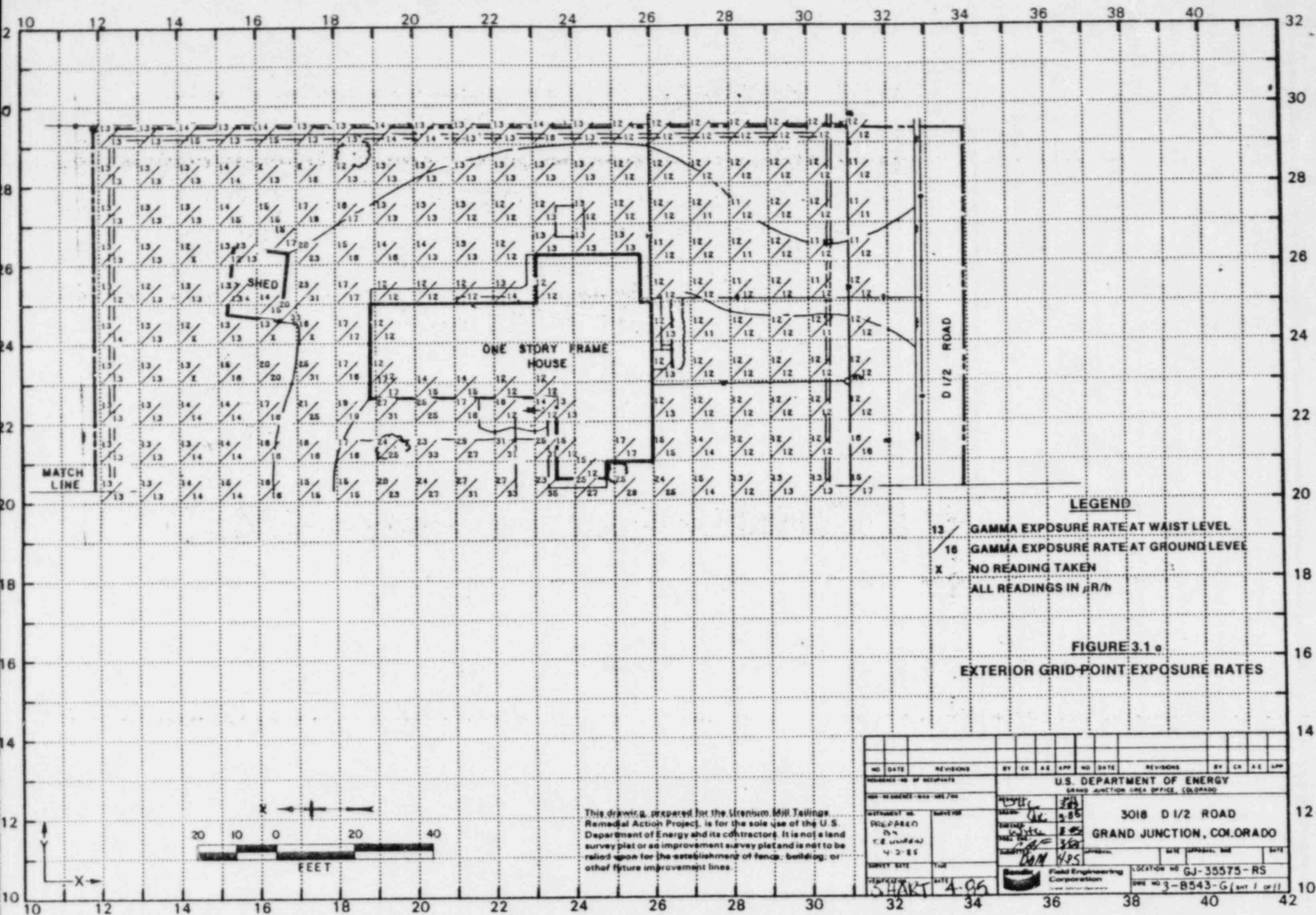
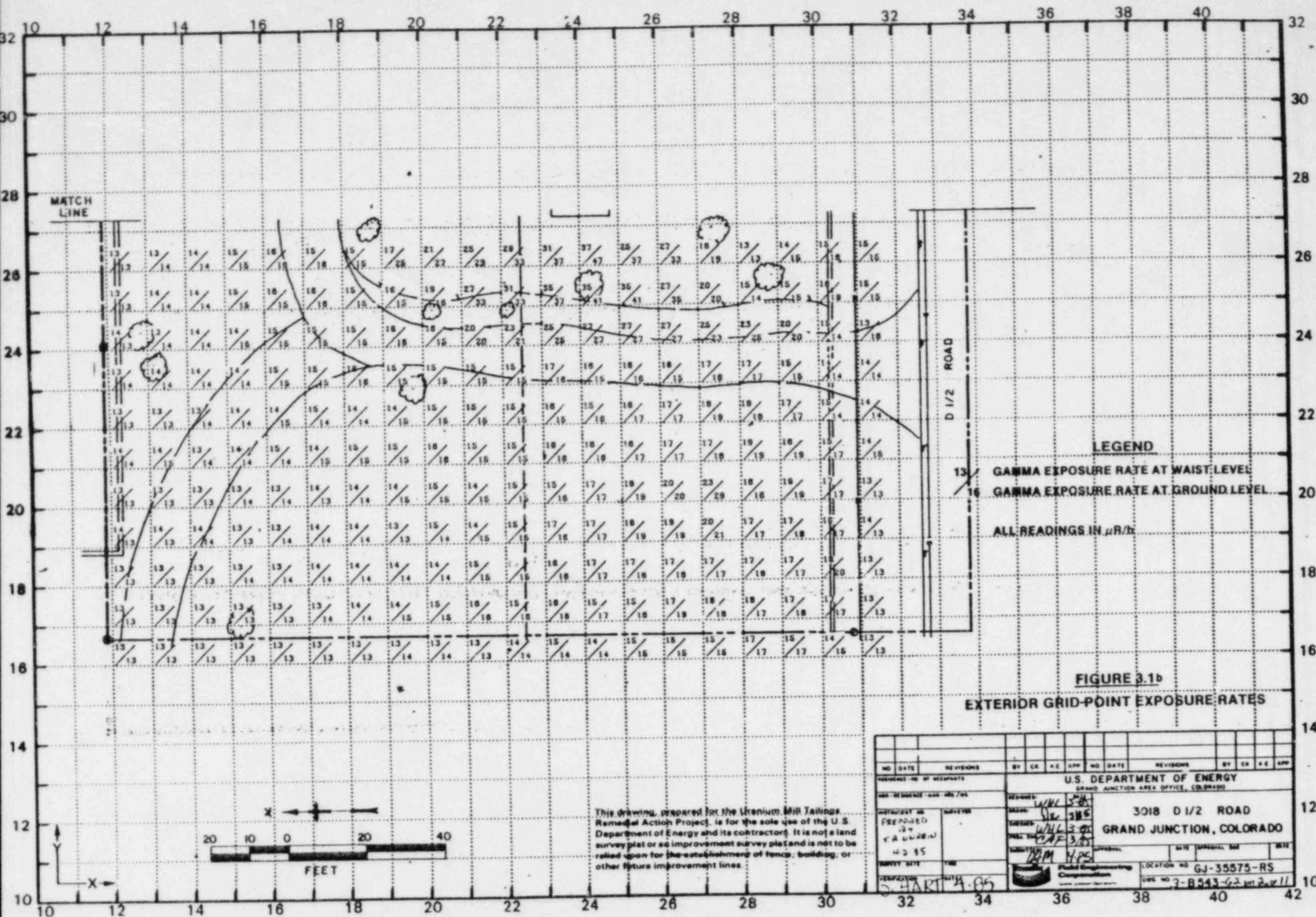


FIGURE 2.1  
VICINITY MAP





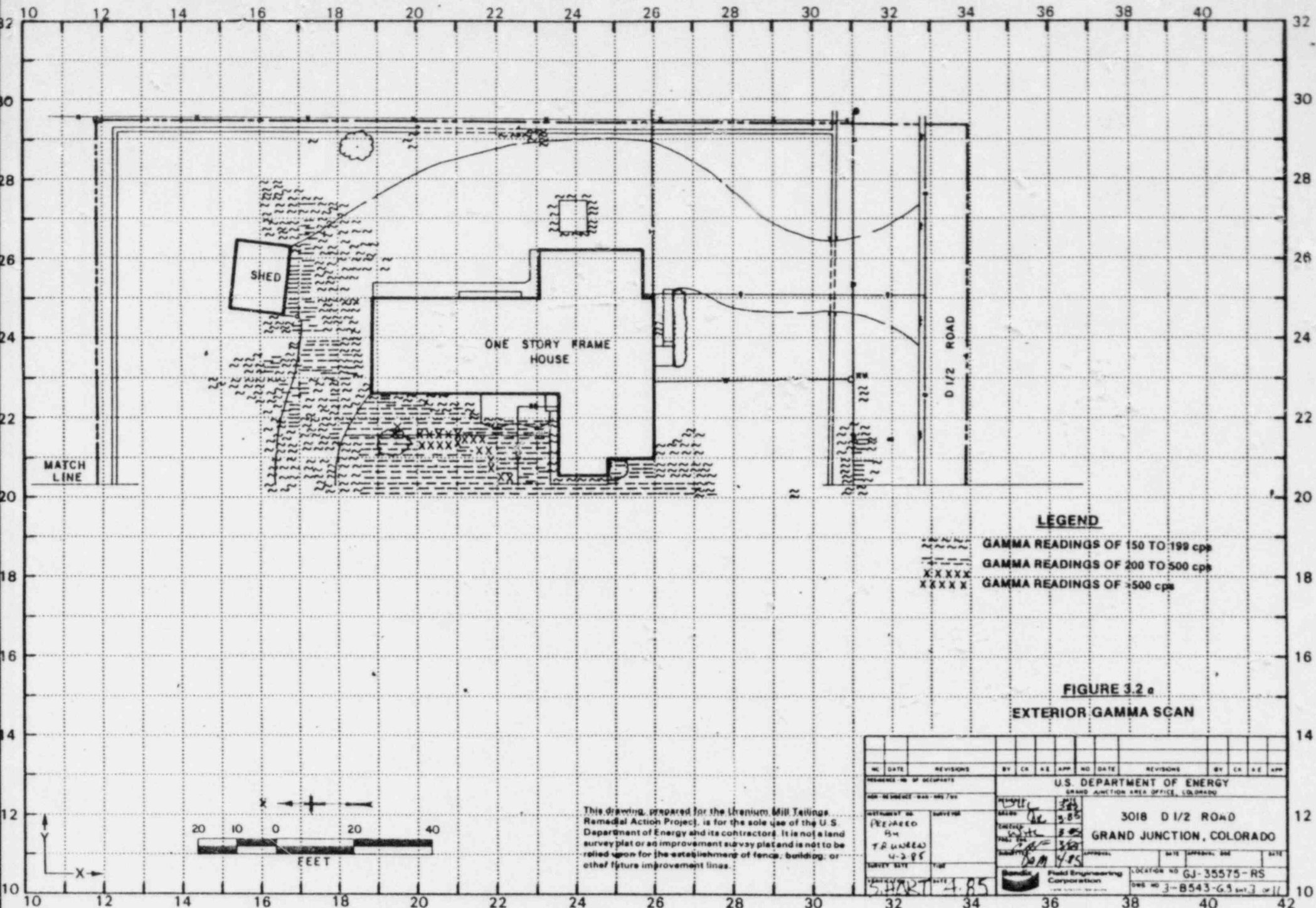


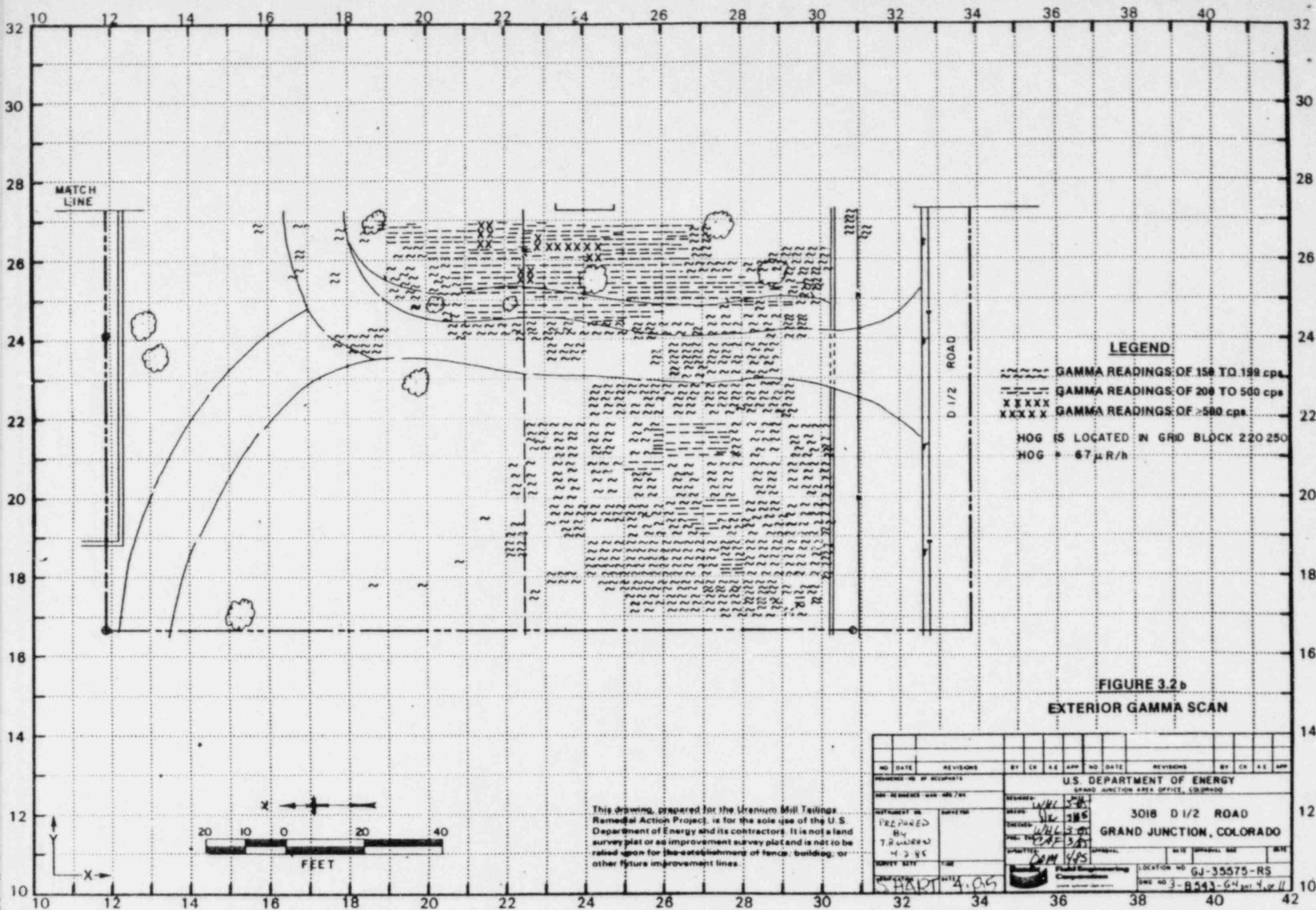


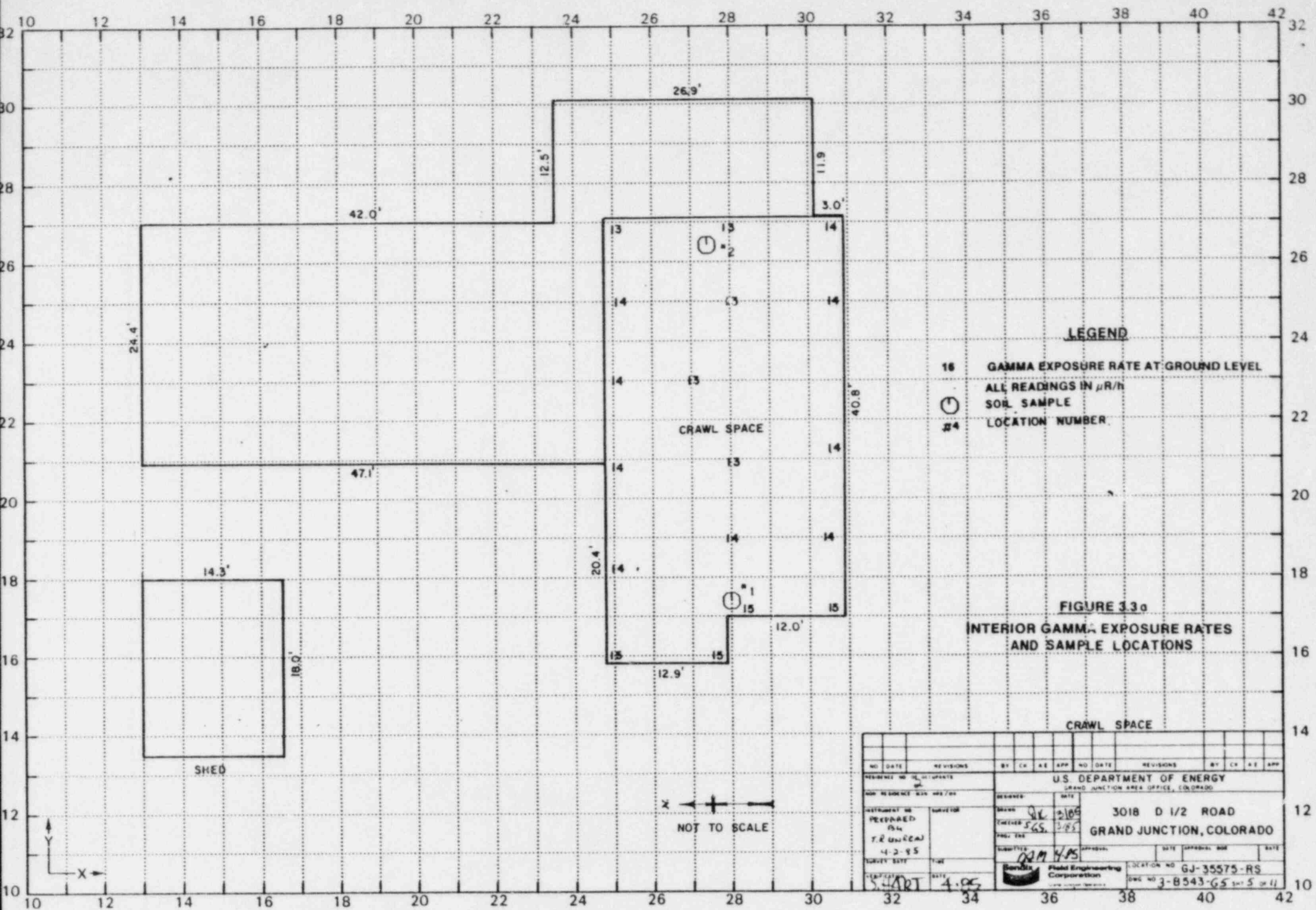
This drawing, prepared for the Uranium Mill Tailings Remedial Action Project, is for the sole use of the U.S. Department of Energy and its contractors. It is not a land survey plat or an improvement survey plat and is not to be relied upon for the establishment of fence, building, or other future improvement lines.

NO. DATE		REVISIONS		BY	CR	AE	APP	NO.	DATE	REVISIONS		BY	CR	AE	APP
U.S. DEPARTMENT OF ENERGY GRAND JUNCTION AREA OFFICE, COLORADO 3018 D 1/2 ROAD GRAND JUNCTION, COLORADO LOCATION NO. GJ-35575-RS DATE 7-8-54 3-62 per 2-11															
PROJECT NO. 40-10-10-10		SUBJECT: WML 3-54		DATE: 7-8-54		BY: WML 3-54		CR: WML 3-54		AE: WML 3-54		APP: WML 3-54		DATE: 7-8-54	
DRAWN BY: WML 3-54		CHECKED BY: WML 3-54		DATE: 7-8-54		BY: WML 3-54		CR: WML 3-54		AE: WML 3-54		APP: WML 3-54		DATE: 7-8-54	
SURVEY SITE		TIME		DATE		BY		CR		AE		APP		DATE	
2-4-54		4:05		7-8-54		WML 3-54		WML 3-54		WML 3-54		WML 3-54		7-8-54	

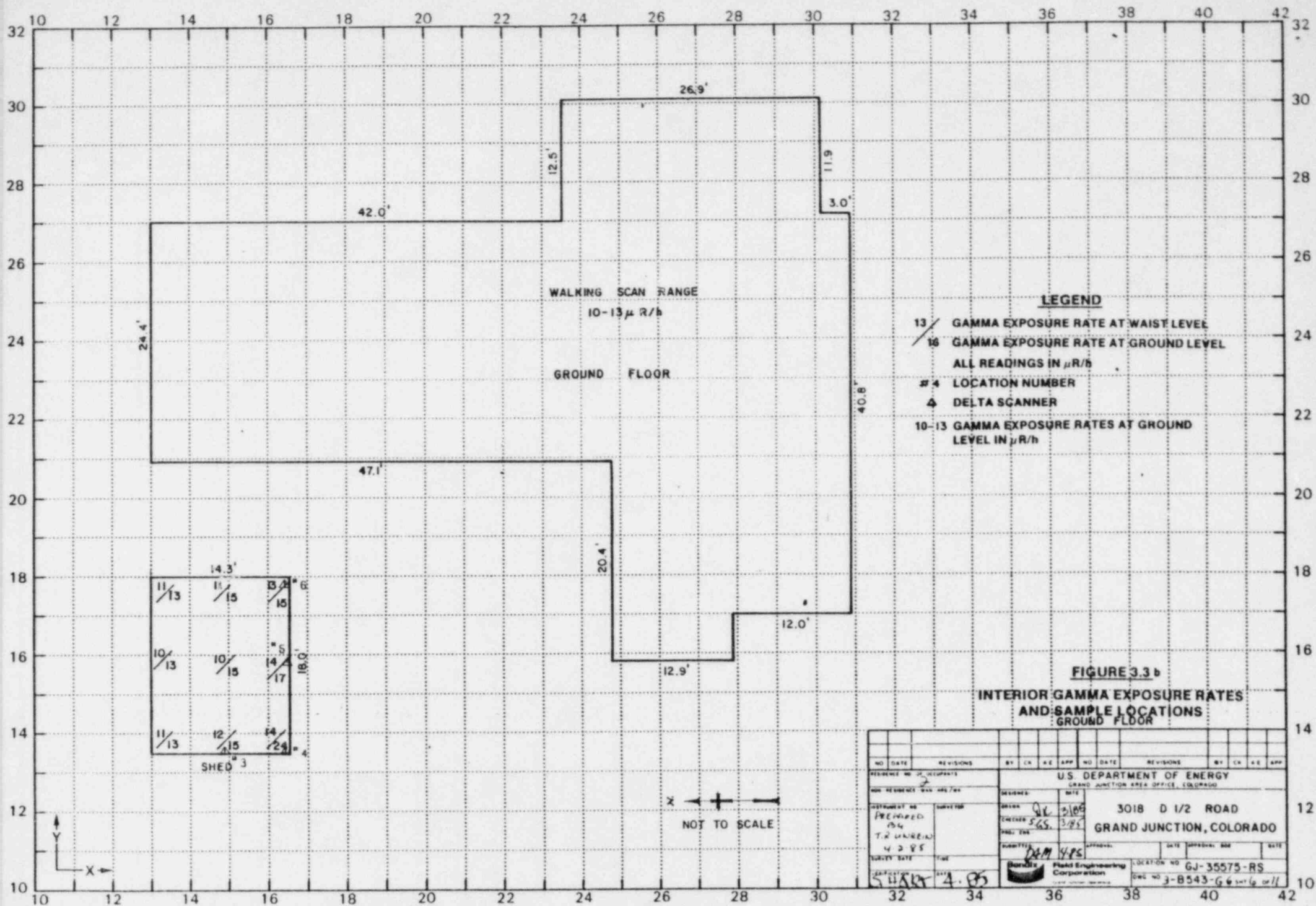




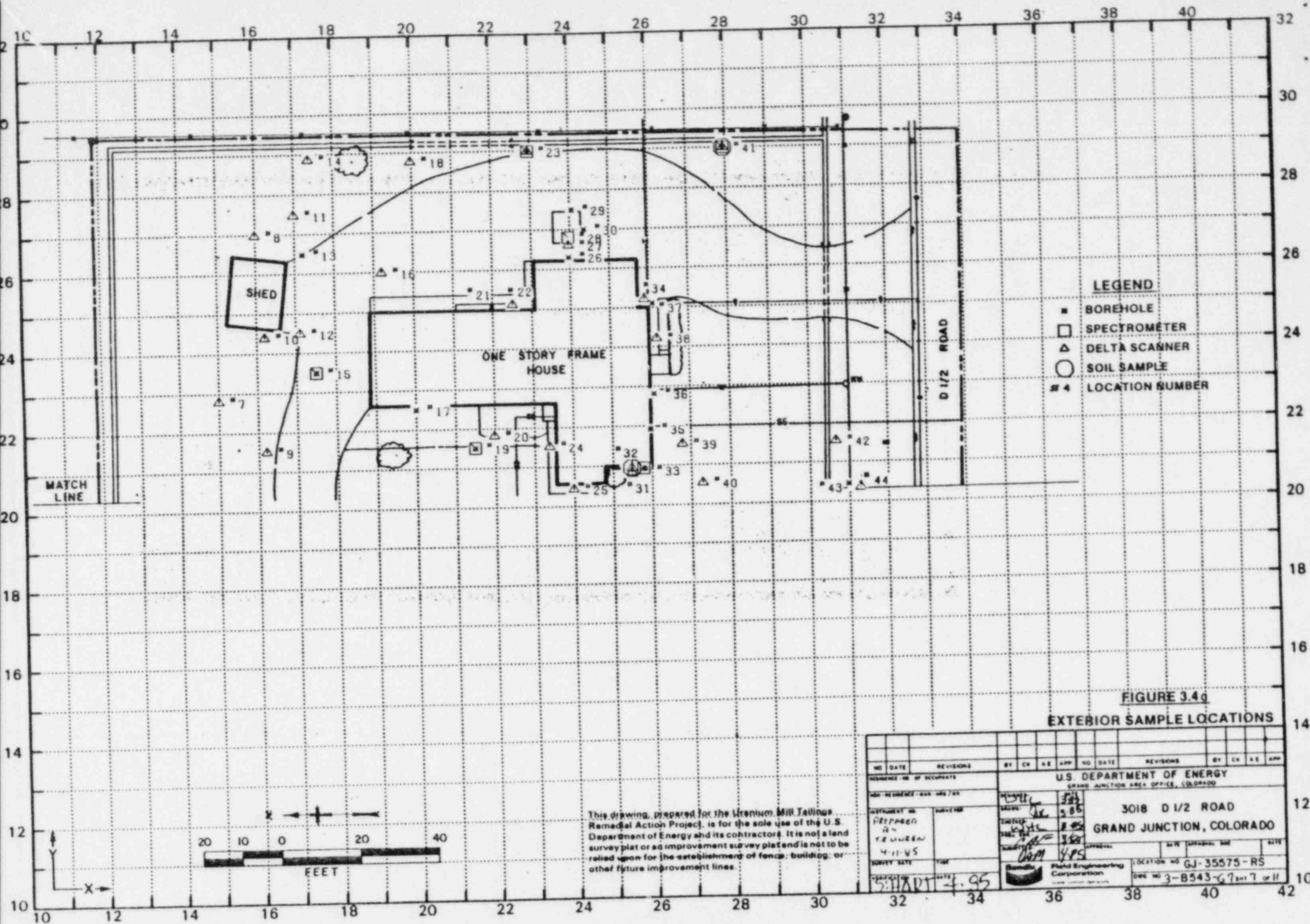








NO	DATE	REVISIONS	BY	CHK	APP	NO	DATE	REVISIONS	BY	CHK	APP
RESIDENCE NO. 35575-RS						U.S. DEPARTMENT OF ENERGY GRAND JUNCTION AREA OFFICE, COLORADO					
DESIGNED BY: J. R. WILSON						DATE: 3/85					
CHECKED BY: T. R. WILSON						DATE: 3/85					
SURVEY DATE: 4/85						APPROVAL: J. R. WILSON					
SURVEY TIME: 4:05						DATE: 4/85					
LOCATION: 3018 D 1/2 ROAD						LOCATION NO: GJ-35575-RS					
DRAWN BY: J. R. WILSON						DWC NO: 3-B543-G-6-1/2-1/2-1/2					

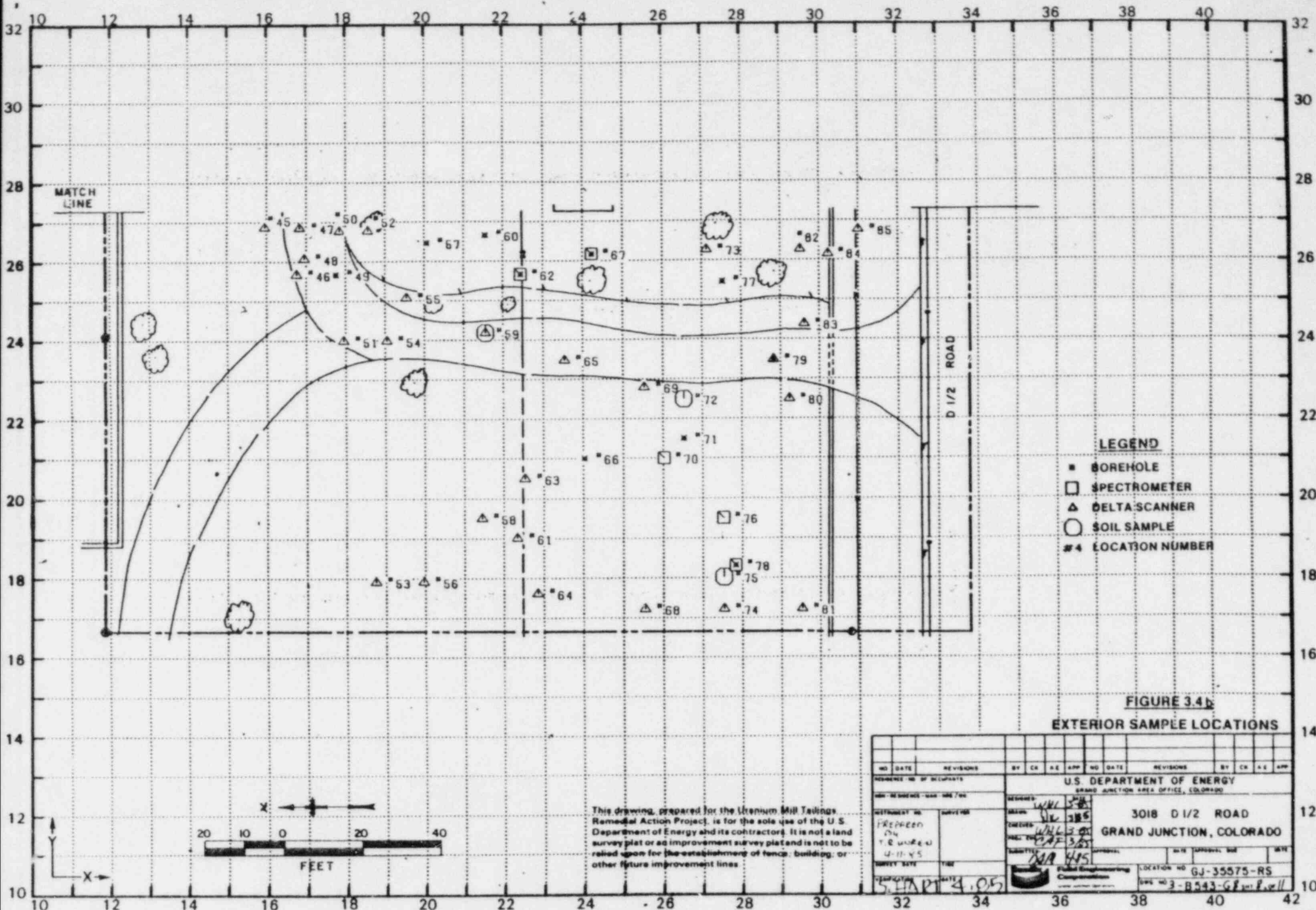


- LEGEND**
- BOREHOLE
  - SPECTROMETER
  - △ DELTA SCANNER
  - SOIL SAMPLE
  - # 4 LOCATION NUMBER

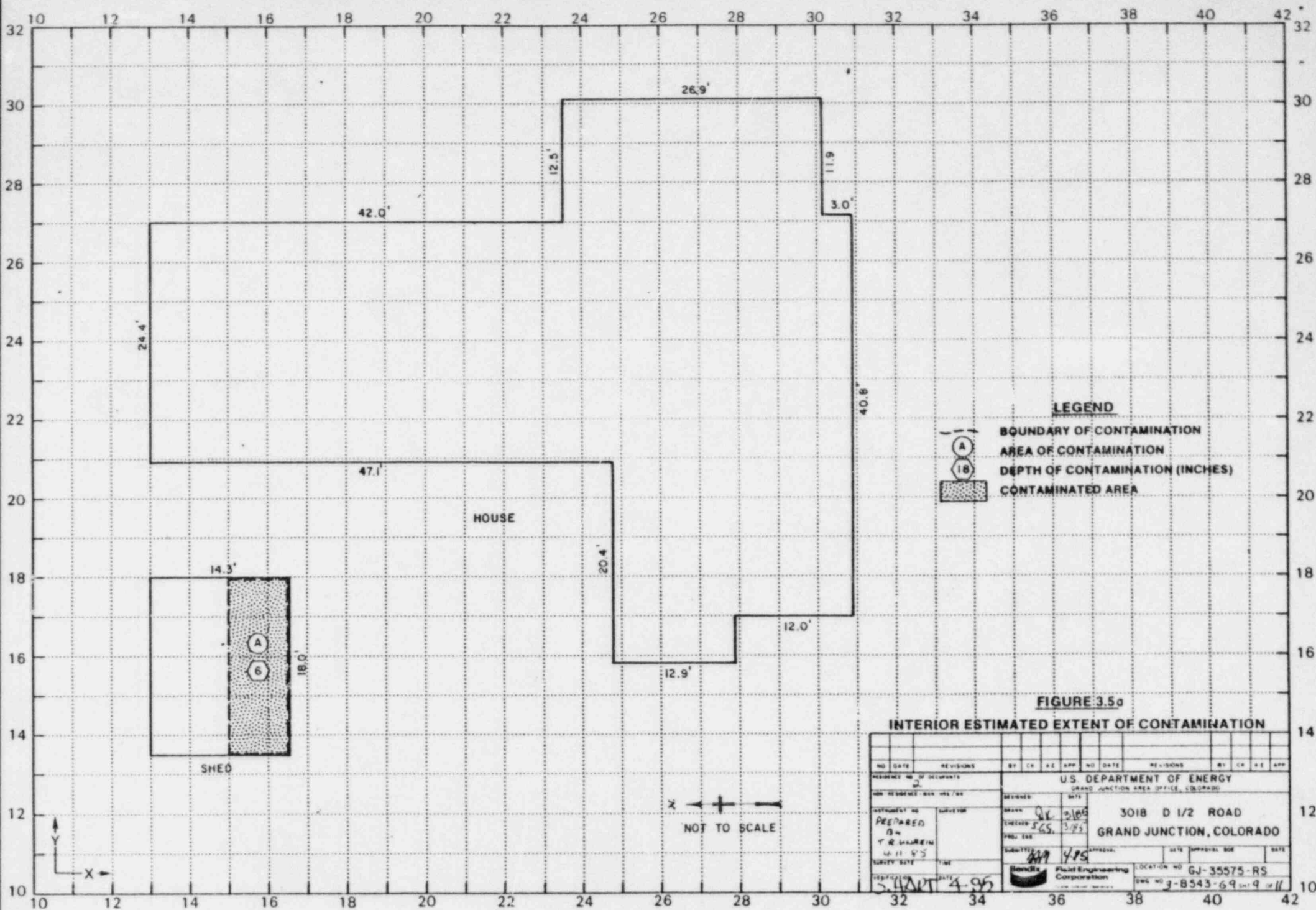
**FIGURE 3.4g**  
**EXTERIOR SAMPLE LOCATIONS**

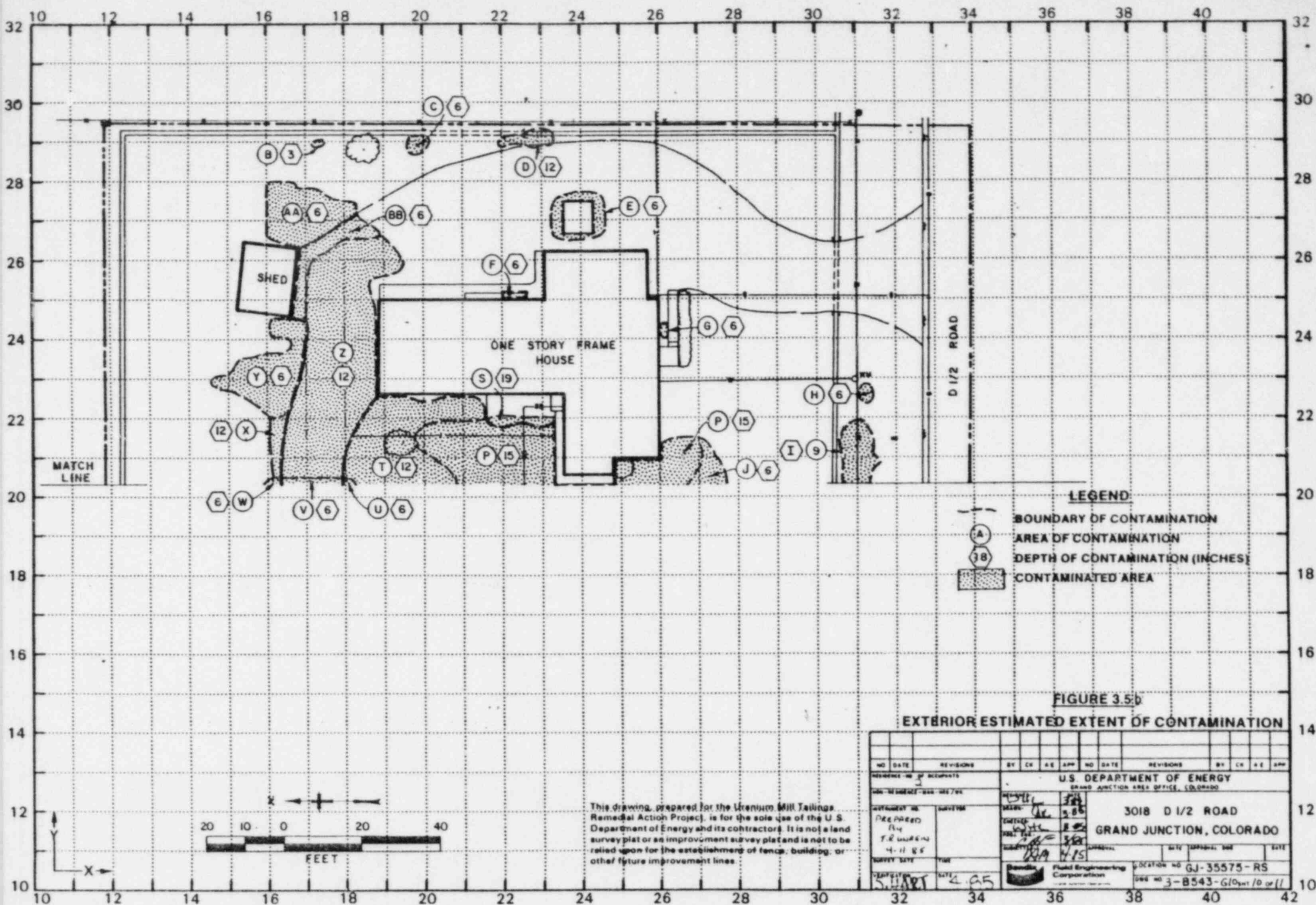
This drawing, prepared for the Uranium Mill Tailings Remedial Action Project, is for the sole use of the U.S. Department of Energy and its contractors. It is not a land survey plat or an improvement survey plat and is not to be relied upon for the establishment of fence, building, or other future improvement lines.

NO. DATE				REVISIONS				BY CH. A.E. APP.				NO. DATE				REVISIONS				BY CH. A.E. APP.											
REFERENCE NO. OF RECORDS																U.S. DEPARTMENT OF ENERGY															
NO. NO. DRAWING - 3018 D 1/2																GRAND JUNCTION AREA OFFICE, COLORADO															
APPROVED BY: [Signature]																3018 D 1/2 ROAD															
DRAWN BY: [Signature]																GRAND JUNCTION, COLORADO															
CHECKED BY: [Signature]																DATE: 4-11-85															
SURVEY DATE: 4-11-85																LOCATION NO. GJ-35575-RS															
SURVEYOR: [Signature]																DOW NO. 3-B543-G-7 SH 7 OF 11															
PROJECT: [Signature]																DATE: 4-95															









This drawing, prepared for the Uranium Mill Tailings Remedial Action Project, is for the sole use of the U. S. Department of Energy and its contractors. It is not a land survey plat or a re-improvement survey plat and is not to be relied upon for the establishment of fence, building, or other future improvement lines.

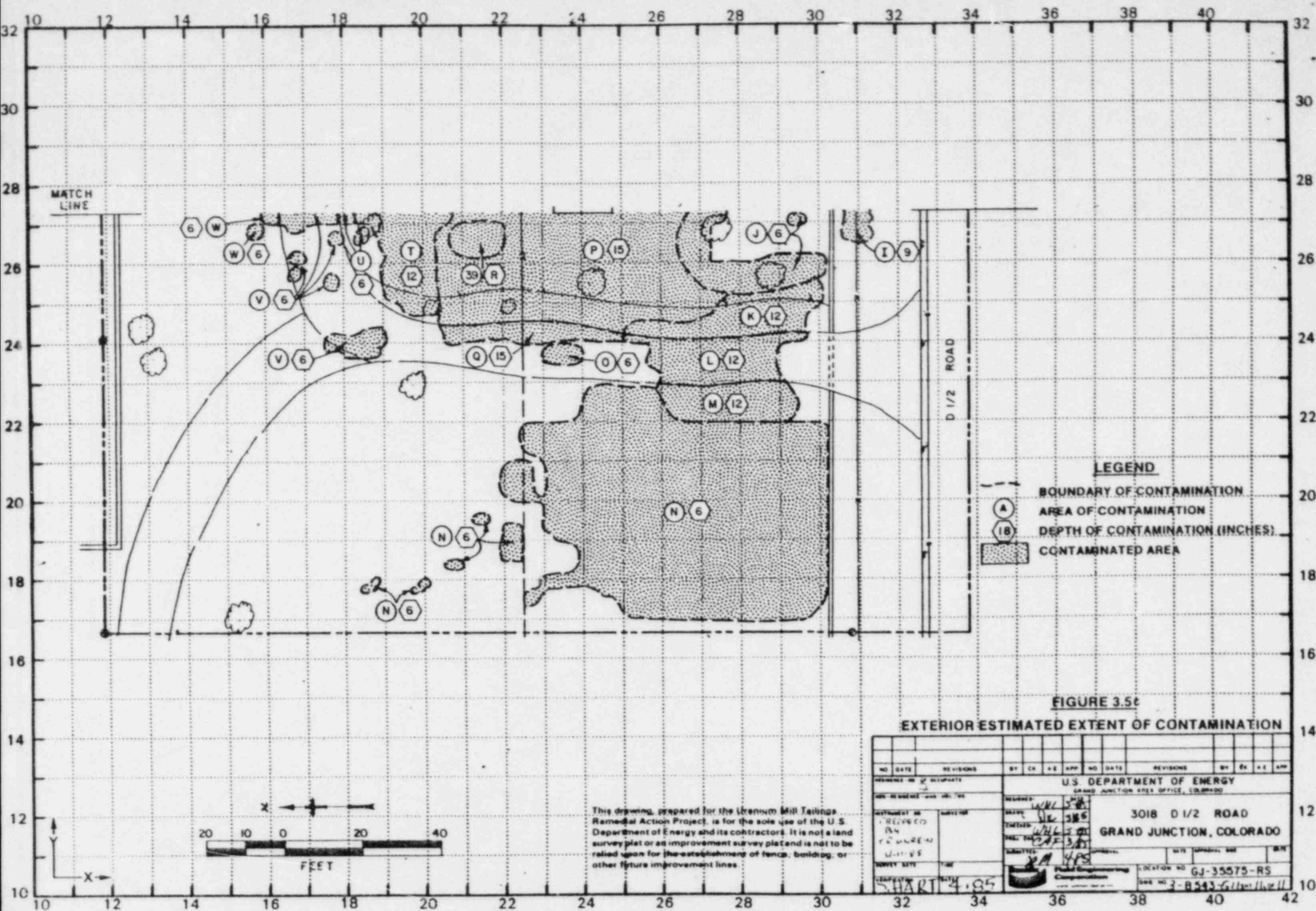


FIGURE 3.5c

EXTERIOR ESTIMATED EXTENT OF CONTAMINATION

NO. DATE		REVISIONS		BY	CK	AE	APP	NO.	DATE	REVISIONS		BY	CK	AE	APP
U.S. DEPARTMENT OF ENERGY GRAND JUNCTION AREA OFFICE, COLORADO															
3018 D 1/2 ROAD GRAND JUNCTION, COLORADO															
LOCATION NO. GJ-35575-RS DATE NO. 3-8543-G/Jan 11/85															

2/85

DOE ID NO. GJ-35575-RS

Date APRIL 12, 1985

U.S. DEPARTMENT OF ENERGY  
URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT  
GRAND JUNCTION VICINITY PROPERTIES

Official Survey Report

Property Address 3018 D 1/2 Road  
Property Owner J.W. and T.J. Capps  
Address of Owner (if different from above) NA  
Report Prepared By T.R. Unrein

I. PRESENCE/ABSENCE OF RESIDUAL RADIOACTIVE MATERIALS

☐ No evidence of residual radioactive material on surveyed property.

☒ Residual radioactive materials found at the following locations:

☒ In open areas.

☒ Under or around exterior improvements.

☒ Under or around a typically nonoccupied structure.

☒ Under or around a typically occupied structure.

II. RESULTS OF RADIOLOGIC ASSESSMENT

☐ Levels of radiation from residual radioactive materials, if any, do not exceed EPA Standards and no action is required under the Uranium Mill Tailings Remedial Action Project.

☒ Levels of radiation from residual radioactive materials exceed EPA Standards such that Remedial Action is recommended and will be accomplished, with your consent, as soon as budget and schedule permit.

cc:

G. A. Franz, III, GJ/CDH

J. Themelis, Mgr. UMTRA Proj. Off.

HIG = 24 uR/h  
HOG = 27 uR/h





**Field Engineering  
Corporation**

Grand Junction Operations

P.O. Box 1569  
Grand Junction, CO 81501  
Tel (303) 242-8621

A Subsidiary of  
The Bendix Corporation

April 12, 1985

Colorado Department of Health  
222 South 6th Street  
Grand Junction, Colorado 81501

ATTN: Jon Luellen

Dear Jon:

This letter is a follow-up of the Technical Review on Department of Energy (DOE) Identification (ID) number GJ-35575-RS.

The areas that require additional work or comments are as follows:

1. The interior radon daughter concentration (0.007) working level has been noted.
2. The delta exploration at location number 27 (240266) is adjacent to the cistern. A concrete lip and road base rock was encountered while trying to take a 6-inch delta reading. We took borehole measurements on two other sides, which showed 6-inches of contamination around the cistern. We also took a surface spectrometer reading on the concrete which showed no contamination.
3. There were no elevated surface gamma readings at location number 34 when it was scanned. This investigation was to see if the line was buried in tailings. I feel this area does not have any contamination.
4. The old sewer line (septic system) has been abandoned. A new sewer line exits the south side of the primary structure (260219) and goes directly south to D-1/2 Road. This has been noted in my Team Leader Notes.



5. I do not know the depth of the water line. We had one small area of elevated gamma readings in that area and I feel that the depth of contamination goes only to 9-inches. The water meter was investigated with readings of 140 cps at the top, 185 cps at the bottom, which is normal.
6. The septic tank lies close to the house, it was investigated. A borehole was drilled next to the line after it exits the tank which showed 15-inches of contamination. The line that goes further west is the leach field. The homeowner informed us that no tailings were used in the construction of the house, but tailings were brought in at a later date and used to fill low areas.
7. Per our discussion, the depth of contamination will remain at 39-inches.
8. The result of the location number 59 soil sample is 4.1 pCi/g.
9. I agree, this has been corrected on the Depth of Contamination maps.
10. I took the data from the surrounding area (Area 'P'). The patio was recently added and I feel there could have been some tailings covered by it. I will suggest that it be further investigated during remedial action.
11. No elevated gamma readings were found in these areas while scanning. The cps range for these grid points is 140 to 145 cps.

Thank you for your time and cooperation. If you should have additional questions or comments you may contact me at 242-8621, extension 418.

Sincerely,

A handwritten signature in dark ink, appearing to read "Thomas Unrein".  
Thomas Unrein  
RSD Survey Team

TU:pr



**INTERNAL  
MEMORANDUM**

**Bendix Field Engineering Corporation  
Grand Junction Projects Office**

**Date:** March 18, 1985

**To:** Files

**From:** Thomas Unrein

**Subject:** Team Leader Notes - GJ-35575-RS

---

**Address:** 3018 D-1/2 Road

**Owner:** J.W. Capps

**Team Members**

T. Unrein (Team Leader)	D. Herrera
B. Beltz	D. Fossey
P. Tuhey	D. Bell
C. Adams	S. Southern
P. Hardy	M. Dexter
V. Young	N. Wallace
B. Wilkins	

**Instruments**

Scintillometers - C-1205, C-1181, C-1184, C-1149, C-1185, C-1036  
Delta Scintillometers - C-3942, C-3937, C-3941  
Total Counts - C-3959, C-3573, C-1062  
Downhole Spectrometer - C-0498  
Surface Spectrometer - C-3431

**Date:** March 15, 1985

The team members arrived at the property and proceeded gridding procedures.

The homeowner (Mr. Capps) indicated that tailings were brought in after the house was built and used for fill in low areas.

The interior was scanned, no elevated readings were obtained. Grid points were taken in the crawl space and two soil samples were taken.

Team Leader Notes  
GJ-35575-RS  
Thomas Unrein  
March 18, 1985  
Page 2

It was thought that the open area west of the driveway was uncontaminated, but while scanning, elevated readings were found, therefore, the entire property was gridded.

The shed behind the primary structure showed elevated readings, this shed sits on blocks and is a moveable structure.

The septic tank is no longer used. The sewer line comes out the front (south) of the primary structure and goes directly to D-1/2 Road.

The team members were unable to complete this property in one day, however, will return the next work day (Monday, March 18) to complete the remainder of the survey.

#### Team Members

T. Unrein (Team Leader)	B. Wilkins
P. Tuhey	M. Heronema
M. Duran	D. Fossey
D. Herrera	

#### Instruments

Scintillometer - C-1182  
Delta Scintillometers - C-3942, C-3940  
Total Count - C-4005, C-4006  
Downhole Spectrometer - C-3361  
Surface Spectrometer - C-3431

Date: March 18, 1985

The team members arrived at the property to continue with the survey and data collection.

There were no real problems noted with this property, except apparently tailings were spread over a large area and at various depths.

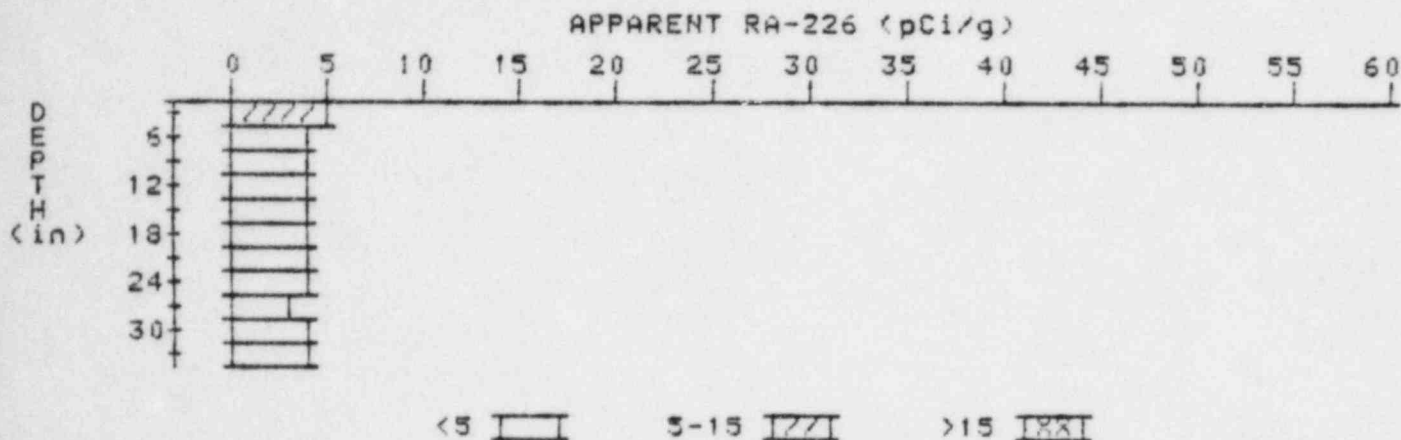
The survey was completed. All the team members were frisked, no problems. Everyone returned to the compound.

# APPARENT RADIUM-226 CONCENTRATION 13 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-R5

HOLE NUMBER: 13

✓ LOCATION: 172265



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.4	5.4
6	4.7	4.3
9	4.2	3.7
12	4.0	4.0
15	3.8	3.6
18	3.7	3.7
21	3.6	3.6
24	3.5	3.5
27	3.4	3.0
30	3.5	3.5
33	3.6	3.6

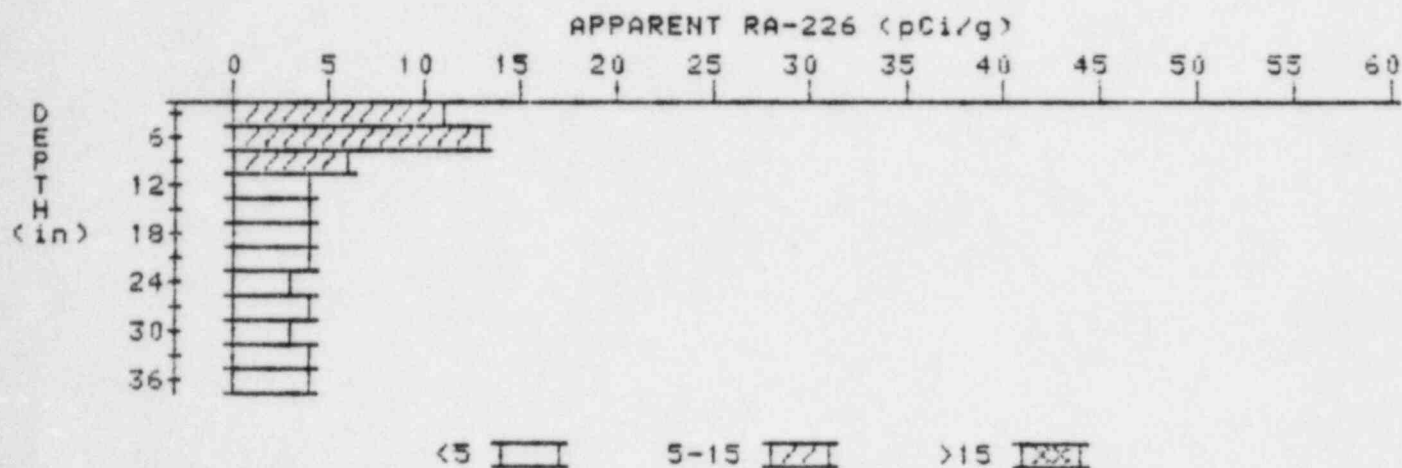
# APPARENT RADIUM-226 CONCENTRATION 15

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-RS

HOLE NUMBER: 15

LOCATION: 175235



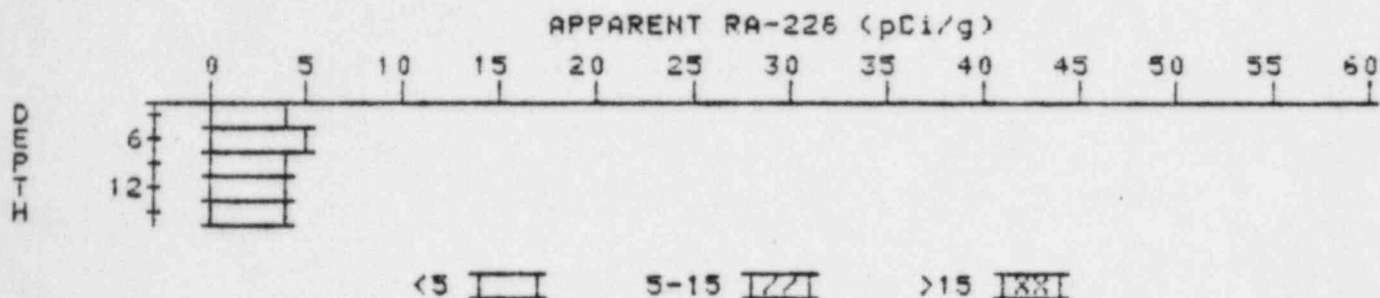
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	11.0	11.0
6	10.0	13.0
9	7.3	5.5
12	5.6	4.2
15	4.7	3.8
18	4.3	4.1
21	4.0	3.8
24	3.8	3.4
27	3.8	4.0
30	3.7	3.3
33	3.8	4.3
36	3.6	3.6

# APPARENT RADIUM-226 CONCENTRATION 17 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-RS

HOLE NUMBER: 17

✓LOCATION: 200225



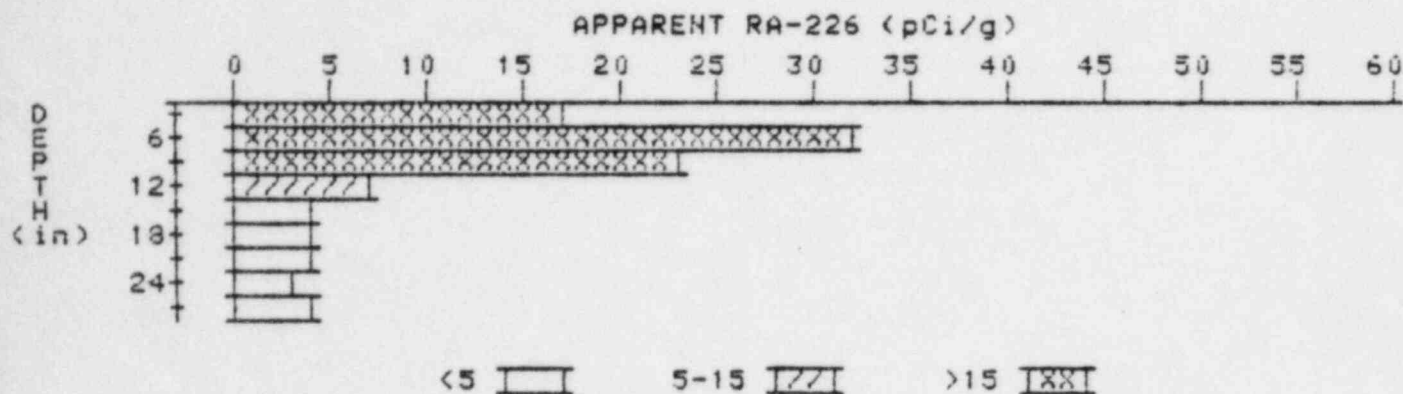
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.5	3.5
6	3.8	4.5
9	3.7	3.5
12	3.7	3.9
15	3.6	3.6

# APPARENT RADIUM-226 CONCENTRATION 19 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-RS

HOLE NUMBER: 19

✓ LOCATION: 215215



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	16.7	16.7
6	20.2	31.9
9	17.2	22.7
12	11.1	7.0
15	7.3	3.7
18	5.5	3.7
21	4.7	4.2
24	4.2	3.5
27	4.1	4.1

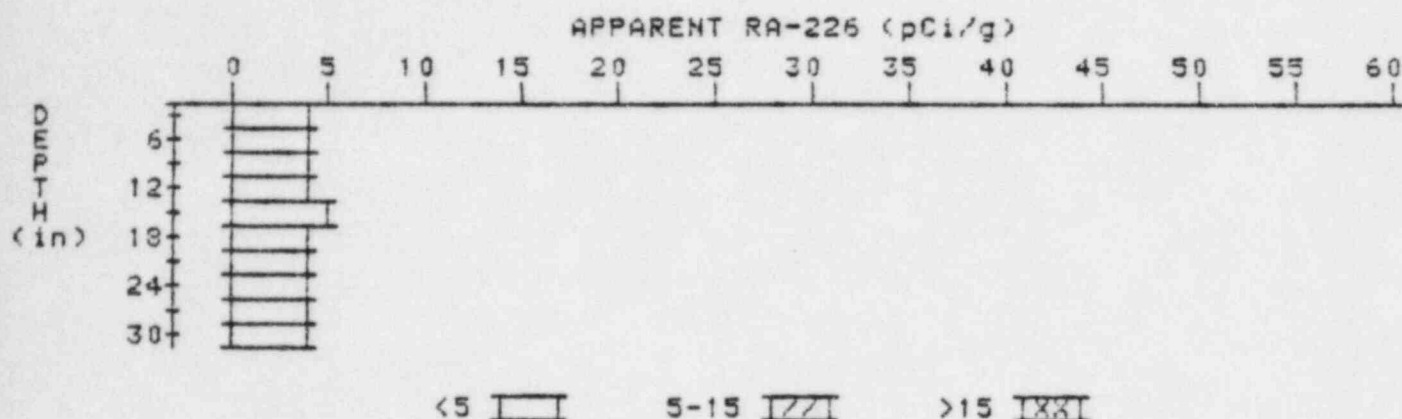


# APPARENT RADIUM-226 CONCENTRATION 21 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-R5

HOLE NUMBER: 21

LOCATION: 220251



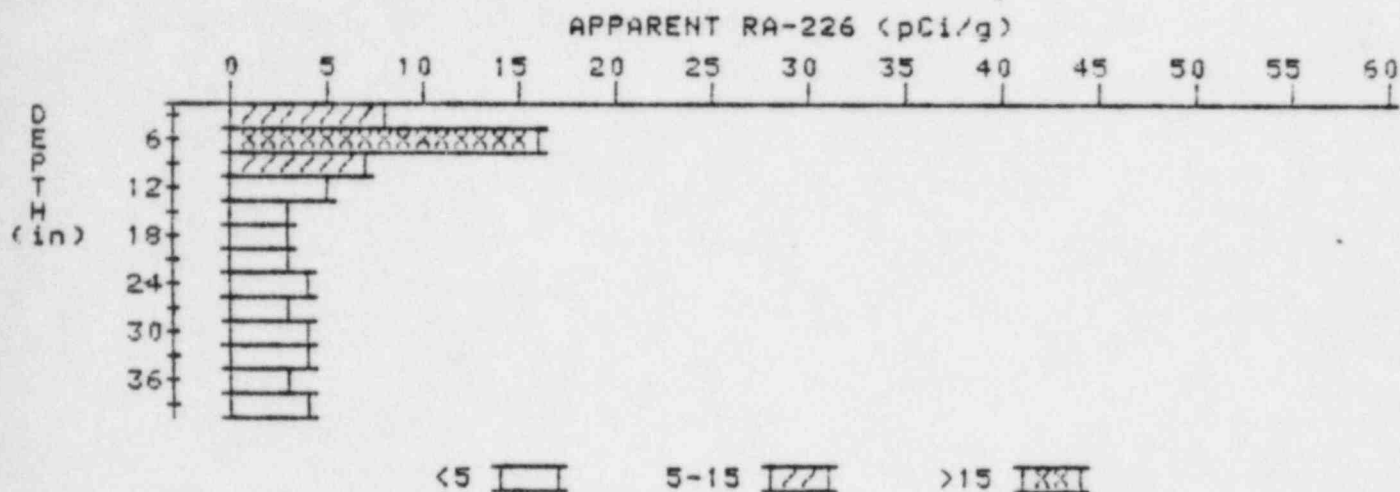
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.0	4.0
6	4.0	3.8
9	4.1	4.3
12	4.1	3.9
15	4.2	4.6
18	4.1	4.3
21	3.9	3.9
24	3.7	3.5
27	3.6	3.6
30	3.5	3.5

# APPARENT RADIUM-226 CONCENTRATION 23 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-RS

HOLE NUMBER: 23

LOCATION: 230290



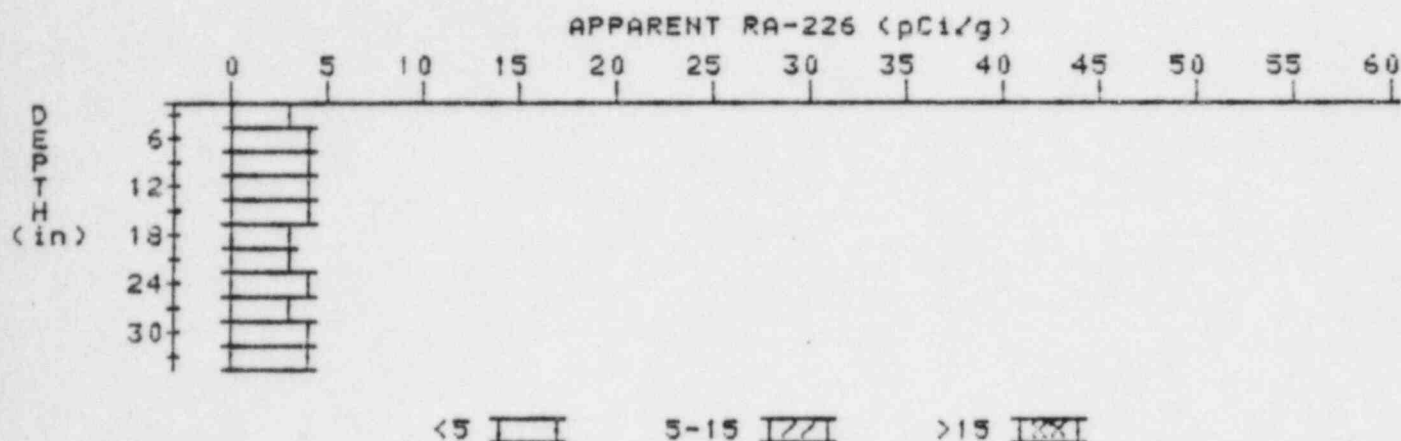
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	8.2	8.2
6	9.5	15.5
9	7.4	6.7
12	5.7	4.8
15	4.5	3.3
18	4.0	3.5
21	3.8	3.4
24	3.8	4.2
27	3.6	3.2
30	3.6	3.6
33	3.6	3.8
36	3.5	3.1
39	3.6	3.6

# APPARENT RADIUM-226 CONCENTRATION 26 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-RS

HOLE NUMBER: 26

✓LOCATION: 240263



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.2	3.2
6	3.5	3.9
9	3.6	3.8
12	3.6	3.8
15	3.5	3.5
18	3.4	3.2
21	3.4	3.2
24	3.5	3.9
27	3.4	3.0
30	3.5	3.7
33	3.5	3.5

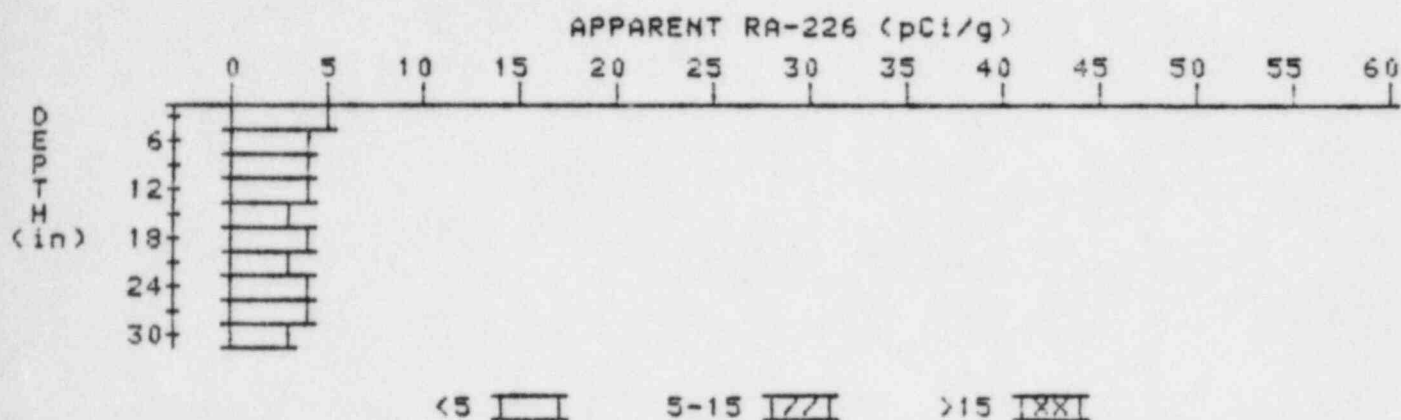
# APPARENT RADIUM-226 CONCENTRATION 29

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35375-R3

HOLE NUMBER: 29

✓ LOCATION: 241275



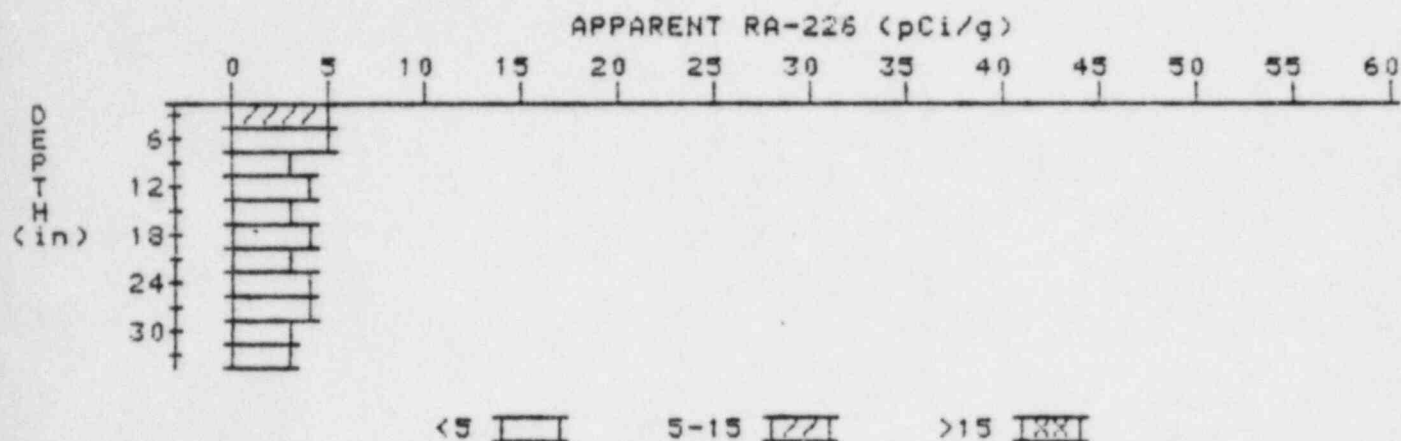
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.9	4.9
6	4.4	4.2
9	4.0	3.6
12	3.8	3.8
15	3.6	3.2
18	3.6	3.8
21	3.5	3.3
24	3.5	3.5
27	3.5	3.7
30	3.4	3.4

# APPARENT RADIUM-226 CONCENTRATION 30 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-33575-R5

HOLE NUMBER: 30

LOCATION: 244270



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.0	5.0
6	4.6	5.0
9	4.0	3.1
12	3.9	4.3
15	3.6	3.1
18	3.6	3.3
21	3.5	3.3
24	3.5	3.5
27	3.5	3.7
30	3.4	3.2
33	3.4	3.4

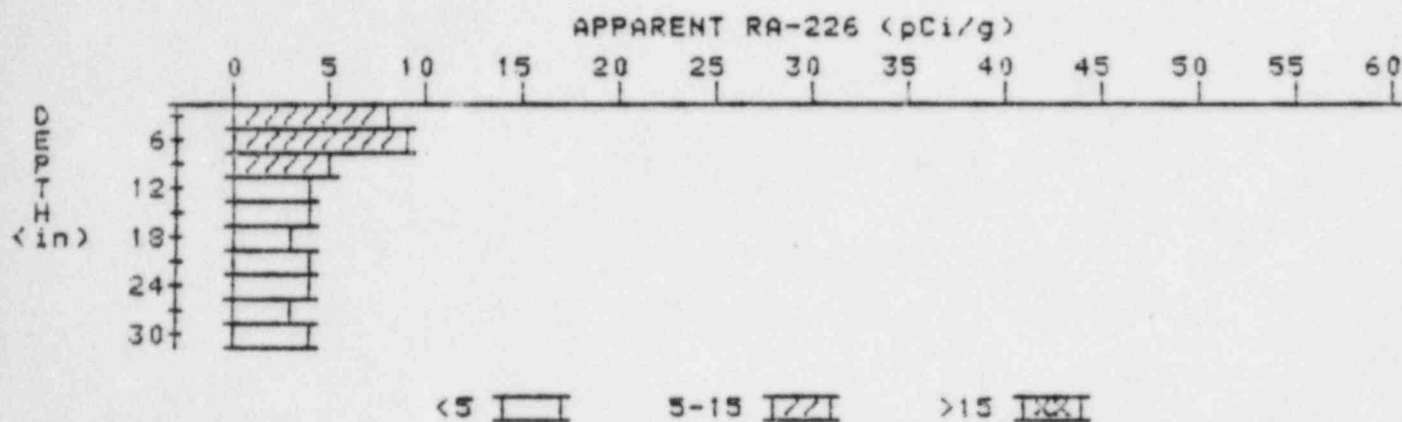
# APPARENT RADIUM-226 CONCENTRATION 33

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-RS

HOLE NUMBER: 33

LOCATION: 258209



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	8.4	8.4
6	7.7	9.5
9	6.0	5.1
12	4.3	3.9
15	4.1	3.6
18	3.7	3.0
21	3.7	3.9
24	3.6	3.6
27	3.5	3.3
30	3.5	3.5

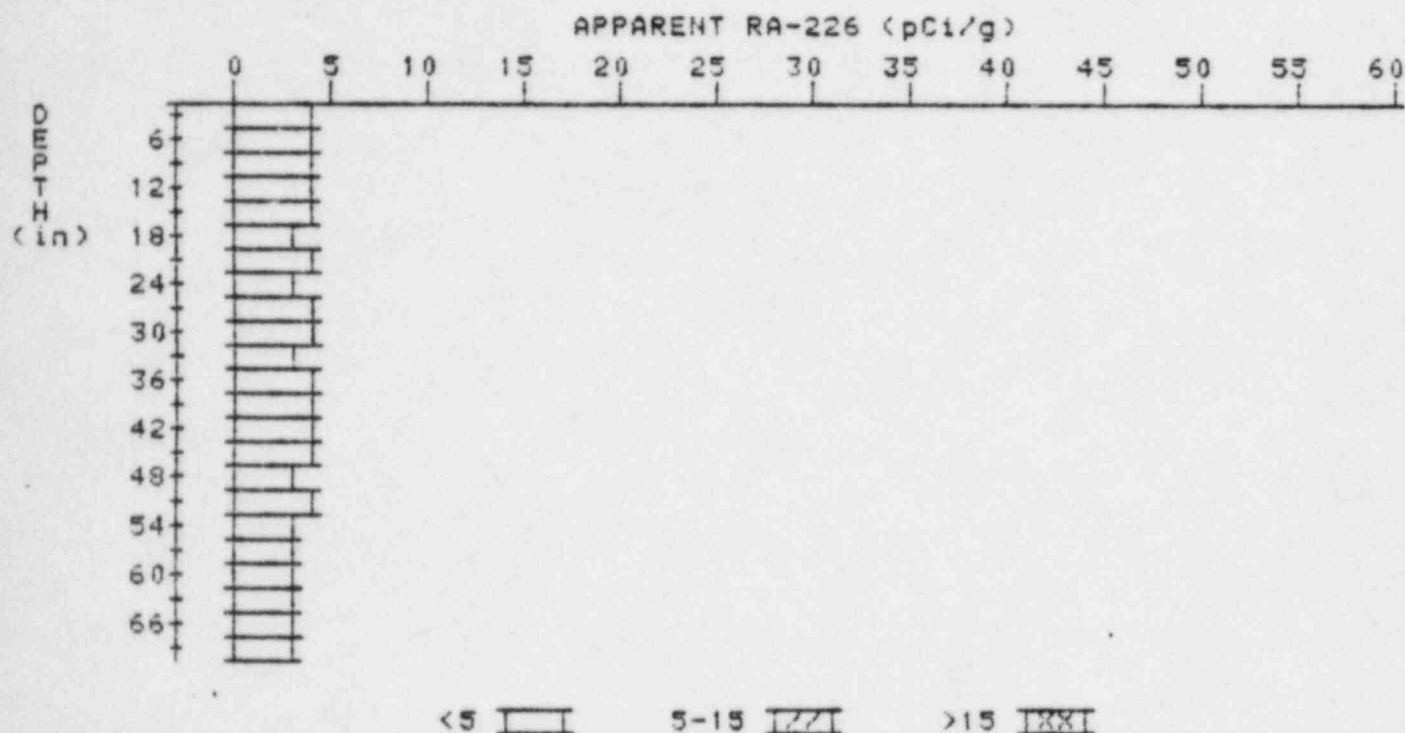


# APPARENT RADIUM-226 CONCENTRATION 35 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-R5

HOLE NUMBER: 35

LOCATION: 260219



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.5	3.5
6	3.7	4.1
9	3.7	3.7
12	3.7	3.7
15	3.7	3.9
18	3.6	3.4
21	3.6	3.3
24	3.5	3.3
27	3.5	3.3
30	3.5	3.7
33	3.4	3.0
36	3.5	3.7
39	3.5	3.5
42	3.5	3.5
45	3.5	3.7

48  
51  
54  
57  
60  
63  
66  
69

3.4  
3.4  
3.3  
3.2  
3.2  
3.2  
3.1  
3.1

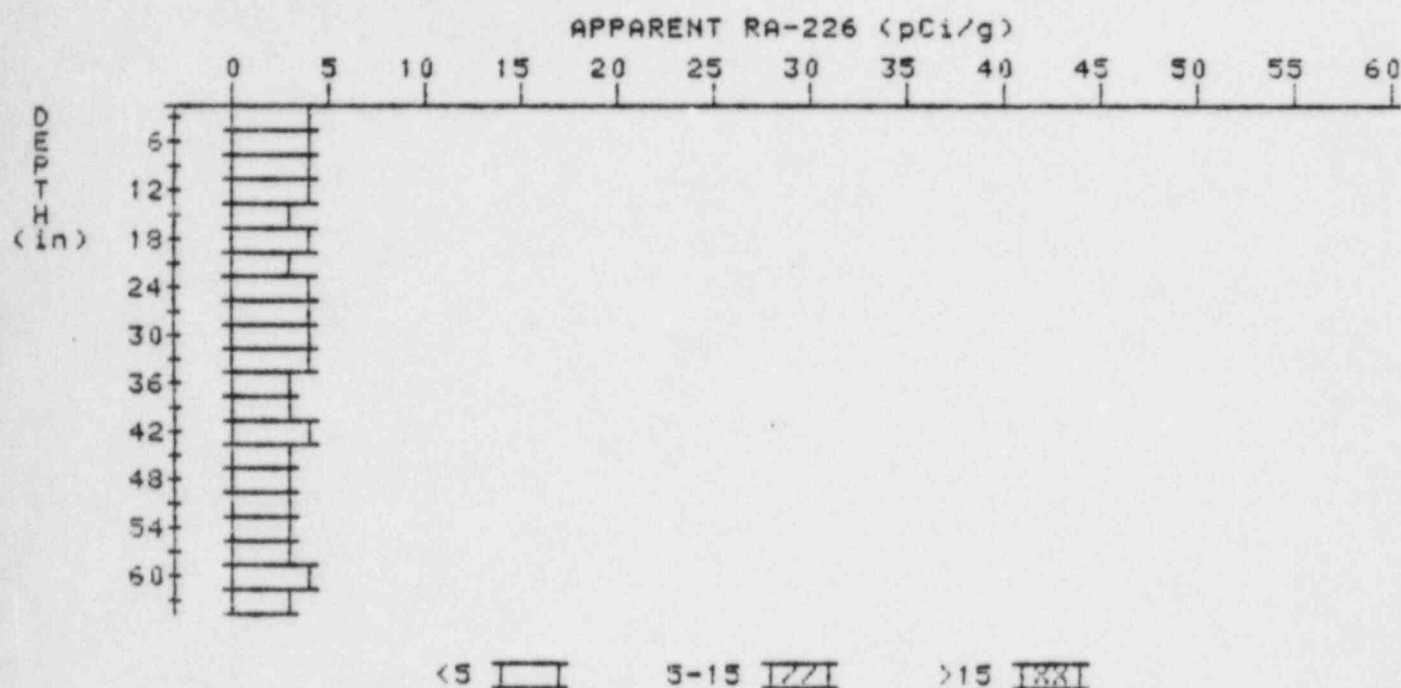
3.2  
3.6  
3.3  
3.0  
3.2  
3.4  
2.9  
3.1

# APPARENT RADIUM-226 CONCENTRATION 36 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-RS

HOLE NUMBER: 36

✓ LOCATION: 261228



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.5	3.5
6	3.8	4.3
9	3.8	4.0
12	3.7	3.7
15	3.6	3.4
18	3.6	4.0
21	3.4	2.9
24	3.5	3.7
27	3.5	3.5
30	3.5	3.5
33	3.5	3.7
36	3.4	3.4
39	3.5	2.9
42	3.4	3.6
45	3.4	3.4
48	3.4	3.4
51	3.4	3.4

54  
57  
60  
63

3.4  
3.4  
3.5  
3.4

3.4  
3.2  
3.9  
3.4

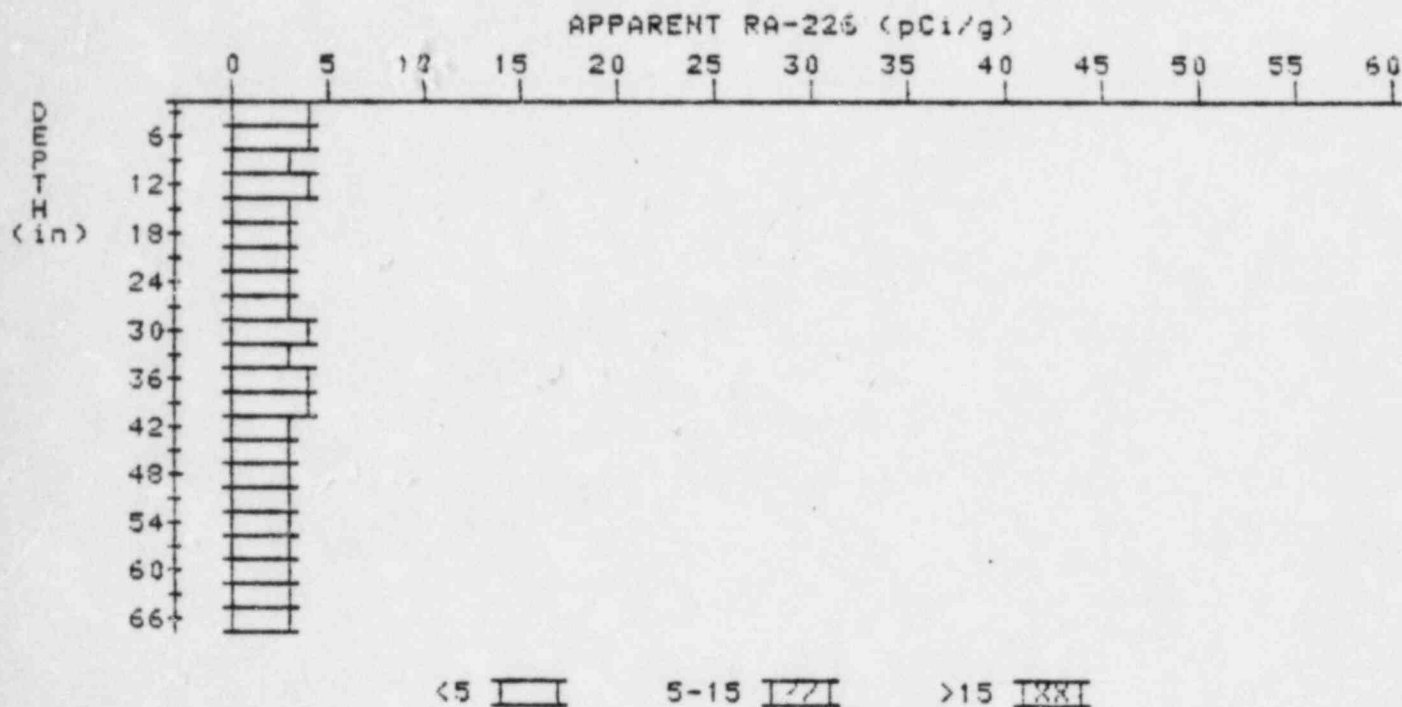
# APPARENT RADIUM-226 CONCENTRATION 37

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-33573-RS

HOLE NUMBER: 37

LOCATION: 261251



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.6	3.6
6	3.6	3.8
9	3.5	3.3
12	3.8	3.7
15	3.4	3.2
18	3.4	3.4
21	3.4	3.4
24	3.4	3.4
27	3.4	3.4
30	3.4	3.6
33	3.3	2.9
36	3.4	3.6
39	3.4	3.3
42	3.3	3.1
45	3.3	3.3
48	3.3	3.3

51  
54  
57  
60  
63  
66

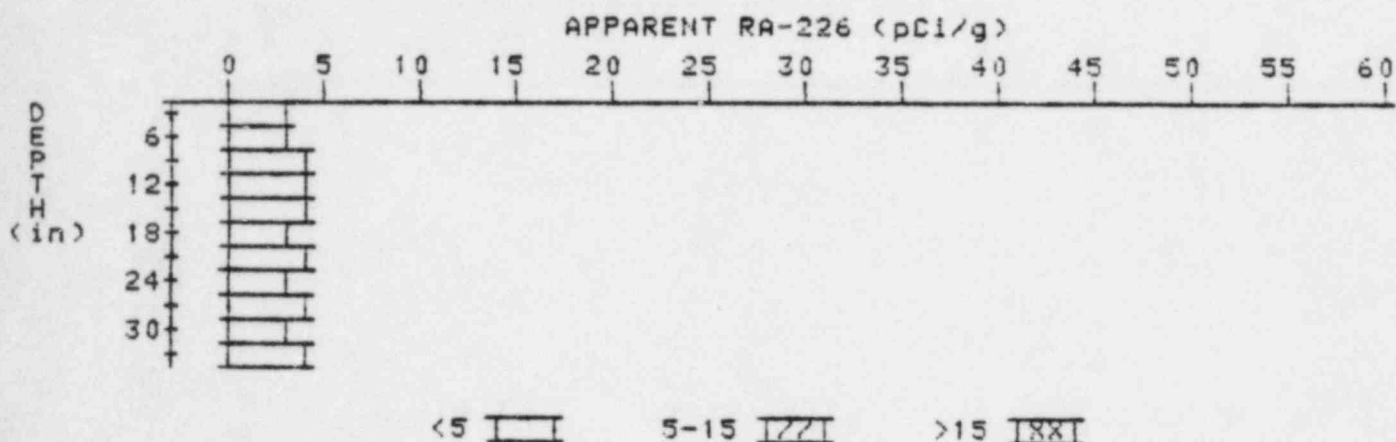
3.3  
3.2  
3.3  
3.3  
3.2  
3.2

3.5  
2.8  
3.5  
3.5  
3.0  
3.2



# APPARENT RADIUM-226 CONCENTRATION 41 DECONVOLUTION GRAPH

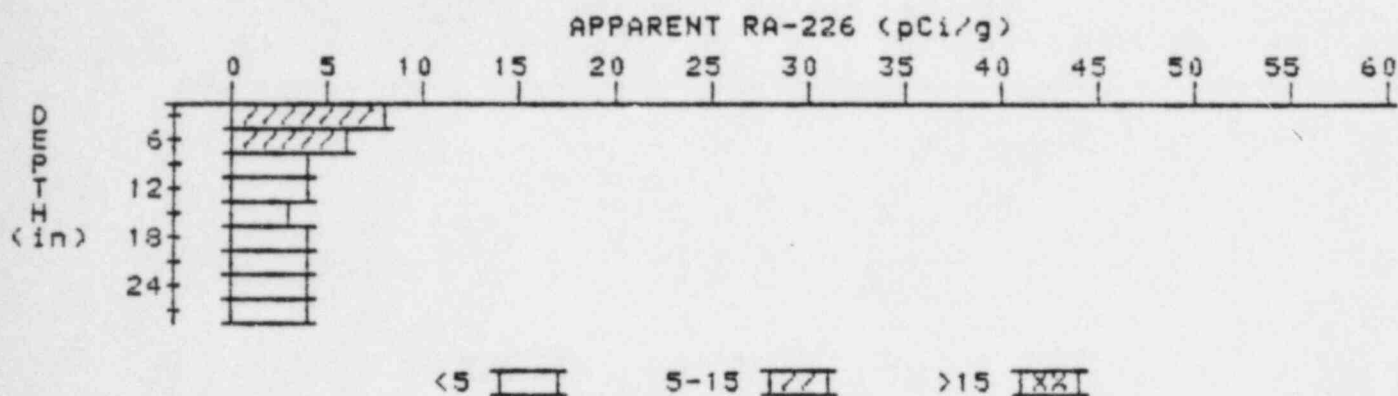
PROPERTY NUMBER: GJ-35575-RS  
HOLE NUMBER: 41  
LOCATION: 280290



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.3	3.3
6	3.4	3.4
9	3.5	3.5
12	3.6	3.8
15	3.6	3.8
18	3.5	3.3
21	3.5	3.5
24	3.5	3.3
27	3.6	4.0
30	3.5	3.3
33	3.5	3.5

# APPARENT RADIUM-226 CONCENTRATION 43 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-R3  
HOLE NUMBER: 43  
LOCATION: 310204



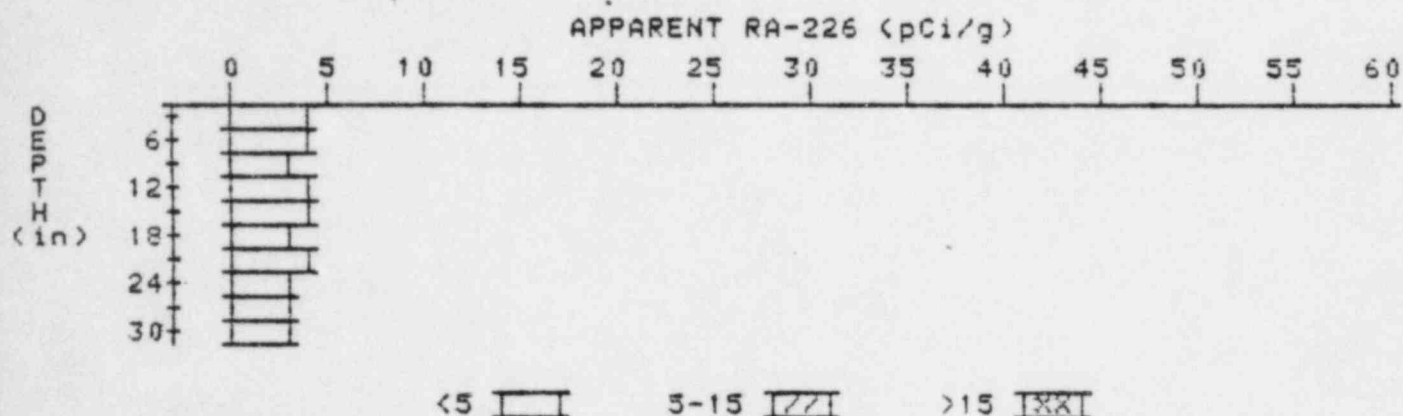
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	7.7	7.7
6	6.4	6.4
9	5.1	4.0
12	4.4	3.9
15	4.0	3.5
18	3.9	3.7
21	3.9	4.1
24	3.8	3.6
27	3.8	3.8

# APPARENT RADIUM-226 CONCENTRATION 49 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-R3

HOLE NUMBER: 49

✓ LOCATION: 177257 .



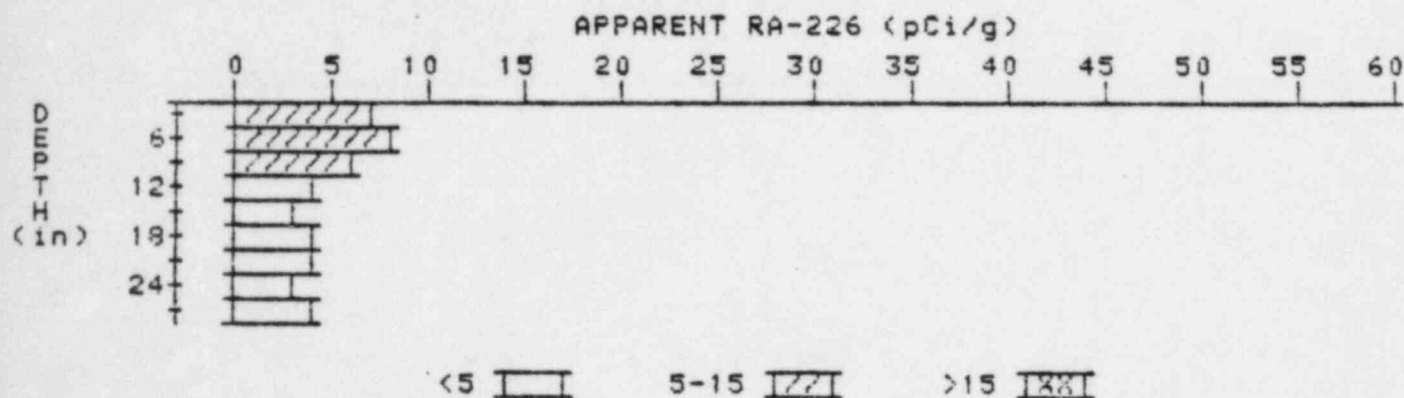
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.1	4.1
6	4.0	4.4
9	3.7	3.2
12	3.7	3.7
15	3.7	3.9
18	3.6	3.4
21	3.6	4.0
24	3.4	3.0
27	3.4	3.4
30	3.4	3.4

# APPARENT RADIUM-226 CONCENTRATION 57 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-R5

HOLE NUMBER: 57

LOCATION: 200265



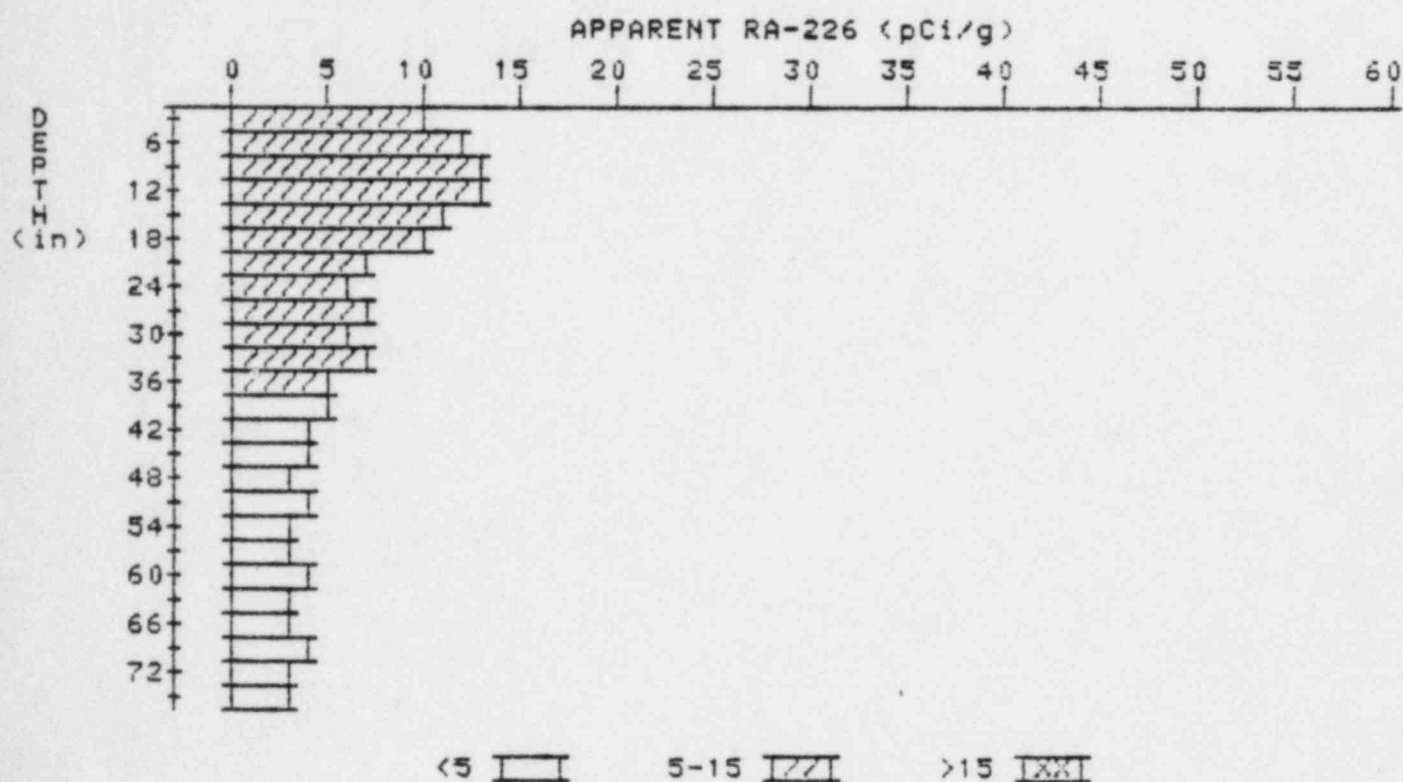
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	6.6	6.6
6	6.5	7.9
9	5.6	5.6
12	4.7	4.2
15	4.1	3.4
18	3.9	3.9
21	3.7	3.5
24	3.6	3.4
27	3.6	3.6

# APPARENT RADIUM-226 CONCENTRATION 60 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-R5

HOLE NUMBER: 60

LOCATION: 215267



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	10.3	10.3
6	11.4	12.5
9	11.9	13.3
12	11.6	12.7
15	10.7	11.4
18	9.4	9.6
21	9.0	6.9
24	7.2	6.5
27	6.3	6.6
30	6.5	6.5
33	6.2	7.1
36	5.4	5.0
39	4.9	4.9
42	4.2	3.7



45  
48  
51  
54  
57  
60  
63  
66  
69  
72  
75

3.9  
3.6  
3.5  
3.4  
3.3  
3.4  
3.4  
3.4  
3.4  
3.3  
3.3

3.9  
3.2  
3.5  
3.4  
2.9  
3.6  
3.4  
3.4  
3.6  
3.1  
3.3

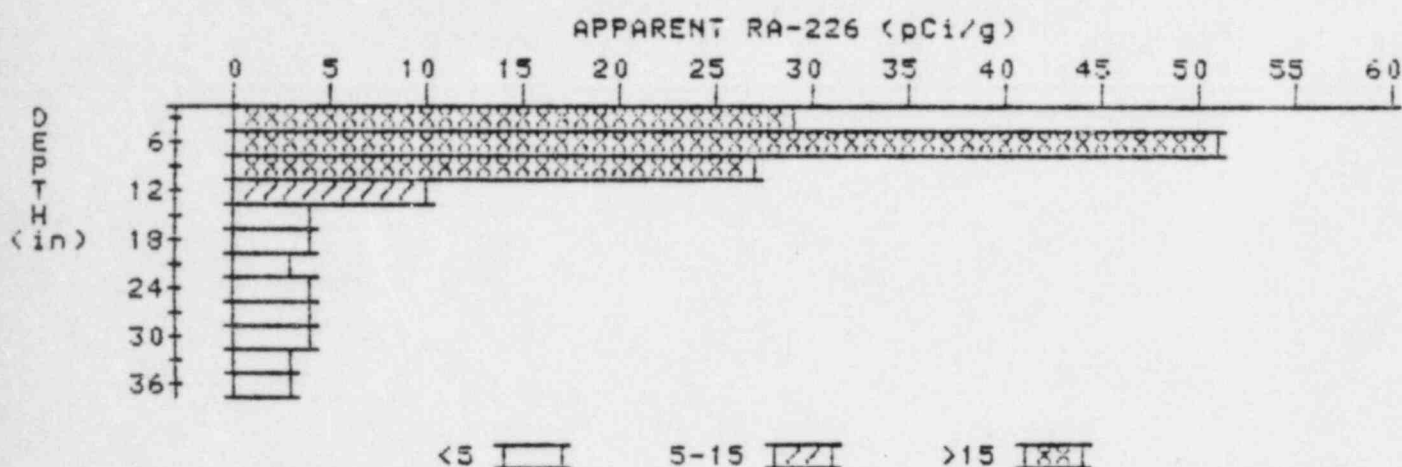
# APPARENT RADIUM-226 CONCENTRATION 62

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-R5

HOLE NUMBER: 62

✓ LOCATION: 224257



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	29.0	29.0
6	31.9	50.7
9	24.2	26.5
12	15.2	9.5
15	9.4	4.1
19	6.6	4.5
21	5.0	3.2
24	4.4	4.0
27	4.0	3.6
30	3.8	4.0
33	3.5	3.1
36	3.4	3.4

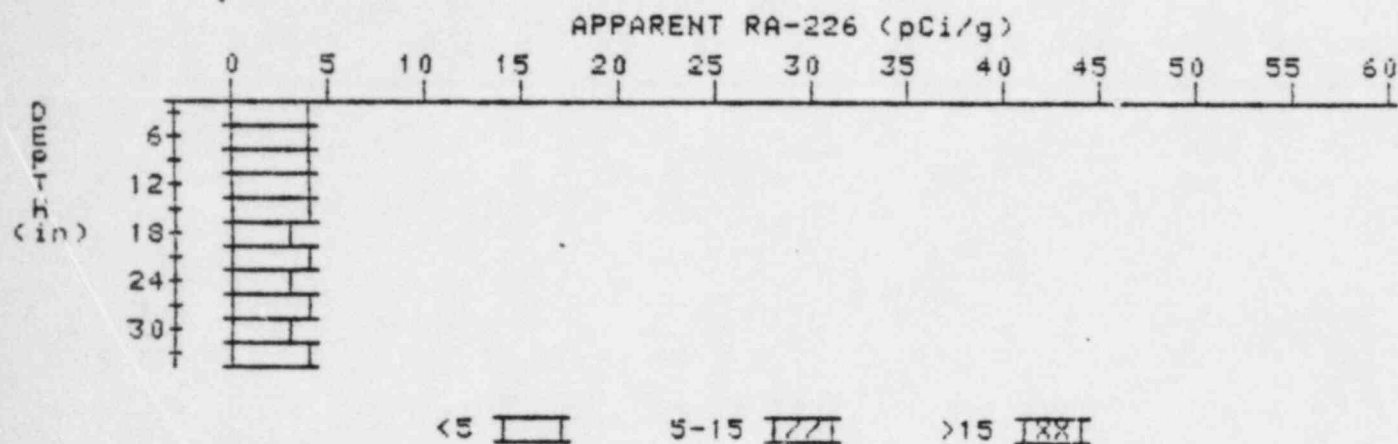
# APPARENT RADIUM-226 CONCENTRATION 66

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-RS

HOLE NUMBER: 66

LOCATION: 240210



Depth (in)	Apparent Radium-226 (pCi/g)	Apparent Radium-226 (pCi/g)
	Undeconvolved	Deconvolved
3	3.8	3.8
6	3.9	4.3
9	3.8	3.6
12	3.8	4.0
15	3.7	3.7
18	3.6	3.2
21	3.7	4.1
24	3.6	3.2
27	3.7	4.1
30	3.6	3.4
33	3.6	3.6

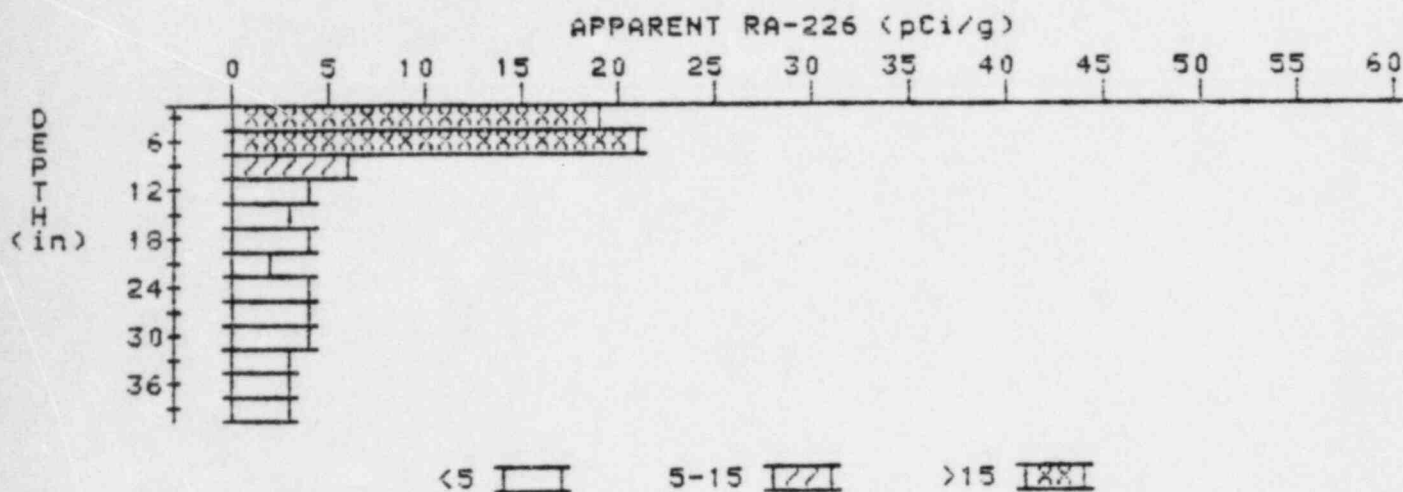
# APPARENT RADIUM-226 CONCENTRATION 67

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-RS

HOLE NUMBER: 67

✓LOCATION: 242262



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	18.7	18.7
6	15.7	20.5
9	10.0	5.9
12	6.6	3.6
15	4.9	3.3
18	4.1	3.7
21	3.5	2.4
24	3.5	3.5
27	3.5	3.5
30	3.5	3.7
33	3.4	3.4
36	3.3	3.1
39	3.3	3.3

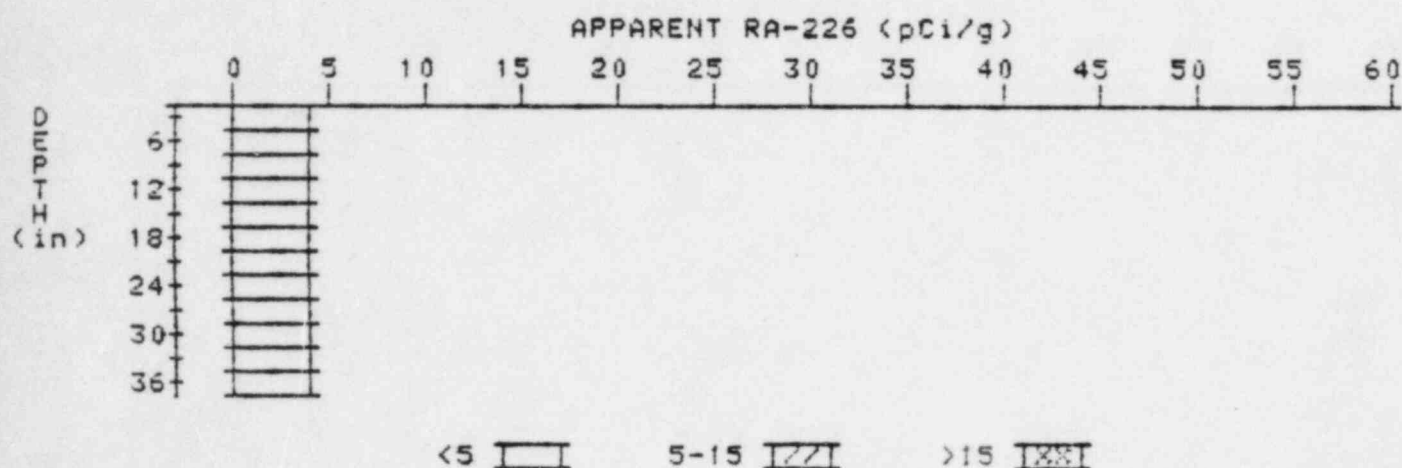
# APPARENT RADIUM-226 CONCENTRATION 71

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-RS

HOLE NUMBER: 71

LOCATION: 265215



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.4	4.4
6	4.3	4.5
9	4.1	3.9
12	4.0	4.0
15	3.9	3.7
18	3.9	4.1
21	3.8	3.8
24	3.7	3.5
27	3.7	3.7
30	3.7	3.5
33	3.8	4.0
36	3.8	3.8

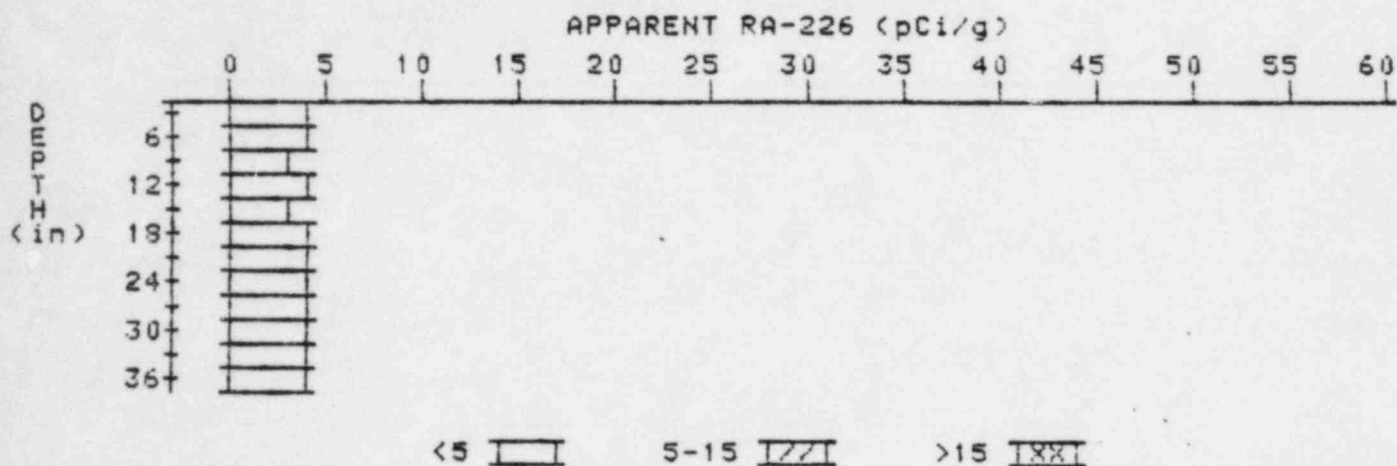


# APPARENT RADIUM-226 CONCENTRATION 77 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-R5

HOLE NUMBER: 77

LOCATION: 275255



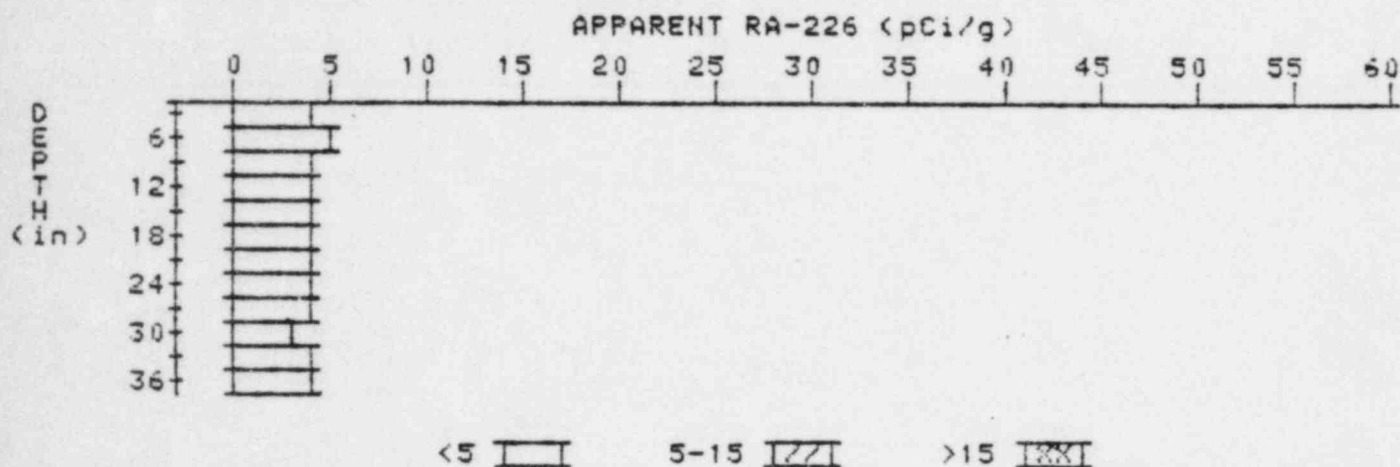
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.7	3.7
6	3.7	3.9
9	3.6	3.4
12	3.6	3.8
15	3.5	3.1
18	3.6	3.6
21	3.7	3.9
24	3.7	3.7
27	3.7	3.7
30	3.7	3.7
33	3.7	3.9
36	3.6	3.6

# APPARENT RADIUM-226 CONCENTRATION 78 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35375-RS

HOLE NUMBER: 78

LOCATION: 278183



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.4	4.4
6	4.3	4.7
9	4.0	3.6
12	3.9	3.9
15	3.8	3.8
18	3.7	3.5
21	3.7	3.5
24	3.8	4.2
27	3.7	3.7
30	3.6	3.4
33	3.6	3.6
36	3.6	3.6

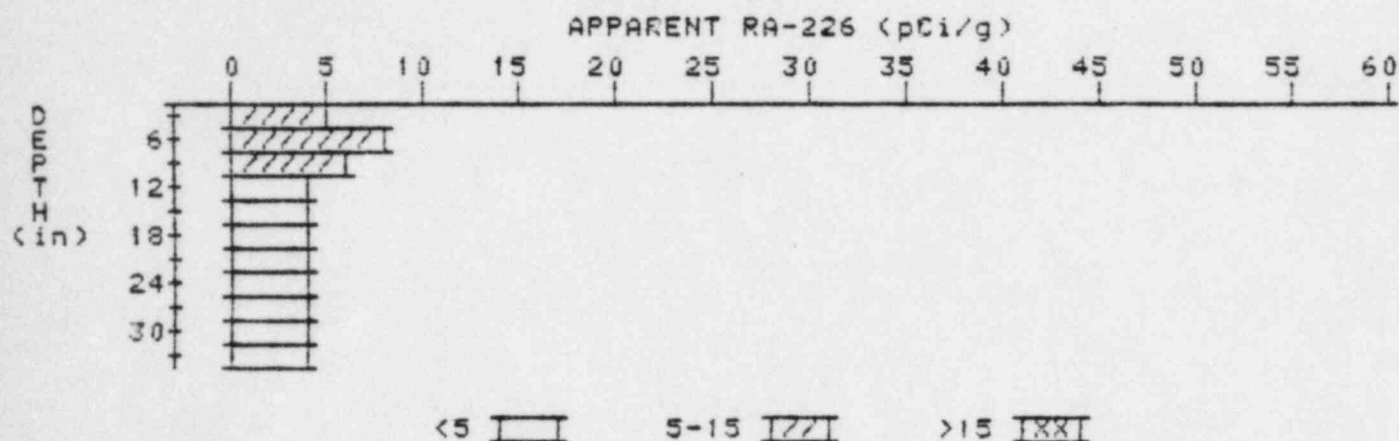
# APPARENT RADIUM-226 CONCENTRATION 79

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-35575-R5

HOLE NUMBER: 79

LOCATION: 288235



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.1	5.1
6	5.9	8.2
9	5.4	5.8
12	4.7	4.0
15	4.4	4.2
18	4.2	4.2
21	4.0	3.6
24	4.0	4.2
27	3.9	3.9
30	3.8	3.6
33	3.8	3.8