

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-08841-RS  
ADDRESS: 2519 SOUTH BROADWAY

APRIL 1985  
REVISED AUGUST 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

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DATE September 3, 1985

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## **1.0 EXECUTIVE SUMMARY**

### **1.1 Introduction**

The location, DOE ID No. GJ-08841-RS, is a single-family residence located at 2519 South Broadway, 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, 47 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action is \$2,635. Remedial action on this property will take approximately 10 days to complete.

## 2.0 PROPERTY DESCRIPTION

### 2.1 General Description

Address: 2519 South Broadway, Grand Junction, Colorado

Zoning: Commercial (C)

Lot Size: Approximately 9,375 sf (0.22 acres)

Legal Description: From the southwest corner section 15, T1S, R1W, north 76 deg 04 min east 940 feet, north 59 deg 37 min east 370 feet, for beginning. Thence N 30 deg 30 min E 60.29 feet, thence N 54 deg 28 min W 125.00 feet, thence S 35 deg 32 min W 60.00 feet, thence S 54 deg 28 min E 130.67 feet to beginning. Plus beginning at same beginning, thence N 54 deg 28 min W 130.67 feet, thence S 35 deg 32 min W 15.00 feet, thence S 54 deg 28 min E to a point S 59 deg 57 min W of beginning, thence N 59 deg 57 min E to beginning, County of Mesa, State of Colorado.

Point of Reference: This property is located approximately 2 miles northwest of the State of Colorado Tailings Repository. Appendix Figure 2.1 shows the property location relative to its surroundings.

Utilities: Utility locations are shown in Appendix Figure 2.2.

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

Bordering Properties:

North:	Single-family residence
South:	Veterinary clinic
East:	Vacant land (watershed)
West:	Monument Road/South Broadway

### 2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-story residence
Size:	Approximately 735 sf
Construction Date:	1955
Construction:	Wood-frame
Foundation:	8" concrete block on spread footing



Footing Depth:	Approximately 52" to bottom of footing from grade
Basement:	Yes - under entire living area, concrete floor
Crawl Space:	None
Condition:	Good

Other Structures:      None

General Remarks:

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-08841-RS on March 11, 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 elevated gamma levels were observed along the fence line that extends along the northeast edge of the property. These elevated gamma levels were determined to be the result of spillover from the adjacent property at 2521 South Broadway. A small area southeast of the primary structure also showed elevated readings. The records also indicated the absence of contamination in 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: 10 to 13 uR/h  
Highest Outside Gamma Reading (HOG): 60 uR/h

Exterior radium-concentration measurements are presented in Appendix Table 3.1. Grid-point survey results are shown in Appendix Figure 3.1. Appendix Figure 3.2 presents the ranges of elevated gamma readings and indicates areas of possible contamination.

##### **3.2.2 Interior Findings**

Background Readings: 10 to 13 uR/h  
Highest Inside Gamma Reading (HIG): 15 uR/h

Interior gamma exposure-rate measurements are summarized in Appendix Table 3.2. 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 Figure 3.4. Data from these investigations are included in Appendix Table 3.1.

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

The working level was not assessed by CDH. No RDC measurements were taken by Bendix.

### 3.5 Extent of Contamination

Appendix Figure 3.5 shows identified areas and estimated depths of contamination on this property, based on assessments of all measurements taken. As noted in this figure, areas recommended for remedial action that contain identified residual radioactive materials are:

- (AREA A) A small area adjacent to the west entry steps is contaminated to a depth of 15 inches (approximately 8 sf).
- (AREA B) A deposit along the south corner of the primary structure is contaminated to a depth of 18 inches (approximately 82 sf).
- (AREA C) Surrounding Area E there is contamination to a depth of 18 inches (approximately 152 sf).
- (AREA D) The fill material beneath the concrete basement entry is contaminated. The concrete is 6 inches thick. The total depth of contamination is 15 inches (approximately 18 sf).
- (AREA E) An area near the east corner of the primary structure is contaminated to a depth of 27 inches (approximately 20 sf).
- (AREA F) Along the east fence line, a portion of the yard adjacent to Area C is contaminated to a depth of 6 inches (approximately 129 sf).
- (AREA G) Immediately southeast of Area F there is a deposit which is contaminated to a depth of 18 inches (approximately 92 sf).
- (AREA H) A portion of the yard adjacent to the west side of Area G is contaminated to a depth of 9 inches (approximately 150 sf).
- (AREA I) Soil adjacent to the southeast portion of Area G is contaminated to a depth of 9 inches (approximately 90 sf).

- (AREA J) A deposit in the gravel driveway at the southwest side of property is contaminated to a depth of 21 inches (approximately 225 sf).
- (AREA K) A small deposit that abuts the southwest property line is contaminated to a depth of 9 inches (approximately 15 sf).

#### **4.0 RECOMMENDED REMEDIAL ACTION**

##### **4.1 Decontamination and Restoration**

The recommended remedial action for this property, DOE ID No. GJ-08841-RS, includes removal of all areas identified as containing radioactive material (as discussed in Section 3.5 and shown in Appendix Figure 3.5) 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 \$2,685.

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 3.1	Radium Concentrations at Exterior Locations
Table 3.2	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 3.1	Exterior Grid-Point Exposure Rates
Figure 3.2	Exterior Gamma Scan
Figure 3.3a	Interior Gamma Exposure Rates (Basement)
Figure 3.3b	Interior Gamma Exposure Rates (Ground Floor)
Figure 3.4	Exterior Sample Locations
Figure 3.5	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

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Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
1	189210	03	TC	2.5		*	West side near water line DC = 0 inches
		06	TC	2.5		*	
		09	TC	2.5		*	
		12	TC	2.5		*	
		15	TC	2.4		*	
		18	TC	2.4		*	
		21	TC	2.3		*	
		24	TC	2.3		*	
		27	TC	2.3		*	
		30	TC	2.2		*	
		33	TC	2.2		*	
		36	TC	2.3		*	
		39	TC	2.2		*	
		42	TC	2.2		*	
		45	TC	2.2		*	
		48	TC	2.3		*	
		51	TC	2.1		*	
		54	TC	2.3		*	
		57	TC	2.3		*	
		60	TC	2.2		*	
		63	TC	2.3		*	
		66	TC	2.3		*	
2	190189	03	TC	2.4		*	Gas line DC = 0 inches
		06	TC	2.5		*	
		09	TC	2.5		*	
		12	TC	2.5		*	
		15	TC	2.3		*	
		18	TC	2.3		*	
		21	TC	2.3		*	
		24	TC	2.3		*	
3	203188	03	TC	5.9		*	South side of house DC = 15 inches Based on the deconvolution graph
		06	TC	7.6		*	
		09	TC	8.5		*	
		12	TC	7.8		*	
		15	TC	5.6		*	
		18	TC	4.2		*	
		21	TC	3.3		*	
		24	TC	2.8		*	
		27	TC	2.5		*	
		30	TC	2.3		*	
		33	TC	2.4		*	
		36	TC	2.3		*	

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Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
3	203188	39	TC	2.2		*	
		42	TC	2.2		*	
		45	TC	2.1		*	
		48	TC	2.1		*	
		51	TC	2.1		*	
		54	TC	2.0		*	
		57	TC	2.1		*	
		60	TC	2.1		*	
		63	TC	2.1		*	
		66	TC	2.2		*	
		69	TC	2.1		*	
4	210165	00	DS	<1.0		*	Background
		00-06	SS			1.3	Moist soil
		03	TC	3.4		*	
		06	BH	3.6	1.6	*	DC = 0 inches
		09	TC	4.2		*	
		12	TC	4.5		*	
		15	TC	4.7		*	
		18	BH	4.9	2.4	*	
		21	TC	5.1		*	
		24	TC	5.1		*	
		27	TC	4.8		*	
		30	TC	4.6		*	
		33	TC	4.4		*	
		36	BH	3.9	1.4	*	
		39	TC	4.3		*	
		42	TC	4.2		*	
		45	TC	4.2		*	
		48	TC	3.9		*	
5	211220	03	TC	4.5		*	NE corner of
		06	TC	5.5		*	house/foundation
		09	TC	6.6		*	DC = 18 inches
		12	TC	6.9		*	Based on the
		15	TC	6.0		*	deconvolution graph
		18	TC	4.9		*	
		21	TC	4.3		*	
		24	TC	4.1		*	
		27	TC	4.0		*	
		30	TC	4.0		*	
		33	TC	4.0		*	
		36	TC	4.1		*	
		39	TC	4.1		*	

## Radium Concentrations at Exterior Locations

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Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
5	211220	42	TC	4.0		*	
		45	TC	4.1		*	
		48	TC	4.1		*	
		51	TC	4.1		*	
		54	TC	4.0		*	
6	214233	00	DS	2.6		*	Side of house by fence
		06	DS	1.9		*	
7	215199	03	TC	5.8		*	East of house DC = 18 inches Based on the deconvolution graph
		06	BH	6.7	3.7	*	
		09	TC	7.0		*	
		12	BH	6.5	2.9	*	
		15	TC	5.6		*	
		18	TC	4.9		*	
		21	TC	4.6		*	
		24	BH	4.3	1.2	*	
		27	TC	4.2		*	
		30	TC	4.2		*	
		33	TC	4.1		*	
		36	TC	4.0		*	
		39	TC	4.0		*	
		42	TC	4.1		*	
8	216207	[04]	DS	6.9		*	On wooden stair Under step on soil
		00	DS	17.3		*	
9	216223	00	DS	3.6		*	NE corner DC = 27 inches Based on the deconvolution graph
		06	DS	10.6		*	
		03	TC	10.4		*	
		06	TC	13.6		*	
		09	TC	20.1		*	
		12	TC	31.0		*	
		15	TC	39.2		*	
		18	BH	36.4	18.9	*	
		21	TC	25.5		*	
		24	TC	16.1		*	
		27	TC	11.3		*	
		30	TC	8.3		*	
		33	TC	6.7		*	
		36	BH	5.8	2.6	*	
		39	TC	5.4		*	
		42	TC	5.0		*	

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Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
9	216223	45	TC	4.8		*	
		48	TC	4.7		*	
		51	TC	4.7		*	
		54	TC	4.6		*	
10	217202	00-04	SS			<1.0	Concrete core
		04-10	SS			28.6	Moist soil under
		03	TC	8.4		*	bottom of stairs
		06	BH	11.7	8.6	*	DC = 15 inches
		09	TC	11.4		*	Based on the
		12	BH	8.2	2.9	*	deconvolution graph
		15	TC	5.6		*	
		18	TC	4.3		*	
		21	TC	3.6		*	
		24	BH	3.1	1.2	*	
		27	TC	2.9		*	
		30	TC	2.7		*	
11	219194	00	DS	3.5		*	Back of house
		06	DS	4.8		*	
		00-06	SS			5.1	Moist soil
12	220190	00	DS	5.3		*	South of house
		06	DS	1.3		*	
		00-06	SS			7.4	Moist, rocky soil
13	220207	03	TC	4.3		*	East of house
		06	TC	4.8		*	DC = 0 inches
		09	TC	4.6		*	Based on the
		12	TC	4.4		*	deconvolution graph
		15	TC	4.1		*	
		18	TC	4.0		*	
		21	TC	4.0		*	
		24	TC	4.1		*	
		27	TC	4.2		*	
		30	TC	4.1		*	
		33	TC	4.1		*	
		36	TC	4.2		*	
		39	TC	4.3		*	
		42	TC	4.3		*	
		45	TC	4.4		*	
		48	TC	4.5		*	
		51	TC	4.6		*	

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Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
13	220207	54	TC	4.7		*	
		57	TC	4.8		*	
		60	TC	4.9		*	
		63	TC	4.8		*	
		66	TC	4.6		*	
		69	TC	4.0		*	
14	220217	00	DS	2.0		*	
15	220221	00	DS	2.9		*	SE corner of house
		06	DS	9.5		*	
16	220234	03	TC	7.8		*	By fence, north
		06	TC	11.2		*	of house
		09	TC	15.0		*	DC = 18 inches
		12	TC	14.6		*	Based of the
		15	TC	10.2		*	deconvolution graph
		18	TC	7.5		*	
		21	TC	6.3		*	
		24	TC	5.5		*	
		27	TC	5.1		*	
		30	TC	4.8		*	
17	228236	00	DS	6.9		*	By fence
18	232236	00	DS	4.4		*	By fence
		06	DS	1.3		*	
19	240180	00	DS	2.5		*	SE parking area
20	240236	03	TC	4.1		*	Clothes line pole
		06	TC	4.1		*	DC = 0 inches
		09	TC	4.1		*	
		12	TC	4.2		*	
		15	TC	4.1		*	
		18	TC	4.2		*	
		21	TC	4.3		*	
		24	TC	4.2		*	
		27	TC	4.4		*	
		30	TC	4.5		*	
21	245165	03	TC	7.7		*	By south fence
		06	BH	9.4	8.6	*	
		09	TC	10.6		*	

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Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
21	245165	12	TC	10.6		*	
		15	TC	9.8		*	DC = 18 inches
		18	TC	7.9		*	Based on the
		21	TC	6.2		*	deconvolution graph
		24	BH	5.2	1.6	*	
		27	TC	4.6		*	
22	245180	00	DS	5.1		*	SE parking area
23	245220	03	TC	3.3		*	DC = 0 inches
		06	TC	3.8		*	
		09	TC	4.0		*	
		12	TC	4.1		*	
		15	TC	4.1		*	
		18	TC	4.1		*	
		21	TC	4.0		*	
		24	TC	4.1		*	
		27	TC	4.1		*	
		30	TC	4.1		*	
		33	TC	4.1		*	
24	250234	03	TC	6.2		*	DC = 9 inches
		06	TC	5.4		*	Based on the
		09	TC	4.7		*	deconvolution graph
		12	TC	4.4		*	
		15	TC	4.4		*	
		18	TC	4.2		*	
		21	TC	4.3		*	
		24	TC	3.9		*	
25	255175	03	TC	16.8		*	East of driveway
		06	TC	23.8		*	DC = 21 inches
		09	TC	28.7		*	Based on the
		12	BH	29.4	20.5	*	deconvolution graph
		15	TC	23.2		*	
		18	TC	16.3		*	
		21	TC	11.1		*	
		24	BH	8.6	4.2	*	
		27	TC	7.0		*	
		30	TC	6.2		*	
		33	TC	5.7		*	
		36	BH	5.3	2.4	*	
		39	TC	5.0		*	
		42	TC	4.7		*	

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Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
25	255175	45	TC	4.6		*	
		48	TC	4.6		*	
		51	TC	4.6		*	
		54	TC	4.7		*	
		57	TC	4.6		*	
		60	TC	4.8		*	
26	255237	03	TC	28.5		*	DC = 18 inches Based on the deconvolution graph
		06	TC	31.8		*	
		09	TC	27.7		*	
		12	BH	22.5	74.9	*	
		15	TC	15.6		*	
		18	TC	10.7		*	
		21	TC	7.9		*	
		24	TC	6.5		*	
		27	TC	6.0		*	
		30	TC	5.7		*	
		33	TC	5.7		*	
		36	TC	5.5		*	
		39	TC	5.7		*	
		42	TC	5.9		*	
		45	TC	6.1		*	
		48	TC	6.3		*	
		51	TC	6.5		*	
		54	TC	6.5		*	
		57	TC	6.7		*	
		60	TC	6.7		*	
		63	TC	6.8		*	
		66	BH	6.9	11.4	*	
		69	TC	6.8		*	
		72	TC	7.1		*	
		75	TC	7.5		*	
		78	TC	7.6		*	
		81	TC	7.3		*	
		84	TC	6.7		*	
		87	TC	6.3		*	
		90	TC	5.7		*	
		93	TC	5.4		*	
		96	TC	5.2		*	
		99	BH	4.9	10.7	*	
27	258165	00	DS	<1.0		*	Along south fence



## Radium Concentrations at Exterior Locations

DOE ID No. GJ-08841-RS

2519 South Broadway

Page 8 of 9

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
28	258182	03	TC	3.7		*	East of driveway DC = 0 inches
		06	TC	4.3		*	
		09	TC	4.3		*	
		12	TC	4.2		*	
		15	TC	4.3		*	
		18	TC	4.4		*	
		21	TC	4.3		*	
		24	TC	4.3		*	
		27	TC	4.3		*	
		30	TC	4.3		*	
29	260230	03	TC	5.0		*	Under clothes line DC = 9 inches Based on the deconvolution graph
		06	TC	4.8		*	
		09	TC	4.5		*	
		12	TC	4.3		*	
		15	TC	4.2		*	
		18	TC	4.1		*	
		21	TC	4.1		*	
		24	TC	4.3		*	
		27	TC	4.4		*	
		30	TC	4.4		*	
30	260234	03	TC	5.1		*	DC = 9 inches Based on the deconvolution graph
		06	TC	4.9		*	
		09	TC	4.6		*	
		12	TC	4.4		*	
		15	TC	4.3		*	
		18	TC	4.4		*	
		21	TC	4.4		*	
		24	TC	4.4		*	
		27	TC	4.5		*	
		30	TC	4.6		*	
31	269166	00	DS	2.8		*	Along south fence
		06	DS	2.5		*	
		00-06	SS			5.0	Moist soil

## Radium Concentrations at Exterior Locations

DOE ID No. GJ-08841-RS

2519 South Broadway

Page 9 of 9

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
32	273237	00	DS	4.1		*	East corner of yard
		06	DS	2.9		*	
		12	DS	1.8		*	
33	280235	00	DS	4.1		*	East corner of yard
		06	DS	1.9		*	
		00-06	SS			4.8	Moist soil

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 = 03-11-85  
Team Leader = WCM

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)
BASEMENT	30	10-14	12	30	11-15	12
GROUND FLOOR *		*	*	*	10-13	12

---

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

Table 4.1  
Area and Volume Calculations  
DOE ID No. GJ-08841-RS

Page 1 of 1

<u>AREA</u>	<u>CALCULATIONS(ft)</u>	<u>SF</u>	<u>DEPTH(ft)</u>	<u>CF</u>	<u>CUBIC YARDS</u>
<u>EXTERIOR</u>					
Concrete					
D	4 x 6 =	24	x 0.5 =	12	
				12	
Volume of Concrete				= 12	= 12/27 = 1
Contaminated Fill					
A	2 x 4 =	8	x 1.3 =	10	
B	5 x 14 =	70			
	3 x 4 =	12			
		82	x 1.5 =	123	
C	14 x 10 =	140			
	8 x 4 =	32			
	(minus Area E) =	(20)			
		152	x 1.5 =	228	
D	2 x 9 =	18	x 0.8 =	14	
E	5 x 4 =	20	x 2.3 =	46	
F	3 x 30 =	90			
	5 x 6 =	30			
	3 x 3 =	9			
		129	x 0.5 =	65	
G	4 x 23 =	92	x 1.5 =	138	
H	6 x 25 =	150	x 0.8 =	120	
I	15 x 6 =	90	x 0.8 =	72	
J	15 x 15 =	225	x 1.8 =	405	
K	3 x 5 =	15	x 0.8 =	12	
				1,233	
Volume of Contaminated Fill				= 1,233	= 1,233/27 = 46
TOTAL VOLUME - EXTERIOR					= 47

See Appendix Figure 3.5 For Areas

Table 4.2  
Estimated Cost of Decontamination and Restoration  
DOE ID No. GJ-08841-RS

Page 1 of 1

EXTERIOR

Excavate identified residual radioactive material (machine-open) 40 cy @ \$14.50/cy	\$ 580
--	--------

Excavate identified residual radioactive material (manual-open) 6 cy @ \$44/cy	264
---	-----

Replace areas with roadbase 46 cy @ \$11.50/cy	529
---	-----

Remove/replace concrete at base of stairs 24 sf @ \$4/sf	96
---	----

Saw cut concrete - 3 feet Lump sum	25
---------------------------------------	----

Remove/replace wood stairs and paint Lump sum	150
--	-----

	TOTAL EXTERIOR \$ 1,644
--	-------------------------

	TOTAL INTERIOR 0
--	------------------

	ACCESS CONTROL 100
--	--------------------

	SUBTOTAL \$ 1,744
--	-------------------

	CONTINGENCY @ 10% 174
--	-----------------------

	SUBTOTAL \$ 1,918
--	-------------------

	CONTRACTOR OVERHEAD & PROFIT @ 40% 767
--	--

	GRAND TOTAL \$ 2,685
--	----------------------

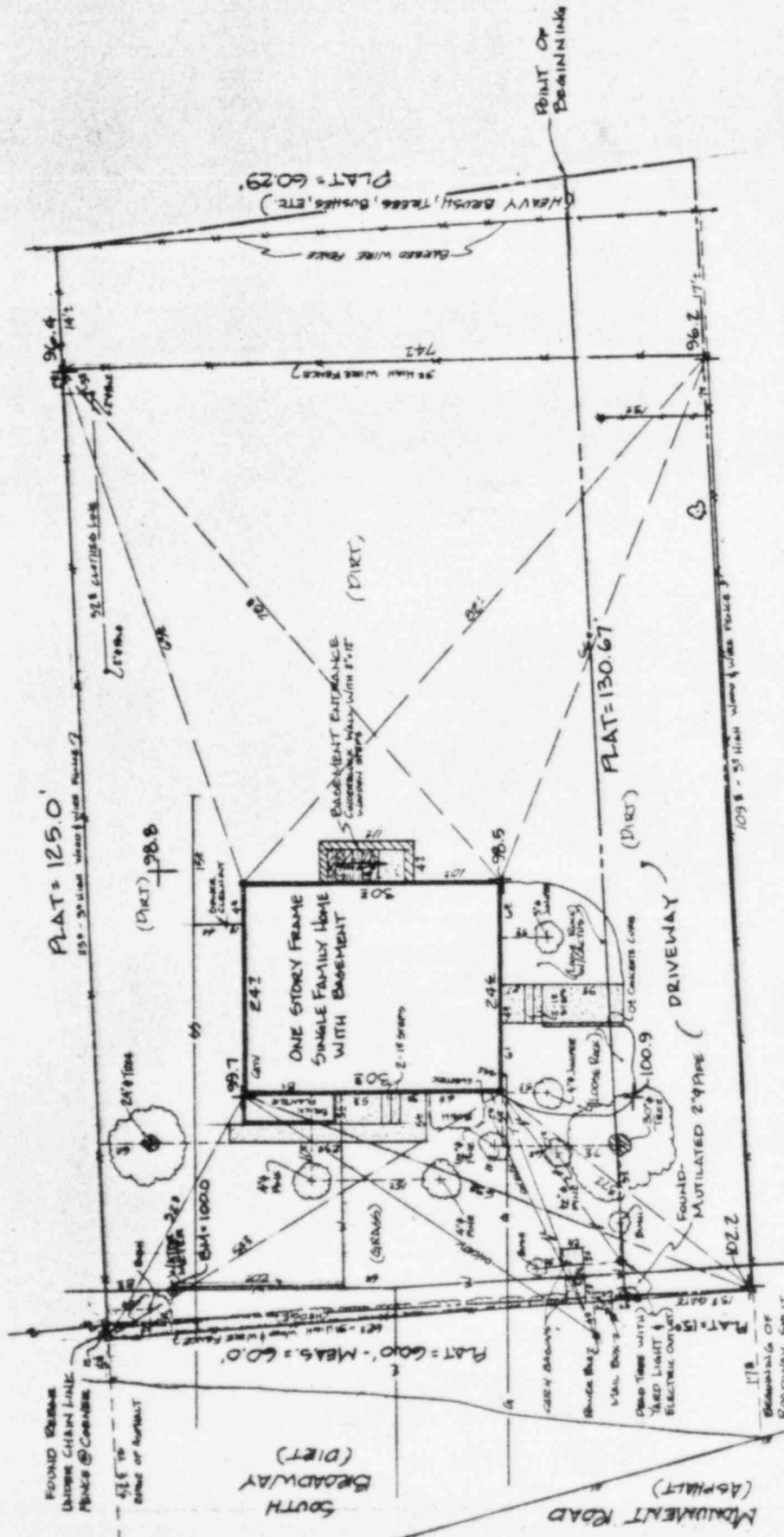
RR083085

REA08841.GJ:REA-GEO08:LMR





FROM THE SOUTHWEST CORNER SECTION 15, T.15, R.1 W., NORTH 76° 04' EAST 940 FEET,  
 NORTH 59° 57' EAST 370 FEET, FOR BEGINNING. THENCE N. 50° 50' E 60.29 FEET, THENCE  
 N. 54° 28' W. 125.00 FEET, THENCE S. 35° 32' W. 60.00 FEET, THENCE S. 54° 28' E. 130.67  
 FEET TO BEGINNING. PLUS,  
 BEGINNING AT SAME BEGINNING, THENCE N. 54° 28' W. 130.67 FEET, THENCE S. 85° 32' W. 15.00 FEET,  
 THENCE S. 54° 28' E. TO A POINT S. 59° 57' W. OF BEGINNING, THENCE N. 59° 57' E. TO BEGINNING,  
 COUNTY OF MESA, STATE OF COLORADO.



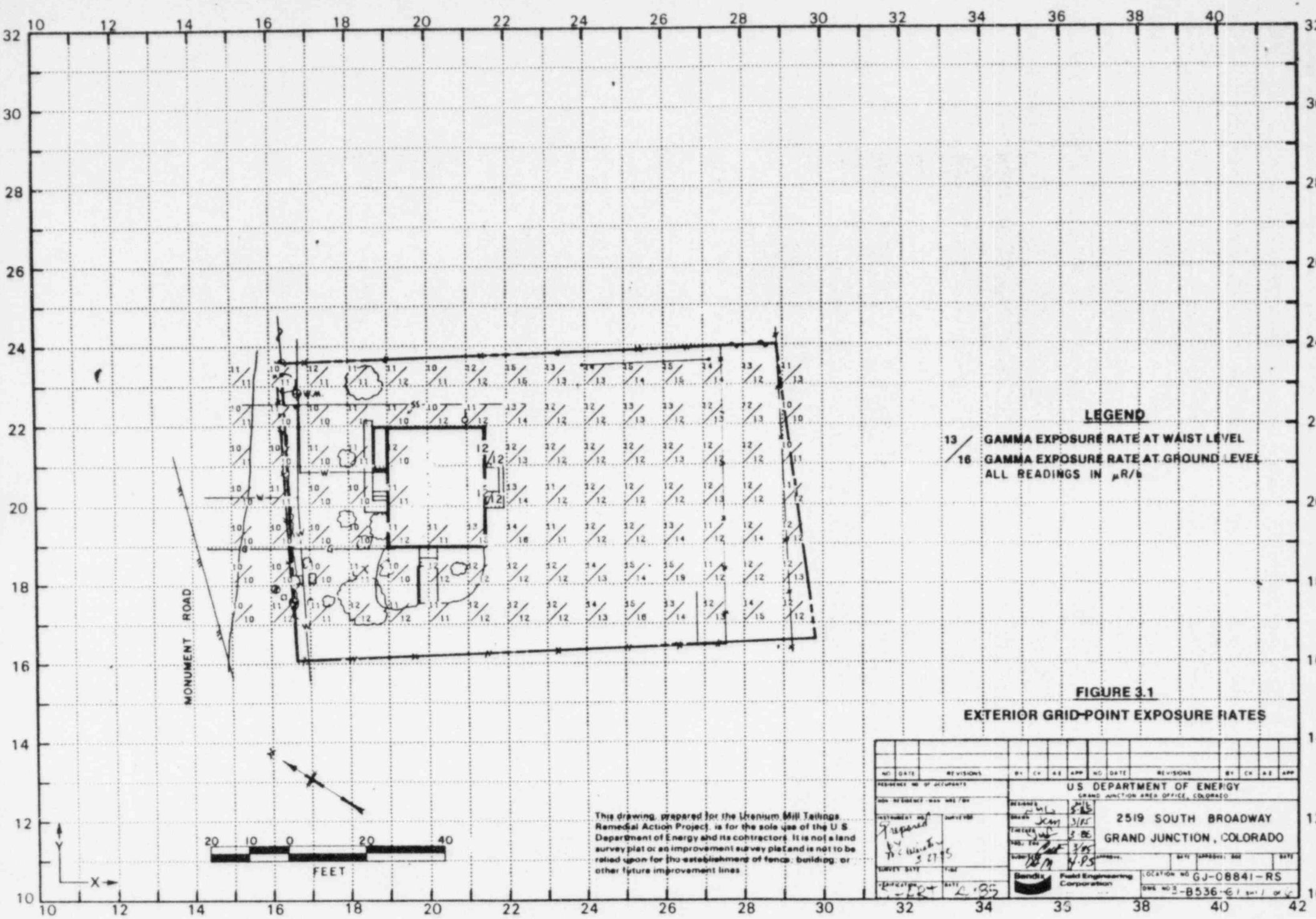
This drawing prepared for the Mountain Mesa Tract  
 Acquired from Project is for the site use of the U.S.  
 Department of Energy. It is not to be used for any  
 other purpose without the written consent of the  
 U.S. Department of Energy. It is not to be used for  
 any other purpose without the written consent of the  
 U.S. Department of Energy.

FIGURE 2.2 SITE PLAN

U.S. DEPARTMENT OF ENERGY	DOE ID NO
GRAND JUNCTION PROJECT OFFICE, COLORADO	GJ018641 R5
ADDRESS	2519 SOUTH BROADWAY
GRAND JUNCTION, COLORADO	
SURV WHL	3.4.85
CHART RSK	3.5.85
CK WLF	3.6.85







**LEGEND**

13/16 GAMMA EXPOSURE RATE AT WAIST LEVEL

16 GAMMA EXPOSURE RATE AT GROUND LEVEL

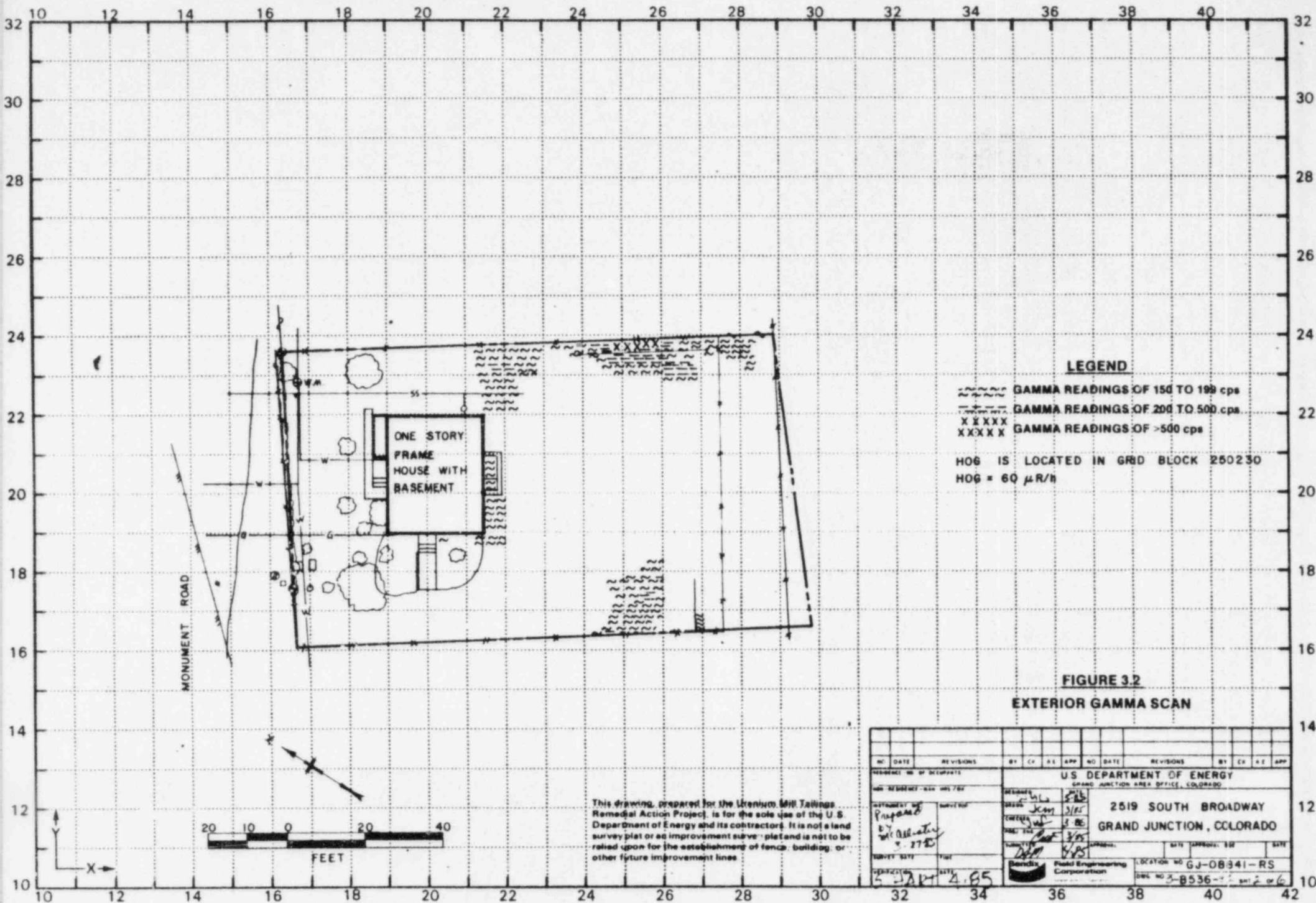
ALL READINGS IN  $\mu\text{R/h}$

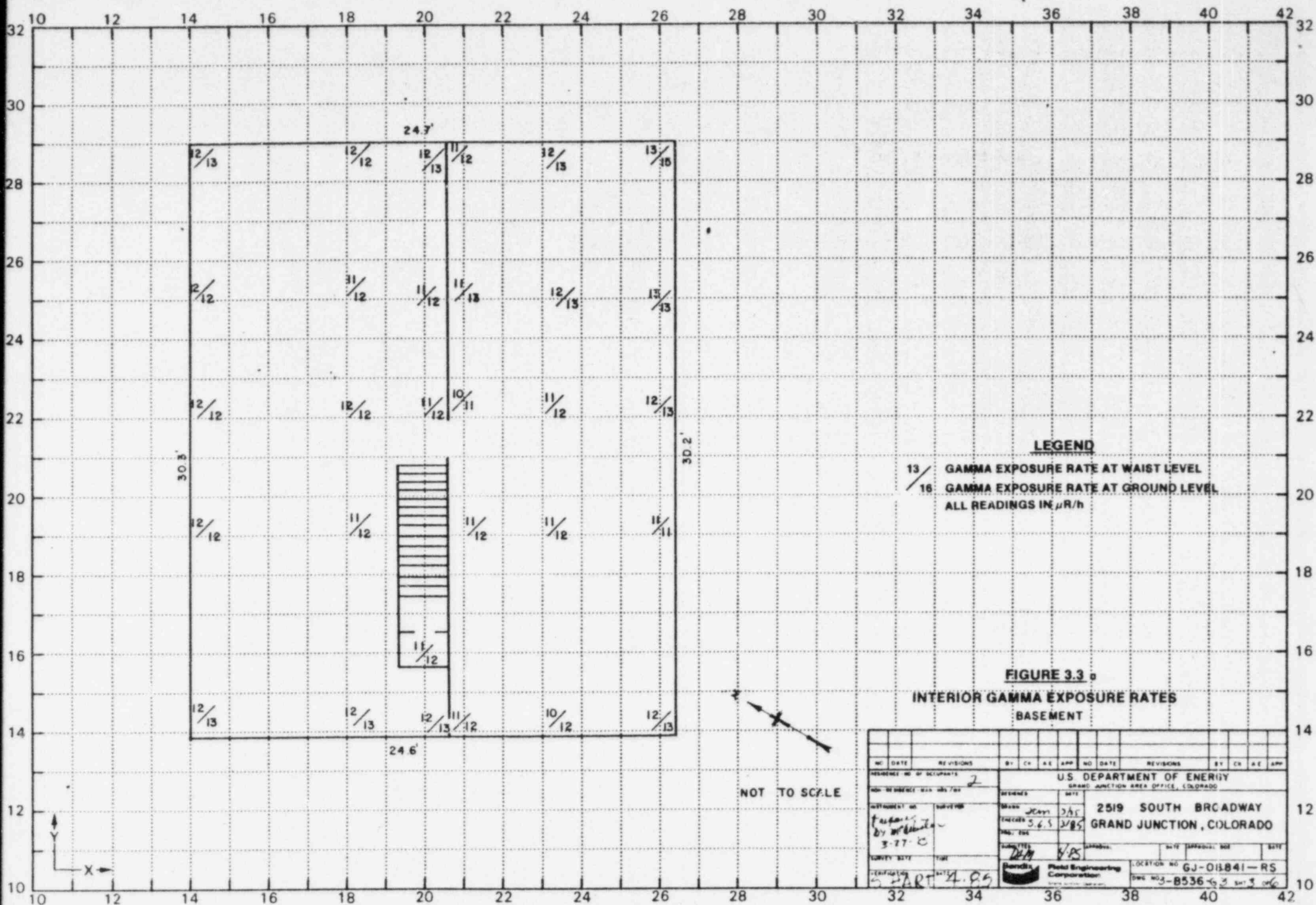
**FIGURE 3.1**

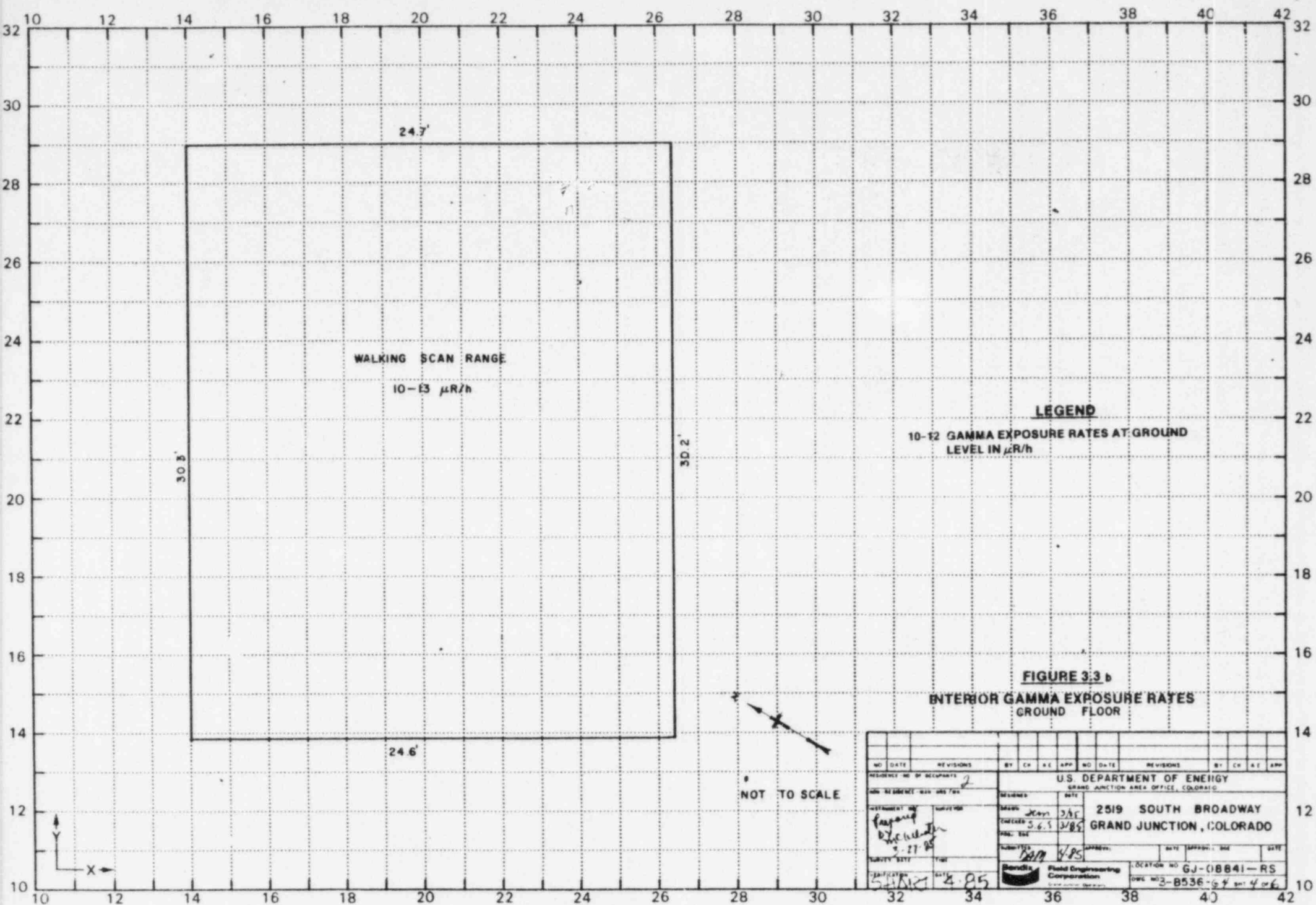
**EXTERIOR GRID-POINT EXPOSURE RATES**

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	CHK	APP	NO. DATE	REVISIONS		BY	CHK	APP
PREPARED BY: <i>[Signature]</i> INSTRUMENT NO.: <i>[Signature]</i> SURVEY DATE: <i>5/27/85</i> LOCATION: <i>2519 SOUTH BROADWAY</i> CITY: <i>GRAND JUNCTION, COLORADO</i> STATE: <i>CO</i> COUNTY: <i>MOHAVE</i> ZONE: <i>17N</i> ELEVATION: <i>5275</i> SCALE: <i>1"=20'</i> DRAWN BY: <i>[Signature]</i> CHECKED BY: <i>[Signature]</i> APPROVED BY: <i>[Signature]</i> DATE: <i>5/27/85</i> LOCATION NO.: <i>GJ-08841-RS</i> DWS NO.: <i>B536-E1</i>												

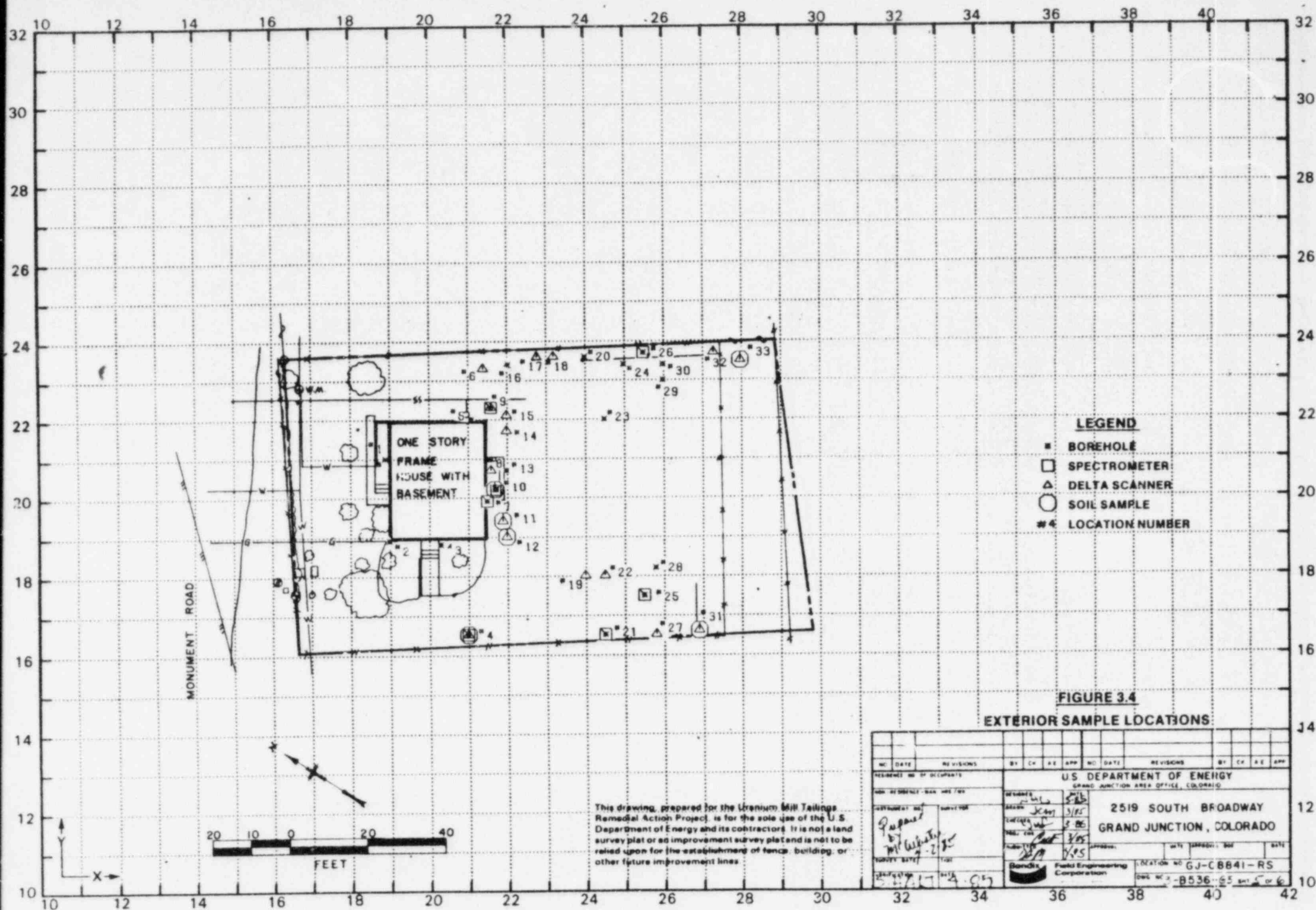


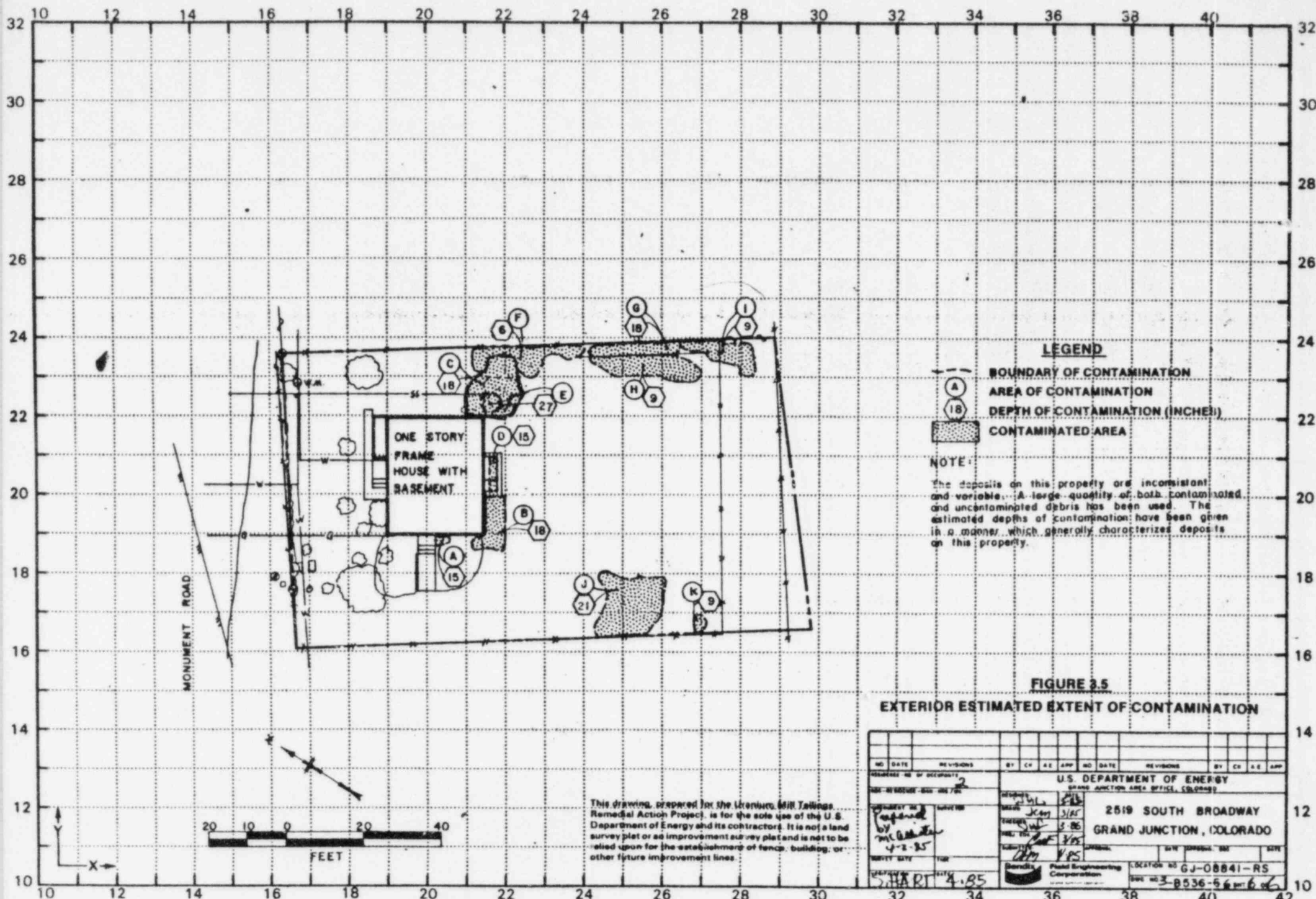




NO.	DATE	REVISIONS	BY	CH	A.E.	APP.	NO.	DATE	REVISIONS	BY	CH	A.E.	APP.
RESIDENCY NO. OF OCCUPANTS <b>2</b> U.S. DEPARTMENT OF ENERGY GRAND JUNCTION AREA OFFICE, COLORADO <b>2519 SOUTH BROADWAY</b> <b>GRAND JUNCTION, COLORADO</b>													
INSTRUMENT NO. <i>5401</i> DATE <i>3-27-85</i>	SURVEYOR <i>W. J. Smith</i>	REVIEWED <i>W. J. Smith</i> DATE <i>3/28/85</i>	APPROVED <i>W. J. Smith</i> DATE <i>3/28/85</i>										
SURVEY SITE <i>5401</i>	TIME <i>4:25</i>	FIELD ENGINEERING CORPORATION 3-8536-64	LOCATION NO. <b>GJ-(18841-RS)</b> DWS NO. <b>3-8536-64</b>										







NO.	DATE	REVISIONS	BY	CH	A.E.	APP.	NO.	DATE	REVISIONS	BY	CH	A.E.	APP.
<p>U.S. DEPARTMENT OF ENERGY            GRAND JUNCTION AREA OFFICE, COLORADO</p> <p>2519 SOUTH BROADWAY            GRAND JUNCTION, COLORADO</p> <p>LOCATION NO. GJ-08841-RS            DATE 3-85            BY 3-85</p> <p>PROJECT ENGINEERING            CONSTRUCTION</p> <p>DATE 3-85            BY 3-85</p> <p>CHART 4.85</p>													

3/85

DOE ID NO. GJ-08841-RS

Date 4/2/85

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

Official Survey Report

Property Address 2519 S. Broadway, Grand Junction Co 81503

Property Owner H.J. Hallis

Address of Owner (if different from above) N/A

Report Prepared By W.C. McAllister

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 = 15 uR/h  
HOG = 60 uR/h



## Bendix

### Field Engineering Corporation

Grand Junction Operations

P.O. Box 1569  
Grand Junction, CO 81502  
Tel. 303 242-8621

- Sales Dept.  
- Field Corporation

April 1, 1985

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

ATTN: Jon Luellen

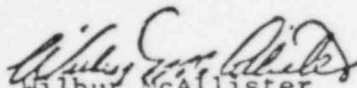
SUBJECT: GJ-08841-RS

The following is in response to your questions and comments during the Technical Review concerning Department of Energy (DOE) Identification (ID) number GJ-08841-RS (2519 South Broadway).

1. Sample location number 228236 (17) was not plotted on the sample location map due to a computer input error, a new map is enclosed.
2. The Depth of Contamination map was changed to 19-inches for the average of boreholes 5, 9, and 16.
3. The secondary radiation that shows up between 42 and 87-inches in borehole 255237 (26) was determined to be from the adjacent property, 2521 South Broadway (GJ-08842-RS).
4. Location 269166 (31) was included as an area for removal. A new Estimated Extent of Contamination map is enclosed.

Thank you for your time and cooperation. If you should have additional questions or comments you may reach me at 242-8621, extension 560.

Sincerely,

  
Wilbur McAllister  
Radiologic Survey Team

WM:pr

Enclosure



# COLORADO DEPARTMENT OF HEALTH

Richard D. Lamm  
Governor

Thomas M. Vernon, M.D.  
Executive Director

April 2, 1985

Wilbur McAllister  
Radiological Survey Team  
Bendix Field Engineering Corp.  
P. O. Box 1569  
Grand Junction CO 81502

Re: GJ-08841-RS

Dear Wilbur:

Thank you for your letter of April 1, 1985 regarding the technical review data for this location.

Your comment #3 stating that the possible "secondary radiation" exhibited between approximately 42" and 87" depth in borehole #26 (255237) was caused by a contaminated deposit on the adjacent property may in fact be correct. It is still recommended, however, that the location and possible contaminated involvement of the septic tank on this property (which may or may not be providing a shine contribution for this borehole) be adequately documented.

If you have any additional questions or if I can be of further assistance, please let me know.

Sincerely,

Jon R. Luellen  
Health Physicist

JRL:zp

cc: UMTRA Location File

**Bendix**

**Field Engineering  
Corporation**

April 5, 1985

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

ATTN: Jon Luellen

SUBJECT: GJ-08841-RS

Dear Jon:

The following is in response to your letter dated 2 April 1985, concerning Department of Energy (DOE) Identification (ID) number GJ-08841-RS.

Borehole number 26 (255227) in question is close to the clean out part of the septic tank on the adjacent property, the probable area of contamination. This property, (DOE) (ID) number GJ-00842-RS, (2521 South Broadway) has been received by this department for assessment. This area will be investigated further during the assessment.

Thank you for your time and cooperation. If you should have additional questions or comments you may reach me at 242-8621, extension 560.

Sincerely,

  
Wilbur McAllister  
Radiologic Survey Team

WM:dk



# COLORADO DEPARTMENT OF HEALTH

Richard D. Lamm  
Governor

Thomas M. Vernon, M.D.  
Executive Director

April 15, 1985

Wilbur McAllister  
Radiological Survey Team  
Bendix Field Engineering Corp.  
P. O. Box 1569  
Grand Junction, CO 81502

RE: GJ-08841-RS

Dear Wilbur:

In response to your letter of April 5, 1985, I wish to clarify my original comment in the April 2 letter. I was suggesting that the possible septic tank on this property (#08841) be located and adequately investigated for possible contaminated involvement. If you feel that you have already performed this documentation, then the assessment data package should reflect this fact.

If I can be of further assistance, please let me know.

Sincerely,

Jon Luellen  
Health Physicist

JRL:sk

cc: UMTRA Location File



**Field Engineering  
Corporation**

Grand Junction Operations

P.O. Box 1000  
Grand Junction, CO 81501  
Tel (303) 242-8621

A Subsidiary of  
The Bendix Corporation

April 16, 1985

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

ATTN: Jon Luellen

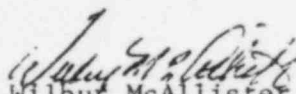
SUBJECT: GJ-08841-RS

Dear Jon:

In reference to your letter dated 15 April 1985, borehole number 9 (location number 216223) was drilled to investigate, where the owner indicated the location of the septic was. I feel this is adequate and the assessment data package has been changed to reflect this.

Thank you for your time and cooperation, if you should have additional questions or comments you may reach me at 242-8621, extension 560.

Sincerely,

  
Wilbur McAllister  
RSD Survey Team

WM:pr

INTERNAL  
MEMORANDUM

Bendix Field Engineering Corporation  
Grand Junction Projects Office

Date: March 11, 1985

To: File

From: W. C. McAllister

Subject: Team Leader Notes - GJ-08841-RS

---

Owner: H. J. and A. B. Wallis

Address: 2519 South Broadway

Telephone: 242-6866

Occupancy: 2

Team Members:	W. McAllister	D. Fossey
	D. Herrera	S. Southern
	P. Tuhey	V. Young
	H. Mattison	M. Duran

The crew arrived at the site on 11 March 1985, at 0830 a.m. The weather was clear with temperatures in the 50's.

Colorado Department of Health (CDH) and Oak Ridge National Laboratory (ORNL) background information indicate elevated gamma levels along the northeast fence line and a small spot southeast of the primary structure.

The contamination along the northeast fence line appears to be the result of spillover from the adjacent property at 2521 S. Broadway (GJ-08842-RS).

A gamma scan in the basement showed no elevated readings. A walking scan was performed on the ground level of the primary structure, no elevated readings were found.

The basement door opened into a cinder block entry that is approximately 4 feet by 10 feet and 48 inches deep. This entry consists of new concrete with wooden steps leading the way to the ground level. Elevated readings were found on the new concrete and a core sample was obtained. Elevated readings also indicate contamination exist under the wooden steps.



11 March 1985  
GJ-08841-RS  
W. C. McAllister

The borehole next to the fence, where the HOG was found, was rocky and could be a leach field.

The driveway and parking area apparently had been filled with rock and gravel at one time which made hard drilling.

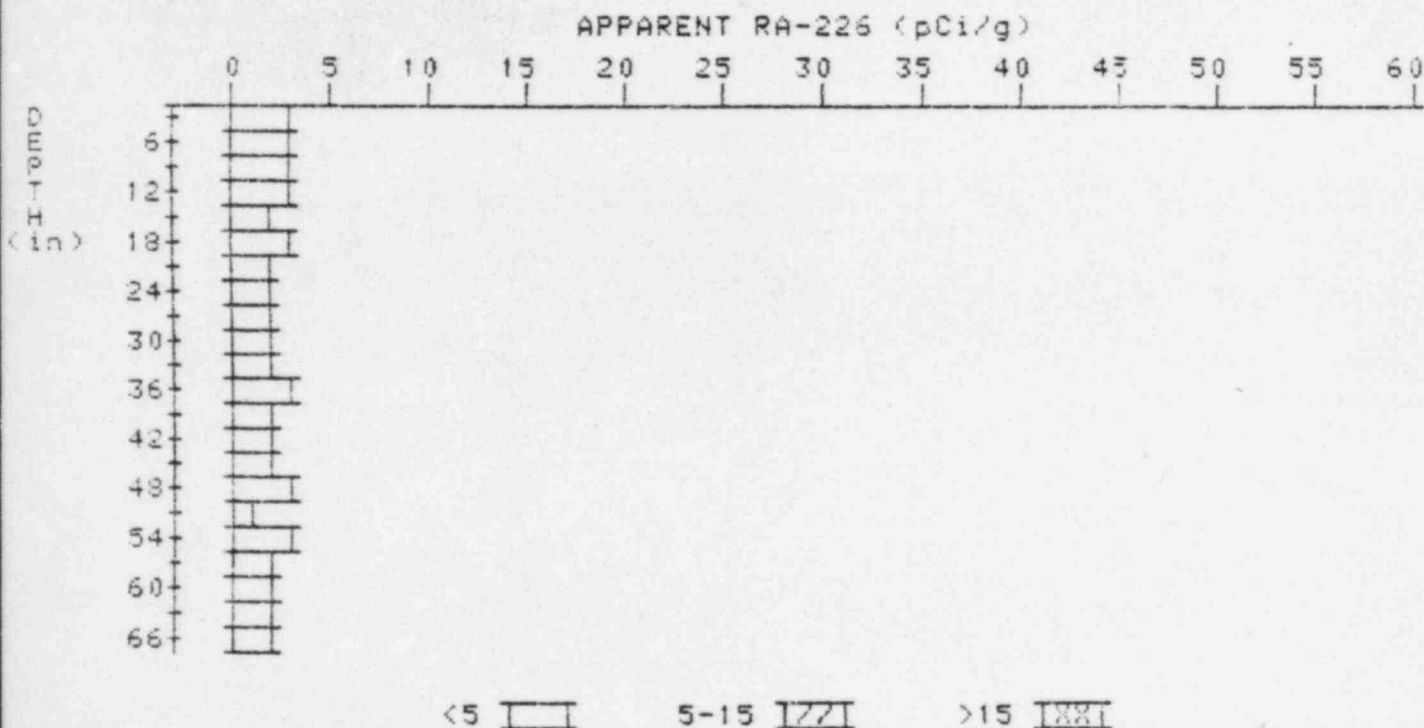
The background borehole was drilled off the driveway next to the property line. This area was rocky and hard drilling.

The owner indicated the old septic was located approximately 6-feet from the east corner of the house. A borehole was located in this area.

# APPARENT RADIUM-226 CONCENTRATION 1

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-08341-R3  
HOLE NUMBER: 1  
LOCATION: 139210



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.5	2.5
6	2.5	2.5
9	2.5	2.5
12	2.5	2.7
15	2.4	2.2
18	2.4	2.6
21	2.3	2.1
24	2.3	2.3
27	2.3	2.5
30	2.2	2.0
33	2.2	2.0
36	2.3	2.7
39	2.2	2.0
42	2.2	2.2
45	2.2	2.0
48	2.3	2.8

51	2.1	1.4
54	2.3	2.7
57	2.3	2.5
60	2.2	1.8
63	2.3	2.5
66	2.3	2.3

# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

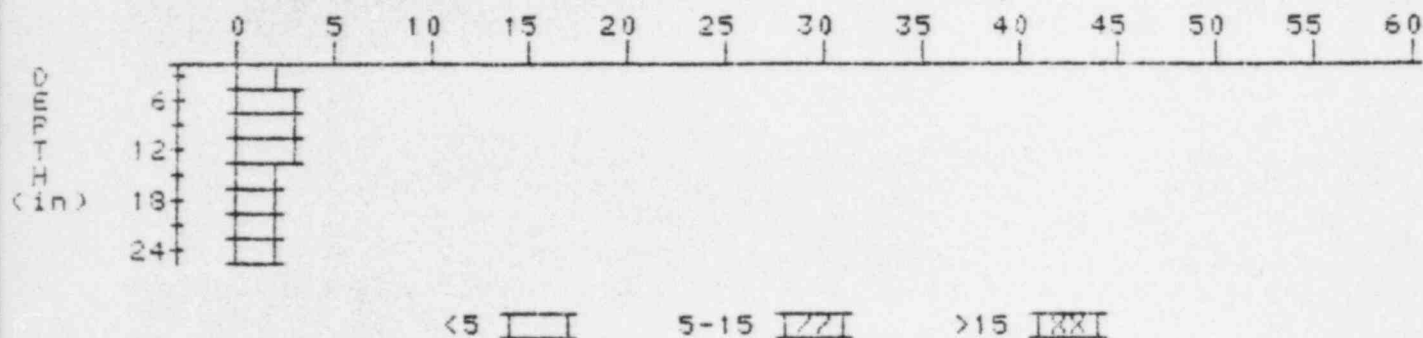
2

PROPERTY NUMBER: GJ-08841-R3

HOLE NUMBER: 2

LOCATION: 190189

APPARENT RA-226 (pCi/g)



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.4	2.4
6	2.5	2.7
9	2.5	2.5
12	2.5	2.9
15	2.3	1.9
18	2.3	2.3
21	2.3	2.3
24	2.3	2.3

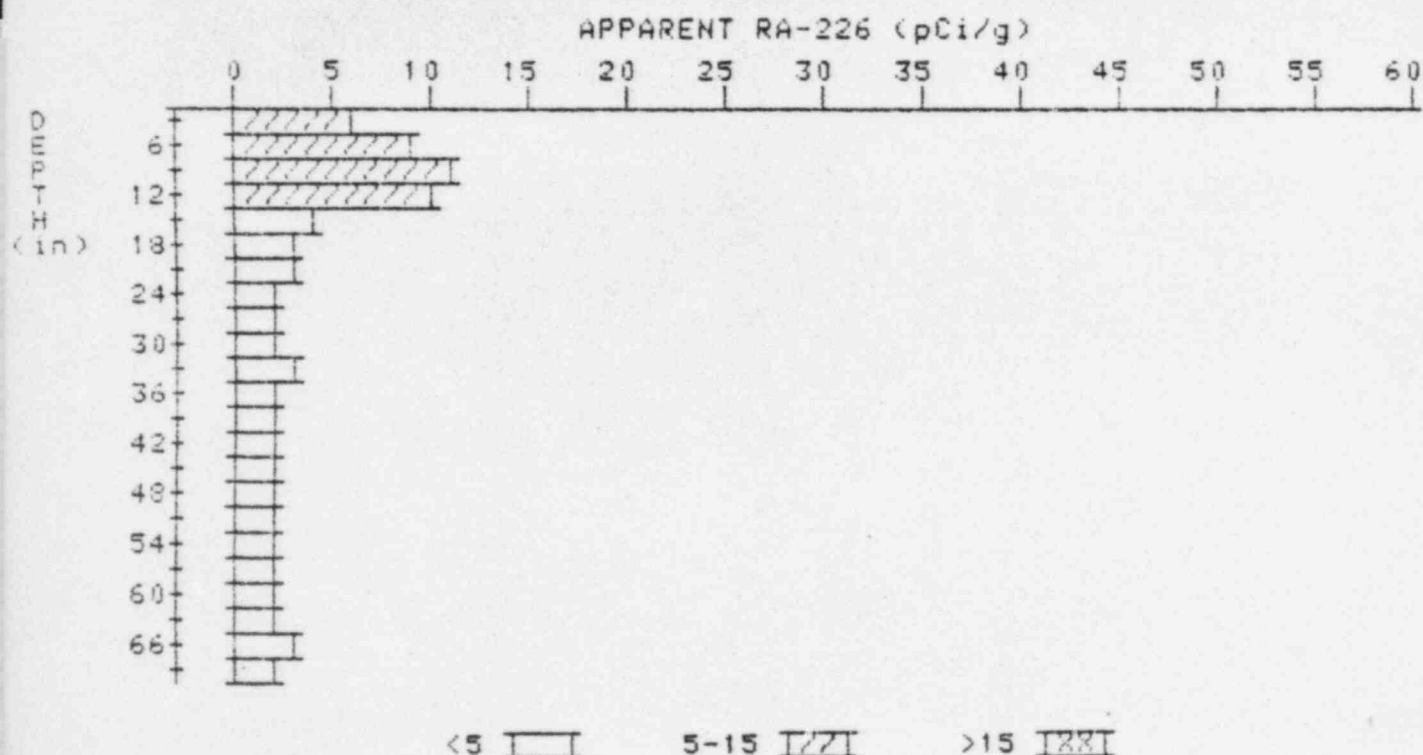
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

3

PROPERTY NUMBER: GJ-08841-RS

HOLE NUMBER: 3

LOCATION: 203188



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.9	5.9
6	7.6	9.0
9	8.5	11.3
12	7.8	10.5
15	5.6	4.2
18	4.2	3.3
21	3.3	2.6
24	2.8	2.4
27	2.5	2.3
30	2.3	1.8
33	2.4	2.8
36	2.3	2.3
39	2.2	2.0
42	2.2	2.4
45	2.1	1.9

48	2.1	2.1
51	2.1	2.3
54	2.0	1.6
57	2.1	2.3
60	2.1	2.1
63	2.1	1.9
66	2.2	2.6
69	2.1	2.1



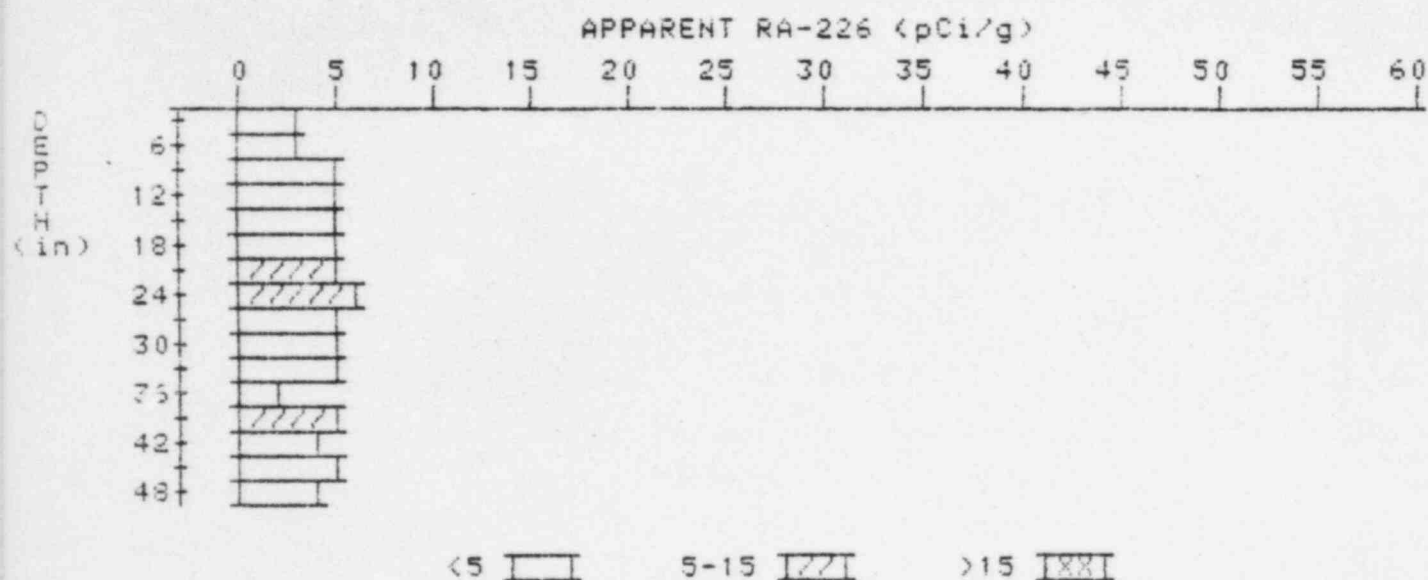
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

4

PROPERTY NUMBER: GJ-08841-R3

HOLE NUMBER: 4

LOCATION: 210165



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.4	3.4
6	3.6	2.9
9	4.2	4.7
12	4.5	4.7
15	4.7	4.7
18	4.9	4.9
21	5.1	5.5
24	5.1	5.6
27	4.8	4.6
30	4.6	4.6
33	4.4	4.9
36	3.9	2.3
39	4.3	5.2
42	4.2	4.0
45	4.2	4.7
48	3.9	3.9

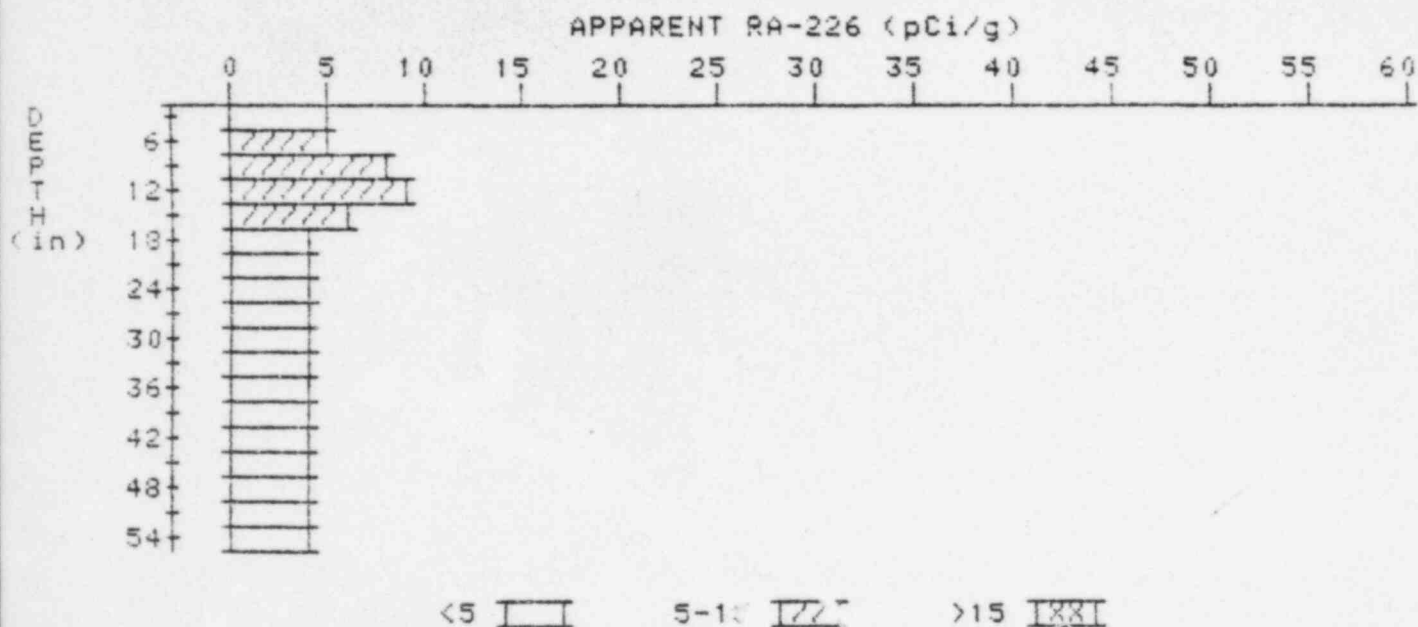
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

5

PROPERTY NUMBER: GJ-08841-RS

HOLE NUMBER: 5

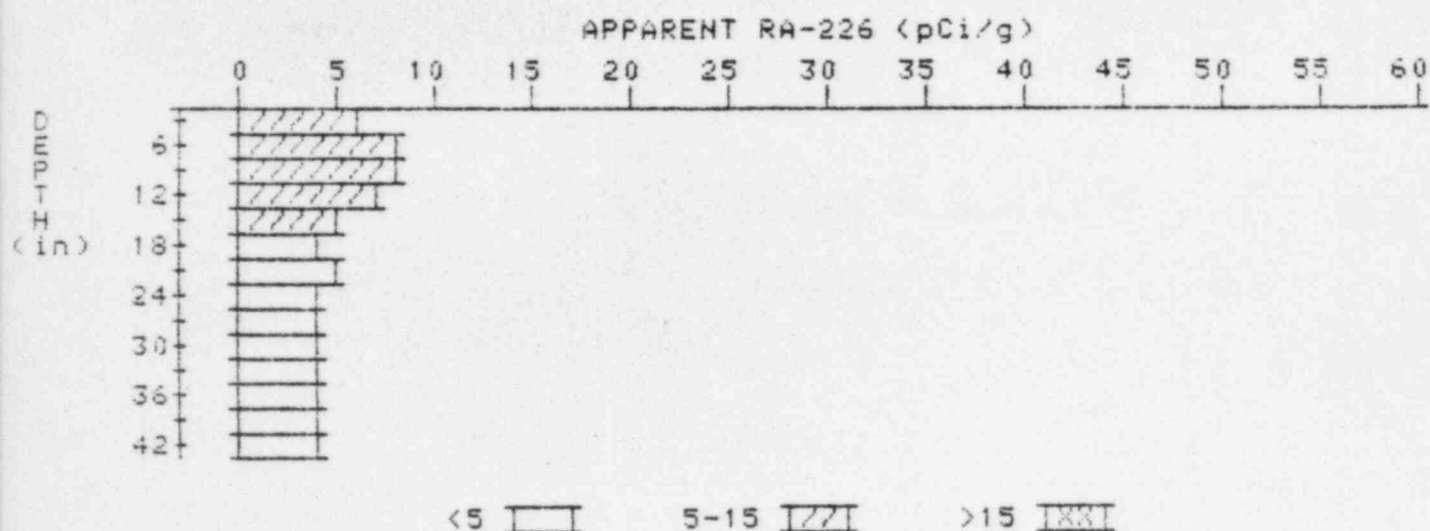
LOCATION: 211220



Depth (in)	Apparent Radium-226 (pCi/g)	Apparent Radium-226 (pCi/g)
	Undeconvolved	Deconvolved
3	4.5	4.5
6	5.5	5.3
9	6.6	8.0
12	6.9	9.0
15	6.0	6.4
18	4.9	4.0
21	4.3	3.6
24	4.1	3.9
27	4.0	3.8
30	4.0	4.0
33	4.0	3.8
36	4.1	4.3
39	4.1	4.3
42	4.0	3.6
45	4.1	4.3
48	4.1	4.1
51	4.1	4.3
54	4.0	4.0

# APPARENT RADIUM-226 CONCENTRATION 7 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-08341-R3  
HOLE NUMBER: 7  
LOCATION: 215199



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.8	5.8
6	6.7	7.8
9	7.0	8.4
12	6.5	7.2
15	5.6	5.2
18	4.9	4.2
21	4.6	4.6
24	4.3	3.9
27	4.2	4.0
30	4.2	4.4
33	4.1	4.1
36	4.0	3.8
39	4.0	3.8
42	4.1	4.1

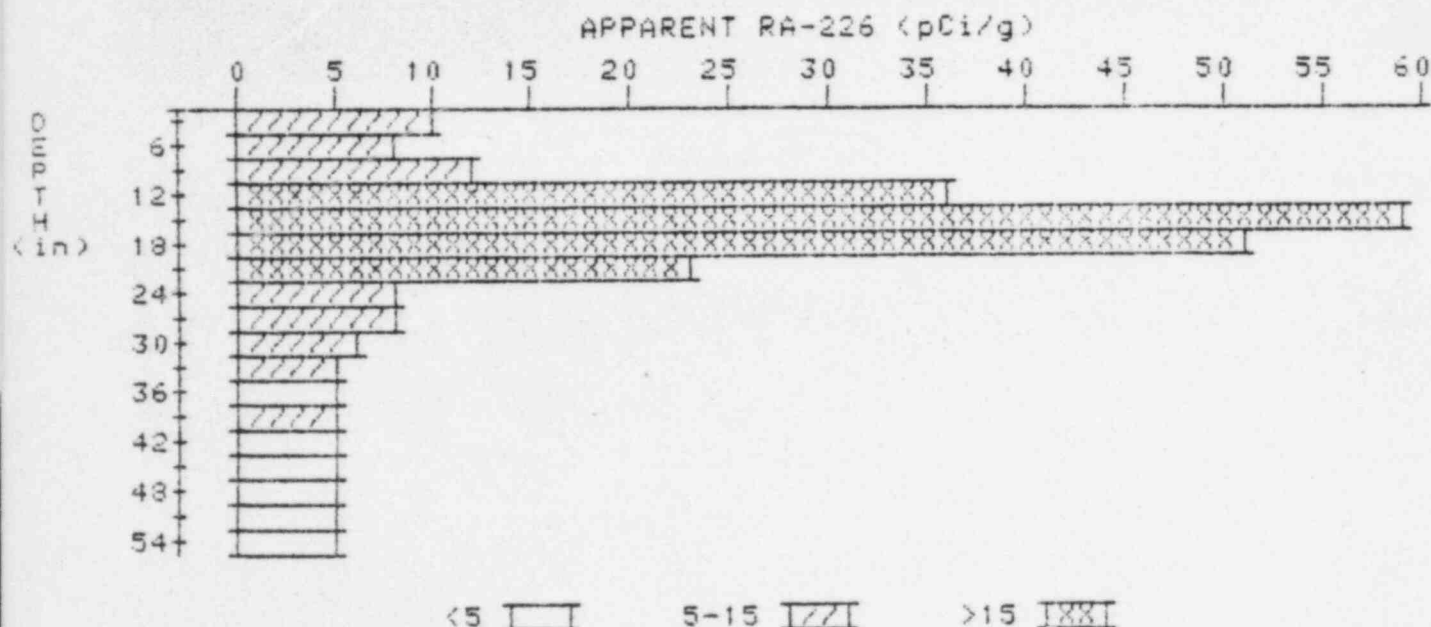
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

9

PROPERTY NUMBER: GJ-08841-RS

HOLE NUMBER: 9

LOCATION: 216223



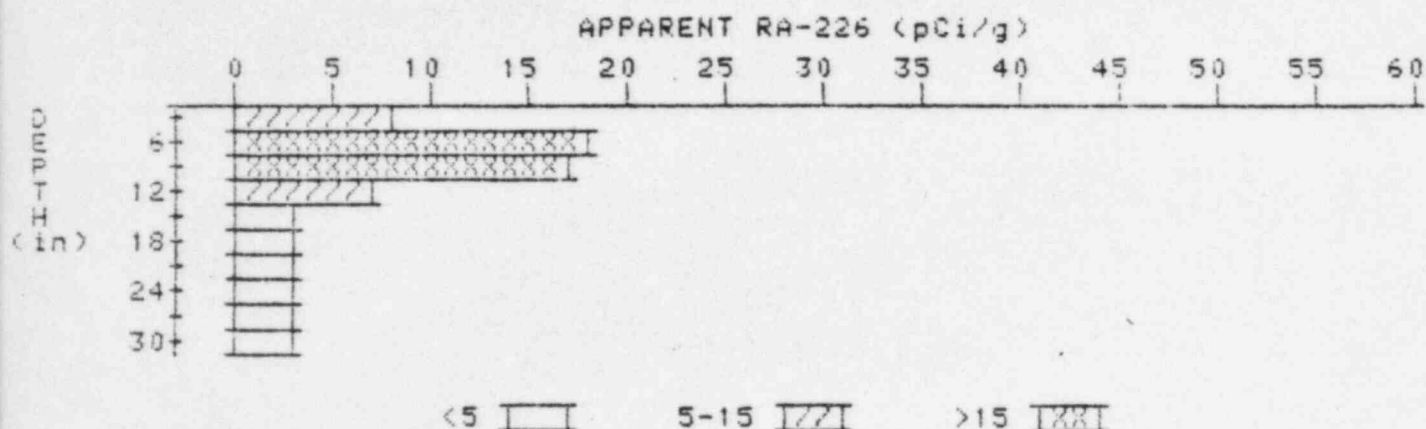
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	10.4	10.4
6	13.6	7.7
9	20.1	12.3
12	31.0	35.8
15	39.2	58.8
18	36.4	50.8
21	25.5	22.8
24	16.1	7.9
27	11.3	8.1
30	8.3	5.8
33	6.7	5.5
36	5.8	4.9
39	5.4	5.4
42	5.0	4.6
45	4.8	4.6
48	4.7	4.5
51	4.7	4.9
54	4.6	4.6

# APPARENT RADIUM-226 CONCENTRATION 10 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-08841-RS

HOLE NUMBER: 10

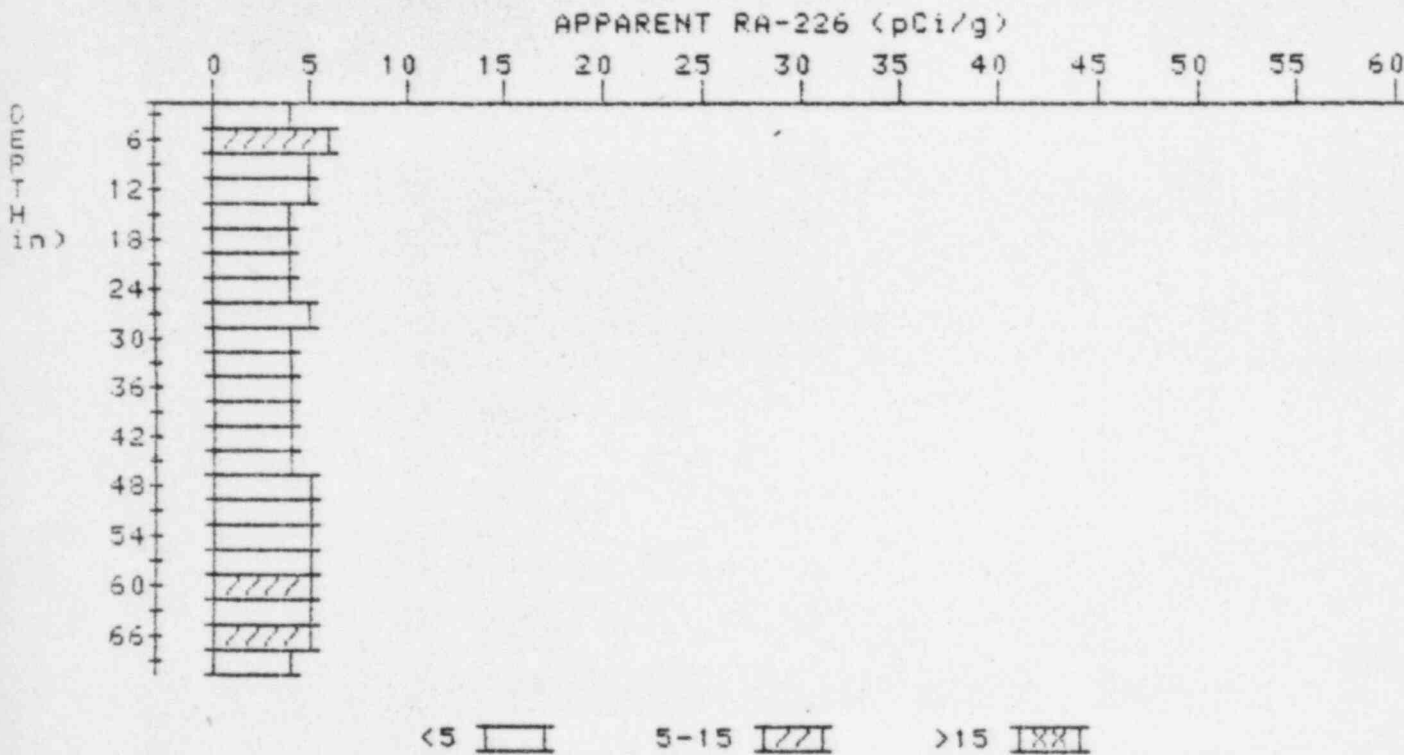
LOCATION: 217202



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	8.4	8.4
6	11.7	18.1
9	11.4	16.6
12	8.2	7.1
15	5.6	3.3
18	4.3	3.2
21	3.6	3.2
24	3.1	2.6
27	2.9	2.9
30	2.7	2.7

APPARENT RADIUM-226 CONCENTRATION 13  
DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-08841-R3  
HOLE NUMBER: 13  
✓ LOCATION: 220207



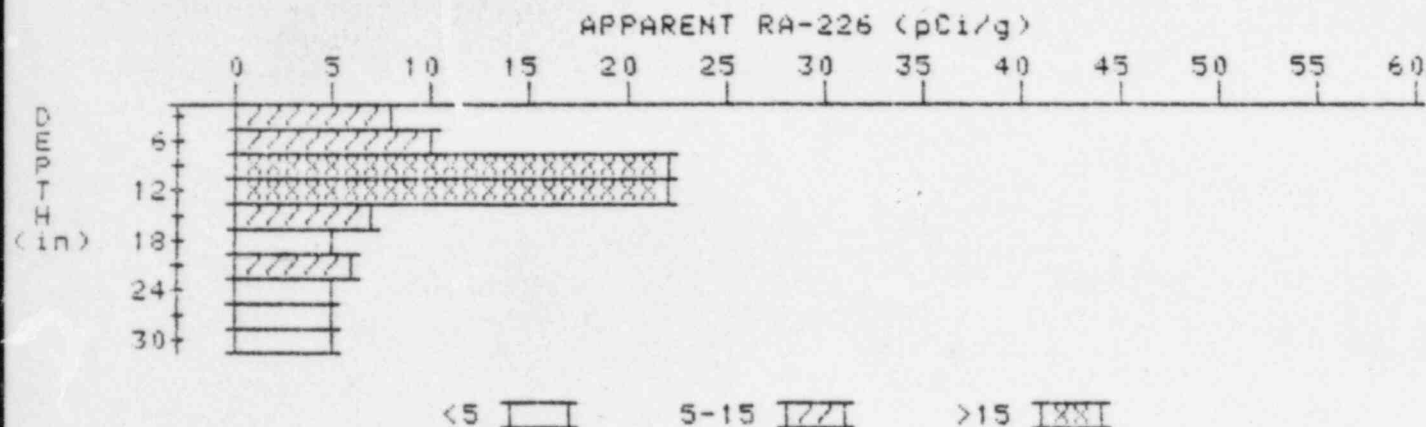
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.3	4.3
6	4.8	6.0
9	4.6	4.6
12	4.4	4.6
15	4.1	3.7
18	4.0	3.8
21	4.0	3.8
24	4.1	4.1
27	4.2	4.6
30	4.1	3.9
33	4.1	3.9
36	4.2	4.2
39	4.3	4.5
42	4.3	4.1
45	4.4	4.4



48	4.5	4.5
51	4.6	4.6
54	4.7	4.7
57	4.8	4.8
60	4.9	5.3
63	4.8	5.0
66	4.6	5.3
69	4.0	4.0

# APPARENT RADIUM-226 CONCENTRATION 16 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-08841-KS  
HOLE NUMBER: 16  
LOCATION: 220234



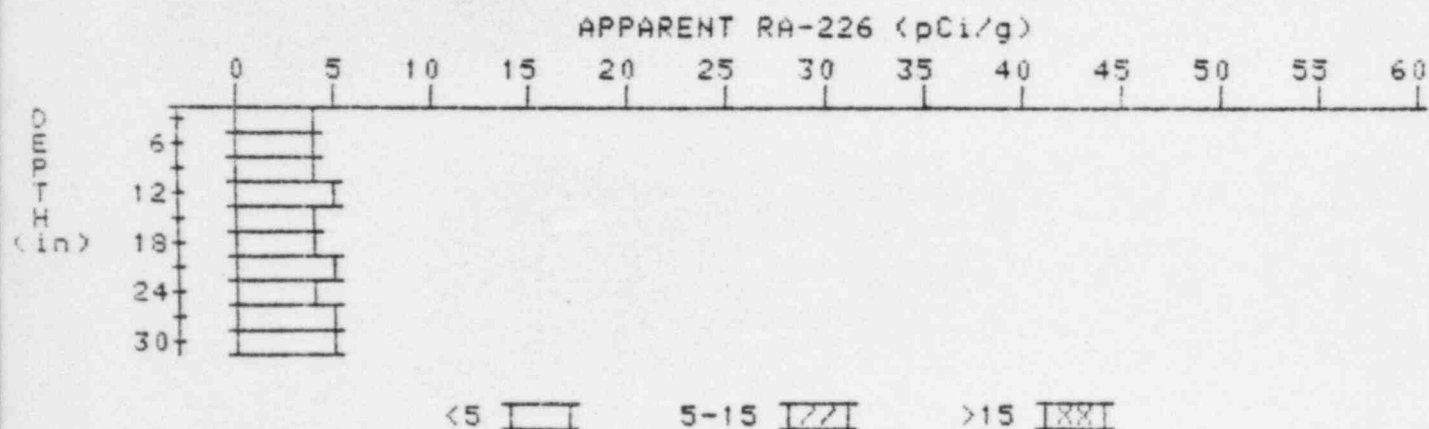
Depth (in)	Apparent Radium-226 (pCi/g)	Apparent Radium-226 (pCi/g)
	Undeconvolved	Deconvolved
3	7.8	7.8
6	11.2	10.5
9	15.0	22.5
12	14.6	21.7
15	10.2	7.2
18	7.5	4.8
21	6.3	5.6
24	5.5	4.8
27	5.1	4.9
30	4.8	4.8

# APPARENT RADIUM-226 CONCENTRATION 20 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-08841-RS

HOLE NUMBER: 20

LOCATION: 240236

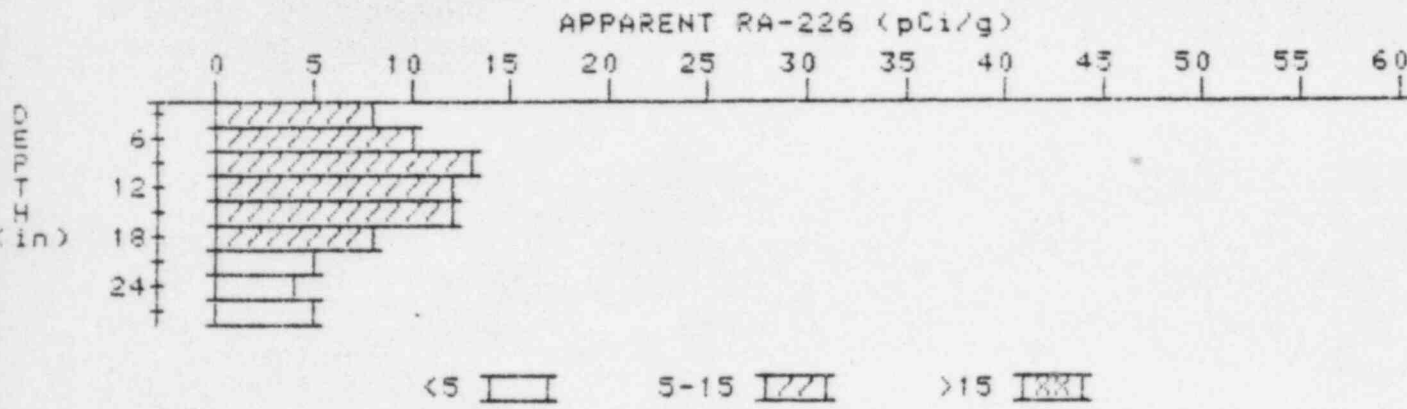


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.1	4.1
6	4.1	4.1
9	4.1	3.9
12	4.2	4.6
15	4.1	3.7
18	4.2	4.2
21	4.3	4.7
24	4.2	3.7
27	4.4	4.6
30	4.5	4.5

# APPARENT RADIUM-226 CONCENTRATION 21

## DECONVOLUTION GRAPH

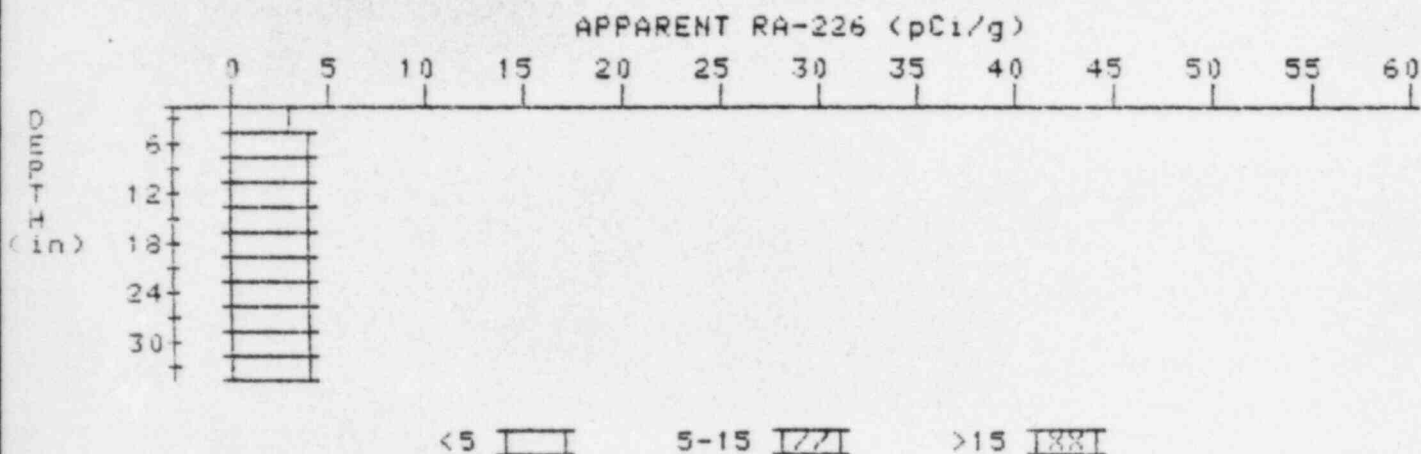
PROPERTY NUMBER: GJ-08841-RS  
HOLE NUMBER: 21  
LOCATION: 245165



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	7.7	7.7
6	9.4	10.3
9	10.6	12.7
12	10.6	12.0
15	9.8	11.8
18	7.9	7.5
21	6.2	5.0
24	5.2	4.5
27	4.6	4.6

# APPARENT RADIUM-226 CONCENTRATION 23 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-08841-RS  
HOLE NUMBER: 23  
LOCATION: 245220



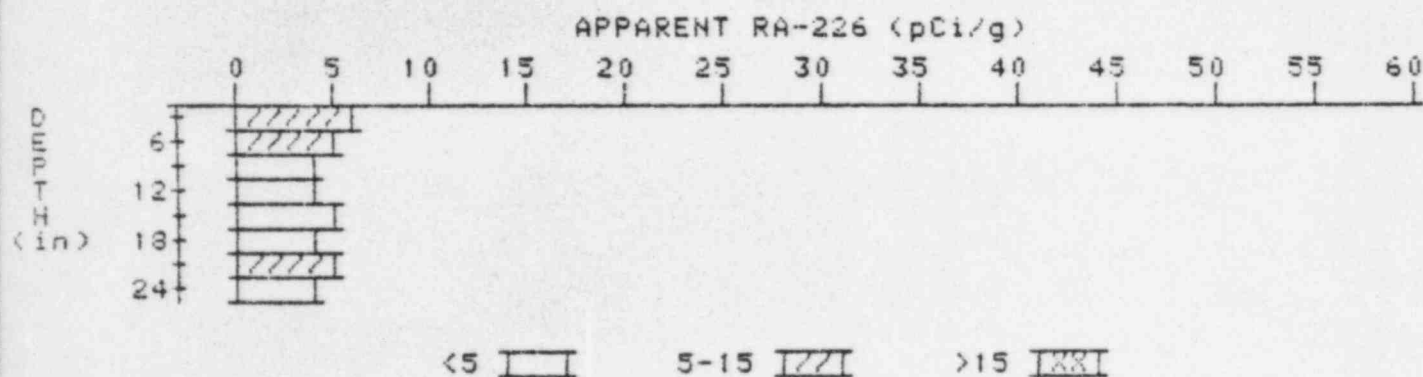
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.3	3.3
6	3.8	4.3
9	4.0	4.2
12	4.1	4.3
15	4.1	4.1
18	4.1	4.3
21	4.0	3.6
24	4.1	4.3
27	4.1	4.1
30	4.1	4.1
33	4.1	4.1

# APPARENT RADIUM-226 CONCENTRATION 24 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-08841-R3

HOLE NUMBER: 24

LOCATION: 250234

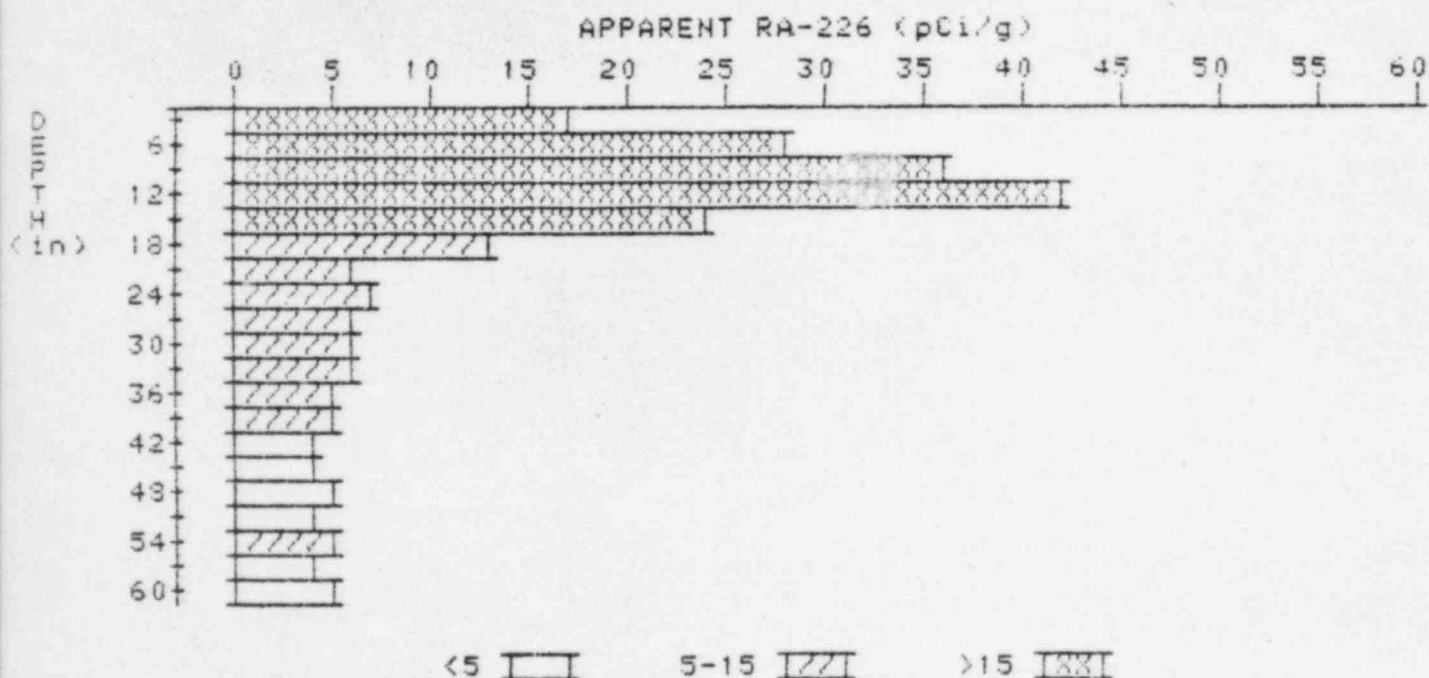


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	6.2	6.2
6	5.4	5.2
9	4.7	4.0
12	4.4	3.9
15	4.4	4.8
18	4.2	3.7
21	4.3	5.2
24	3.9	3.9



# APPARENT RADIUM-226 CONCENTRATION 25 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-08941-RS  
HOLE NUMBER: 25  
LOCATION: 255175



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	16.8	16.8
6	23.8	27.5
9	28.7	36.2
12	29.4	41.7
15	23.2	24.4
18	16.3	13.3
21	11.1	6.3
24	8.6	7.0
27	7.0	5.6
30	6.2	5.7
33	5.7	5.5
36	5.3	5.1
39	5.0	5.0
42	4.7	4.3
45	4.6	4.4
48	4.6	4.6
51	4.6	4.4
54	4.7	5.1

57  
60

4.6  
4.8

4.1  
4.8

# APPARENT RADIUM-226 CONCENTRATION 26

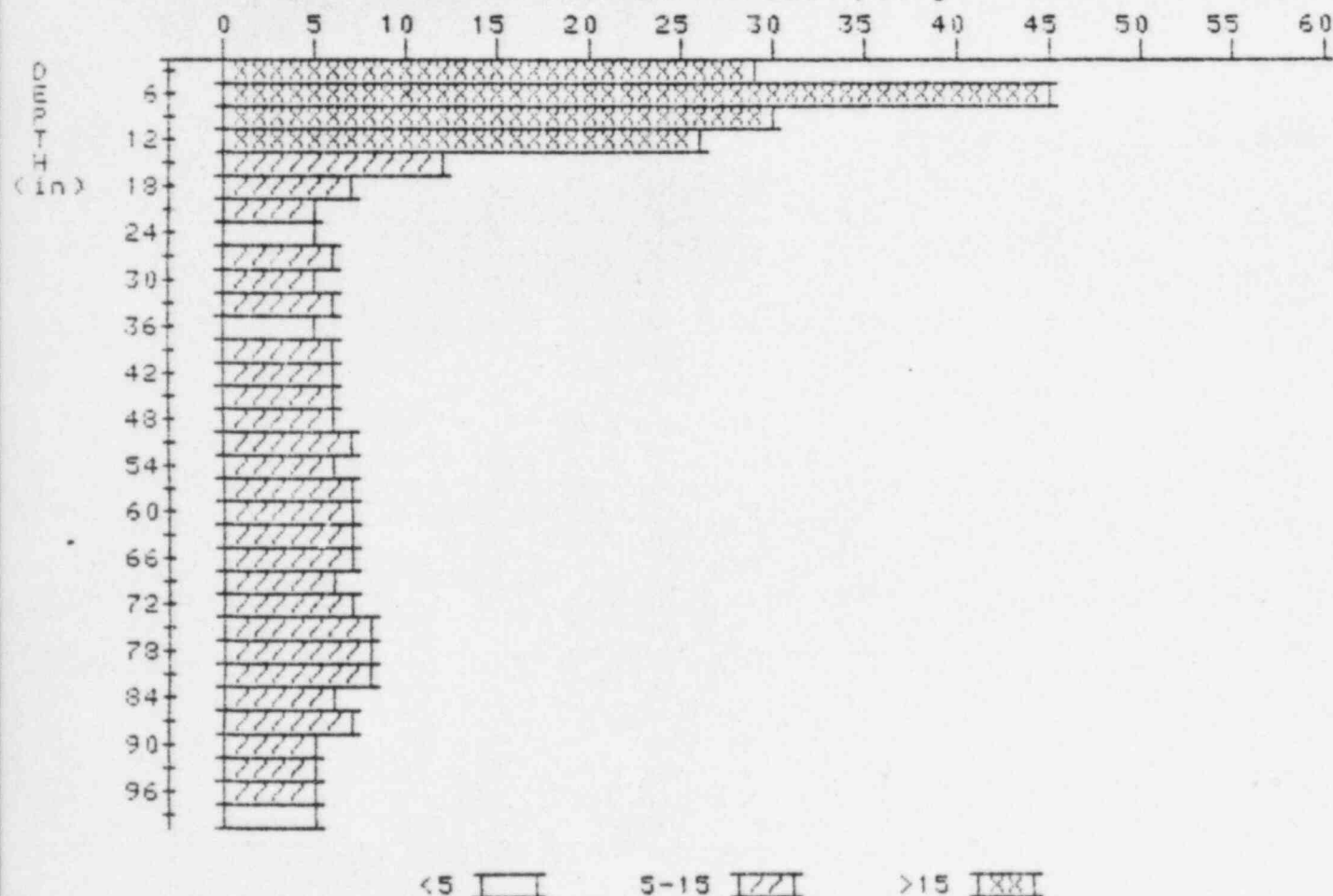
## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-08841-RS

HOLE NUMBER: 26

LOCATION: 255237

APPARENT RA-226 (pCi/g)



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	23.5	23.5
6	31.8	45.0
9	27.7	29.7
12	22.5	25.5
15	15.6	12.0
18	10.7	7.0
21	7.9	5.4
24	6.5	4.9

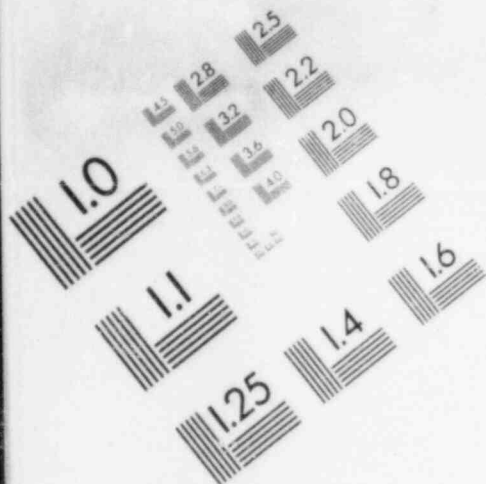
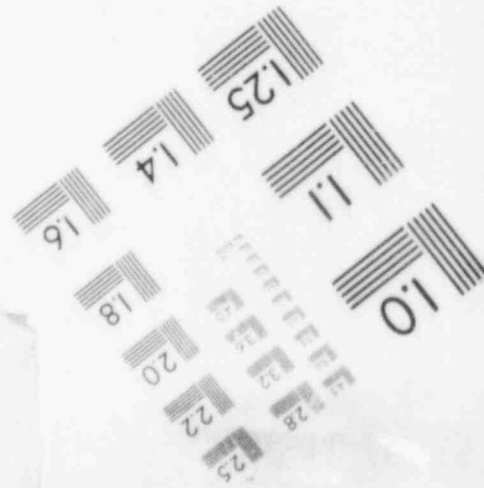
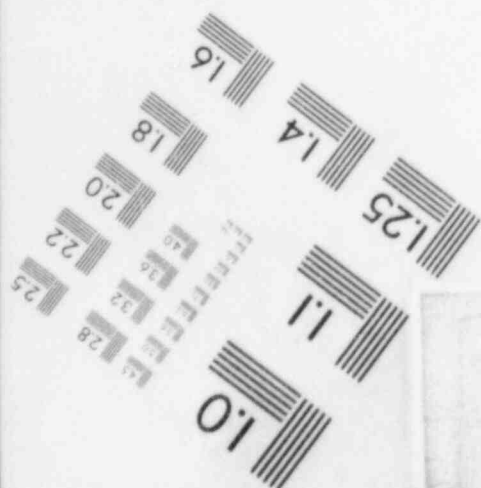
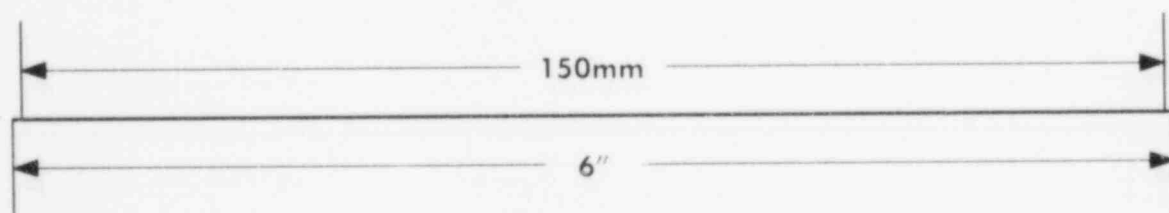
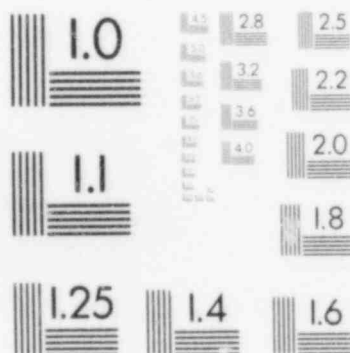
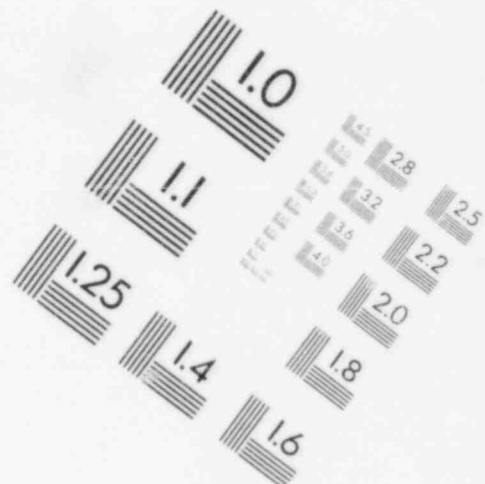


IMAGE EVALUATION  
TEST TARGET (MT-3)



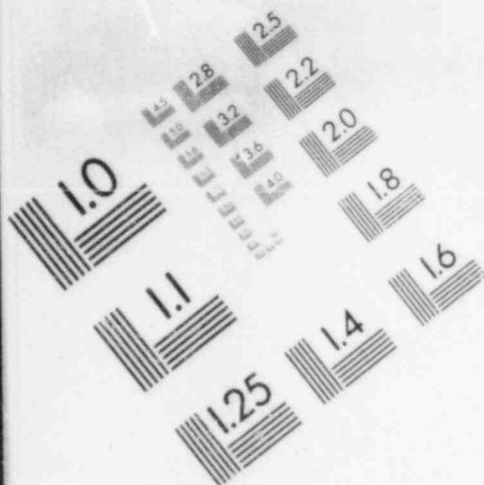
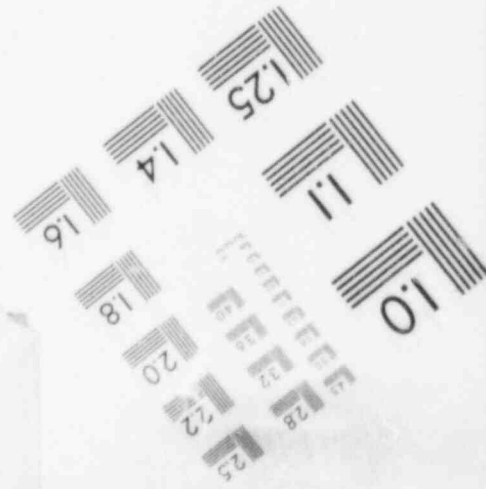
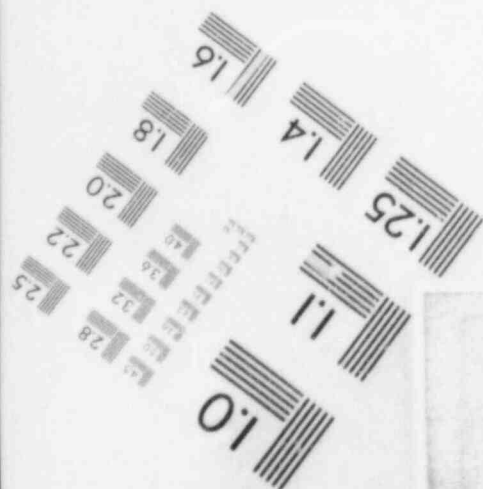
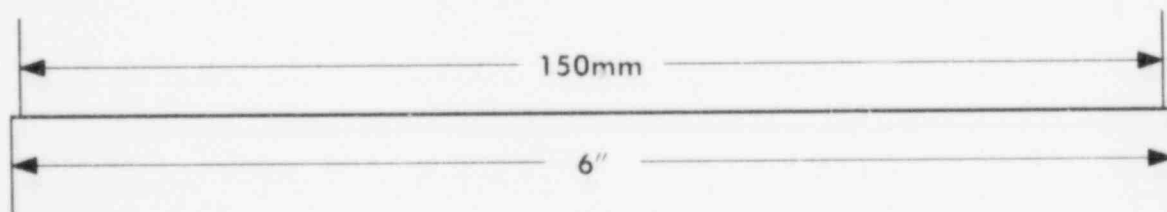
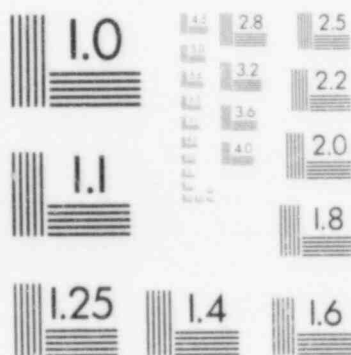
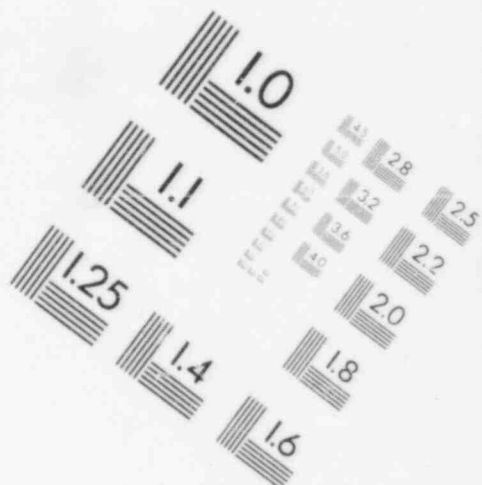


IMAGE EVALUATION  
TEST TARGET (MT-3)

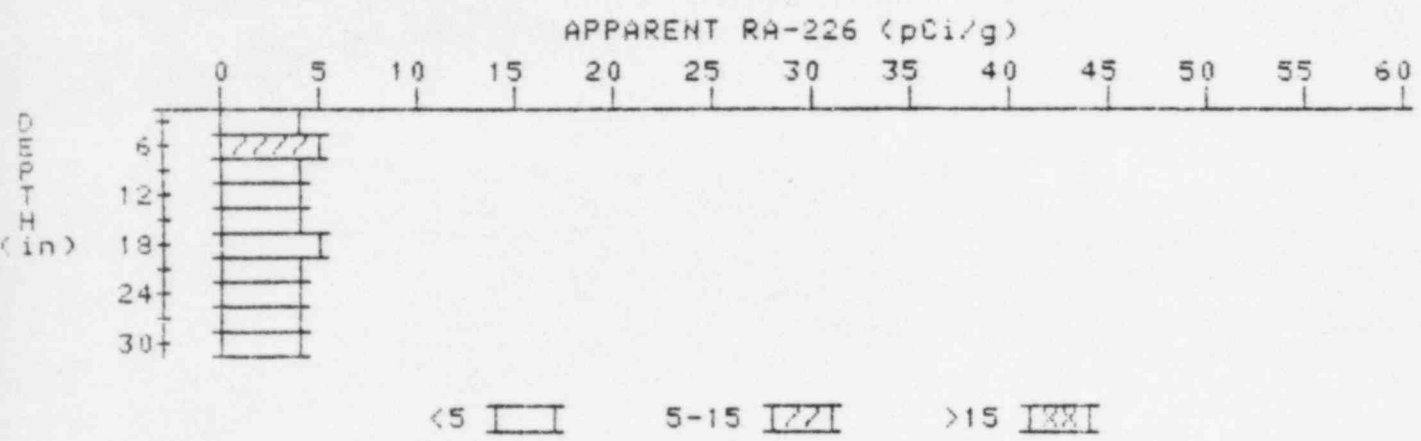


27	6.0	5.6
30	5.7	5.2
33	5.7	6.1
36	5.5	4.8
39	5.7	5.7
42	5.9	5.9
45	6.1	6.1
48	6.3	6.3
51	6.5	6.9
54	6.5	6.1
57	6.7	7.1
60	6.7	6.5
63	6.8	6.8
66	6.9	7.3
69	6.8	6.1
72	7.1	6.9
75	7.5	8.0
78	7.6	8.3
81	7.3	7.8
84	6.7	6.3
87	6.3	6.7
90	5.7	5.2
93	5.4	5.2
96	5.2	5.4
99	4.9	4.9



# APPARENT RADIUM-226 CONCENTRATION 28 DECONVOLUTION GRAPH

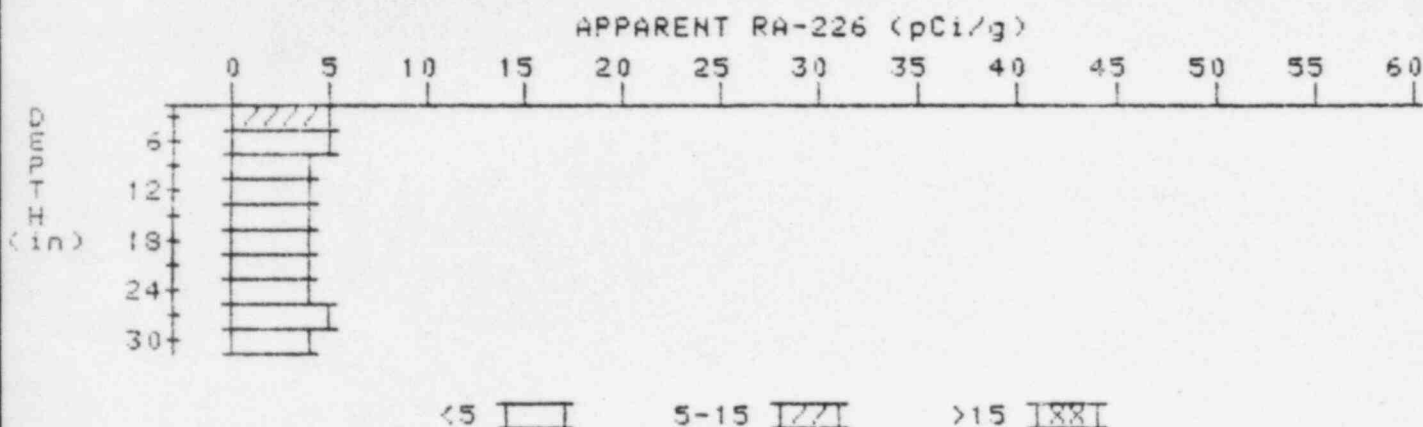
PROPERTY NUMBER: GJ-08841-RS  
 HOLE NUMBER: 28  
 LOCATION: 258182



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.7	3.7
6	4.3	5.4
9	4.3	4.5
12	4.2	3.8
15	4.3	4.3
18	4.4	4.8
21	4.3	4.1
24	4.3	4.3
27	4.3	4.3
30	4.3	4.3

# APPARENT RADIUM-226 CONCENTRATION 29 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-08841-RS  
HOLE NUMBER: 29  
LOCATION: 260230



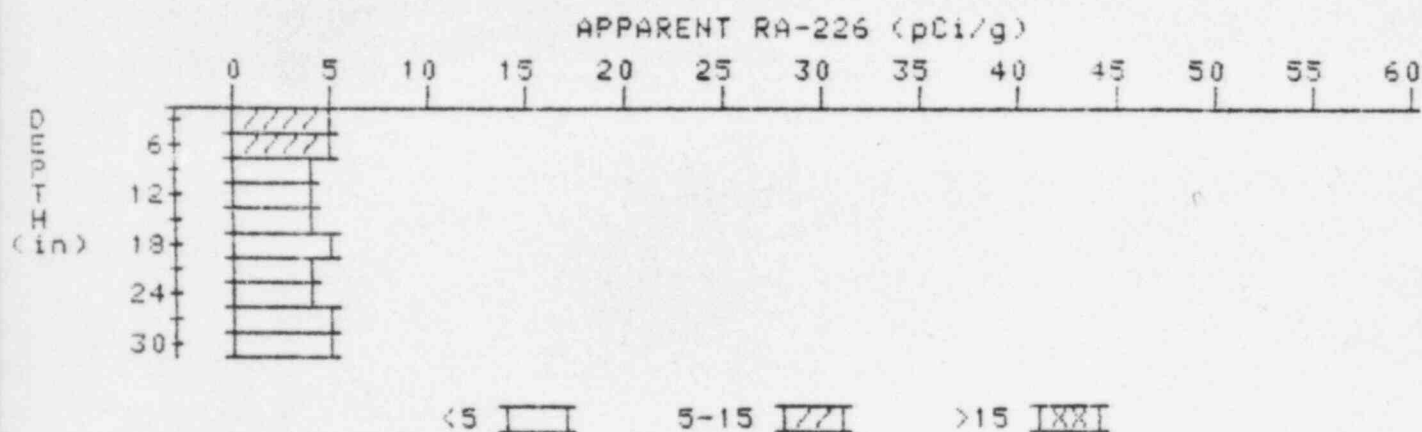
Depth (in)	Apparent Radium-226 (pCi/g)	Apparent Radium-226 (pCi/g)
	Undeconvolved	Deconvolved
3	5.0	5.0
6	4.8	5.0
9	4.5	4.3
12	4.3	4.1
15	4.2	4.2
18	4.1	3.9
21	4.1	3.7
24	4.3	4.5
27	4.4	4.6
30	4.4	4.4

# APPARENT RADIUM-226 CONCENTRATION 30 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-08841-RS

HOLE NUMBER: 30

LOCATION: 260234



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.1	5.1
6	4.9	5.1
9	4.6	4.4
12	4.4	4.2
15	4.3	3.9
18	4.4	4.6
21	4.4	4.4
24	4.4	4.2
27	4.5	4.5
30	4.6	4.6