

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-14635-MR  
ADDRESS: 3164 F ROAD

AUGUST 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

BENDIX FIELD ENGINEERING CORPORATION  
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DATE

*August 20, 1985*

REA14635:REA-AB008

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## 1.0 EXECUTIVE SUMMARY

### 1.1 Introduction

The location, DOE ID No. GJ-14635-MR, is a single-family residence located at 3164 F Road, Grand Junction, Colorado. A second residence, 3166 F Road, located on the same property, has been investigated by the Colorado Department of Health and by Oak Ridge National Laboratories and identified as uncontaminated. Both addresses appear in the headings of Tables 3.1a, 3.1b, and 3.2, as the Bendix survey team investigated both structures. Bendix' findings corroborate those of CDH and ORNL; that is, the residence at 3166 F Road is free of tailings and is therefore excluded from remedial action, while the residence at 3164 shows evidence of tailings contamination.

The purpose of this assessment is to evaluate the extent of uranium millsite contamination at 3164 F Road. 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 partial removal of contaminated material and restoration of the property to its original condition. The identified residual radioactive materials found on this property are concrete and tailings; the estimated volume is: exterior, 1 cu. yd.; interior, 1 cu. yd.

Area B, as discussed in Section 3.5 and shown on Appendix Figure 3.5a, will not be included in this remedial action for the reasons discussed in Section 4.2.

Estimated cost to perform remedial action, including dislocation when applicable, is \$1,533. Remedial action on this property will take approximately 10 days to complete.

## 2.0 PROPERTY DESCRIPTION

### 2.1 General Description

Address: 3164 F Road, Grand Junction, Colorado

Zoning: Residential (R-2)

Lot Size: Approximately 217,800 sf (5 acres)

Legal Description: E 1/2, W 1/2, E 1/2, SW 1/4, SE 1/4, Sec 3, 1S, 1E, Exc. Canal & Exc S 50 ft. for R.O.W., County of Mesa, State of Colorado.

Point of Reference: This property is located approximately 5 miles northeast 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:	F Road
East:	Single-family residence
West:	Single-family residence

### 2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-family residence
Size:	Approximately 1,530 sf
Construction Date:	1959
Construction:	Wood-frame
Foundation:	Concrete stemwall on spread footing
Footing Depth:	Approximately 21" and 84" to bottom of footing from grade
Basement:	Yes - approximately 10' x 11'
Crawl Space:	Yes - partial
Condition:	Good



Other Structures:

Type:	Single-family residence
Size:	Approximately 790 sf
Construction:	Wood-frame
Foundation:	Concrete slab-on-grade
Condition:	Good

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-14635-MR on March 5, 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 elevated gamma readings in the basement and foundation of 3164 F Road. The adjacent property at 3166 F Road was identified as uncontaminated.

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: 11 to 12 uR/h  
Highest Outside Gamma Reading (HOG): 32 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: 11 to 13 uR/h  
Highest Inside Gamma Reading (HIG): 41 uR/h

Interior radium-concentration measurements are presented in Appendix Table 3.2. Interior gamma exposure-rate measurements are summarized in Appendix Tables 3.3a and 3.3b. Appendix Figures 3.3a, 3.3b, and 3.3c 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 3.4a 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 and 3.5b 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) The 5-inch-thick basement concrete floor slab at 3164 F Road is contaminated (approximately 100 sf).
- (AREA B) The concrete footing of the structure at 3164 F Road is contaminated. The footing is 18 inches in height and 3 inches below exterior grade (approximately 137 sf; this area is excluded from remedial action).
- (AREA C) A small area located at the northeast corner of the property is contaminated. The contaminated soil is located in an irrigation flume. The depth of contamination is 9 inches (approximately 32 sf).

#### 4.0 RECOMMENDED REMEDIAL ACTION

##### 4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-14635-MR, includes removal of select areas identified as containing radioactive material (as discussed in Section 3.5 and shown in Appendix Figures 3.5a and 3.5b) and transport of removed material to the disposal site.

Remedial action will not be performed on Area B of this property because the levels of radioactivity in this area does not exceed the EPA Standards (40 CFR 192), as described below:

- (1) Indoor radon-decay products shall not exceed a working level of 0.03, nor, to the extent possible, a working level of 0.02. (At this property the gross working level, as determined by CDH, is 0.007.)
- (2) Indoor gamma radiation shall not exceed 20 microroentgens per hour (uR/h) above background levels. (At this location the interior background readings were found to be between 11 and 13 uR/h, with the highest mean surface gamma reading at 15 uR/h.)

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 \$1,533.

This remedial action will result in select 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 Office, 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 3.3a	Summary of Interior Gamma Exposure Rates
Table 3.3b	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 2.2a	Site Plan
Figure 2.2b	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
Figure 3.3b	Interior Gamma Exposure Rates
Figure 3.3c	Interior Gamma Exposure Rates
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

Official Survey Report

Memo of Understanding

Team Leader Notes

Deconvolution Graphs (Apparent Radium-226 Concentration)



## Radium Concentrations at Exterior Locations

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3164 and 3166 F Road

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
5	14J250	00	DS	<1.0		*	Background
		00-06	SS			2.0	Dry
		03	TC	2.5		*	DC = 0 inches
		06	TC	2.9		*	
		09	TC	3.0		*	
		12	BH	3.1	1.2	*	
		15	TC	3.2		*	
		18	TC	3.2		*	
		21	TC	3.4		*	
		24	TC	3.4		*	
		27	TC	3.4		*	
		30	BH	3.5	<1.0	*	
		33	TC	3.4		*	
6	140280	00	DS	<1.0		*	Background
		00-06	SS			1.6	Dry
		03	TC	2.6		*	DC = 0 inches
		06	TC	2.9		*	
		09	TC	3.1		*	
		12	BH	3.1	1.9	*	
		15	TC	3.2		*	
		18	TC	3.2		*	
		21	TC	3.3		*	
		24	TC	3.4		*	
		27	TC	3.4		*	
		30	BH	3.4	<1.0	*	
		33	TC	3.5		*	
7	180170	03	TC	2.7		*	DC = 0 inches
		06	TC	3.0		*	
		09	TC	3.1		*	
		12	BH	3.2	<1.0	*	
		15	TC	3.2		*	
		18	TC	3.2		*	
		21	TC	3.3		*	
		24	TC	3.3		*	
		27	TC	3.4		*	
		30	BH	3.4	1.1	*	
		33	TC	3.5		*	
		36	TC	3.4		*	



## Radium Concentrations at Exterior Locations

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
8	190210	03	TC	2.5		*	DC = 0 inches
		06	TC	2.7		*	
		09	TC	2.9		*	
		12	TC	2.9		*	
		15	TC	3.0		*	
		18	TC	3.1		*	
		21	TC	3.1		*	
		24	TC	3.1		*	
		27	TC	3.3		*	
		30	TC	3.2		*	
		33	TC	3.3		*	
9	196250	03	TC	2.5		*	Sewer line DC = 0 inches
		06	TC	2.8		*	
		09	TC	2.8		*	
		12	BH	2.9	<1.0	*	
		15	TC	2.9		*	
		18	TC	3.0		*	
		21	TC	3.1		*	
		24	TC	3.1		*	
		27	TC	3.2		*	
		30	BH	3.2	1.1	*	
		33	TC	3.2		*	
10	203150	[06]	DS	8.1		*	On foundation wall
11	205183	[06]	DS	9.3		*	On foundation wall
12	207277	03	TC	2.6		*	Gas line DC = 0 inches
		06	TC	2.9		*	
		09	TC	3.0		*	
		12	TC	3.1	1.2	*	
		15	TC	3.1		*	
		18	TC	3.2	<1.0	*	
		21	TC	3.2		*	
		24	TC	3.1	<1.0	*	
		27	TC	3.2		*	
		30	TC	3.3		*	
13	208184	00	DS	<1.0		*	1' from foundation wall

## Radium Concentrations at Exterior Locations

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
14	209234	03	TC	2.8		*	Sewer line
		06	TC	3.1		*	
		09	TC	3.2		*	DC = 0 inches
		12	TC	3.2		*	
		15	TC	3.2		*	
		18	TC	3.3		*	
		21	TC	3.3		*	
		24	TC	3.4		*	
		27	TC	3.4		*	
		30	TC	3.4		*	
		33	TC	3.5		*	
		36	TC	3.5		*	
		39	TC	3.5		*	
		42	TC	3.5		*	
		45	TC	3.6		*	
		48	TC	3.6		*	
		51	TC	3.6		*	
		54	TC	3.5		*	
		57	TC	3.5		*	
		60	TC	3.5		*	
		63	TC	3.5		*	
		66	TC	3.6		*	
15	210193	03	TC	3.0		*	Sewer line
		06	TC	3.2		*	DC = 0 inches
		09	TC	3.2		*	
		12	BH	3.3	1.3	*	
		15	TC	3.4		*	
		18	TC	3.4		*	
		21	TC	3.4		*	
		24	TC	3.6		*	
		27	TC	3.6		*	
		30	TC	3.6		*	
		33	TC	3.6		*	
		36	BH	3.5	1.4	*	
		39	TC	3.6		*	
		42	TC	3.7		*	
		45	TC	3.7		*	
		48	TC	3.8		*	
		51	TC	3.8		*	
		54	TC	3.8		*	
		57	TC	3.8		*	
		60	BH	3.8	2.0	*	

## Radium Concentrations at Exterior Locations

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
15	210193	63	TC	3.8		*	
		66	TC	3.7		*	
		69	TC	3.8		*	
		72	TC	3.7		*	
		75	TC	3.8		*	
		78	TC	3.7		*	
		81	TC	3.6		*	
		84	TC	3.6		*	
		87	TC	3.6		*	
		90	TC	3.6		*	
		93	TC	3.6		*	
		96	BH	3.6	1.3	*	
16	215150	[06]	DS	9.3		*	On foundation wall
17	216183	[06]	DS	9.0		*	On foundation wall
18	217274	03	TC	2.9		*	Water line DC = 0 inches
		06	TC	3.1		*	
		09	TC	3.1		*	
		12	BH	3.0	1.2	*	
		15	TC	3.0		*	
		18	TC	3.0		*	
		21	TC	3.1		*	
		24	TC	3.2		*	
		27	TC	3.3		*	
		30	TC	3.3		*	
		33	TC	3.5		*	
		36	BH	3.5	1.1	*	
		39	TC	3.5		*	
		42	TC	3.6		*	
		45	TC	3.5		*	
		48	TC	3.6		*	
		51	TC	3.6		*	
		54	TC	3.7		*	
		57	TC	3.7		*	
		60	TC	3.7		*	
		63	TC	3.6		*	
		66	TC	3.6		*	
		69	TC	3.7		*	
		72	BH	3.8	<1.0	*	

## Radium Concentrations at Exterior Locations

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
18	217274	75	TC	3.8		*	
		78	TC	3.6		*	
		81	TC	3.6		*	
		84	TC	3.6		*	
		87	TC	3.5		*	
		90	TC	3.5		*	
		93	TC	3.5		*	
		96	TC	3.4		*	
		99	TC	3.2		*	
		102	TC	3.2		*	
		105	TC	3.3		*	
		108	TC	3.3		*	
		111	TC	3.4		*	
		114	TC	3.5		*	
		117	TC	3.4		*	
		120	BH	3.4	1.1	*	
		123	TC	3.4		*	
		126	TC	3.5		*	
19	220184	00	DS	1.6		*	1' from foundation wall
20	220261	03	TC	2.6		*	Water line DC = 0 inches
		06	TC	3.0		*	
		09	TC	3.1		*	
		12	BH	3.2	1.1	*	
		15	TC	3.3		*	
		18	BH	3.3	<1.0	*	
		21	TC	3.3		*	
		24	BH	3.3	1.4	*	
		27	TC	3.3		*	
		30	TC	3.3		*	
		33	TC	3.3		*	
21	221273	03	TC	2.6		*	Water line DC = 0 inches
		06	TC	3.0		*	
		09	TC	3.1		*	
		12	BH	3.2	<1.0	*	
		15	TC	3.2		*	
		18	TC	3.2		*	
		21	TC	3.2		*	
		24	TC	3.3		*	
		27	TC	3.3		*	
		30	TC	3.3		*	

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
21	221273	33	TC	3.4		*	
		36	BH	3.4	1.2	*	
		39	TC	3.4		*	
		42	TC	3.6		*	
		45	TC	3.7		*	
		48	TC	3.6		*	
		51	TC	3.7		*	
		54	TC	3.8		*	
		57	TC	3.8		*	
		60	TC	3.8		*	
		63	TC	3.8		*	
		66	TC	3.8		*	
		69	TC	3.8		*	
		72	BH	3.7	1.2	*	
		75	TC	3.9		*	
		78	TC	3.8		*	
		81	TC	3.8		*	
		84	TC	3.8		*	
		87	TC	3.7		*	
		90	TC	3.7		*	
		93	TC	3.7		*	
		96	TC	3.6		*	
		99	TC	3.6		*	
		102	TC	3.5		*	
		105	TC	3.4		*	
		108	TC	3.4		*	
		111	TC	3.4		*	
		114	TC	3.4		*	
		117	TC	3.4		*	
		120	BH	3.4	1.8	*	
		123	TC	3.5		*	
		126	TC	3.5		*	
22	223150	03	TC	2.8		*	Gas line DC = 0 inches
		06	TC	3.1		*	
		09	TC	3.1		*	
		12	BH	3.2	<1.0	*	
		15	TC	3.0		*	
		18	TC	2.9		*	
		21	TC	2.8		*	
		24	BH	2.7	<1.0	*	
		27	TC	2.8		*	
		30	TC	2.9		*	

## Radium Concentrations at Exterior Locations

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
22	223150	33	TC	3.0		*	
		36	TC	2.9		*	
		39	TC	3.0		*	
		42	TC	3.1		*	
		45	TC	3.2		*	
		48	BH	3.3	1.4	*	
23	225177	[06]	DS	10.5		*	Front of house on foundation wall
24	226177	[06]	DS	1.1		*	Front of house on foundation wall
25	227184	03	TC	2.7		*	Water line
		06	TC	3.0		*	DC = 0 inches
		09	TC	3.1		*	
		12	BH	3.1	<1.0	*	
		15	TC	3.0		*	
		18	TC	2.9		*	
		21	TC	2.9		*	
		24	TC	2.9		*	
		27	TC	3.0		*	
		30	TC	3.0		*	
		33	TC	3.2		*	
		36	BH	3.3	1.2	*	
		39	TC	3.4		*	
		42	TC	3.4		*	
		45	TC	3.6		*	
		48	TC	3.7		*	
		51	TC	3.8		*	
		54	BH	3.8	1.6	*	
		57	TC	3.8		*	
		60	TC	3.9		*	
26	240170	03	TC	2.6		*	DC = 0 inches
		06	TC	2.8		*	
		09	TC	2.7		*	
		12	BH	2.9	1.0	*	
		15	TC	2.9		*	
		18	TC	2.7		*	
		21	TC	2.8		*	
		24	BH	2.7	<1.0	*	
		27	TC	2.7		*	
		30	TC	2.8		*	

## Radium Concentrations at Exterior Locations

DOE ID #CJ-14635-MR

3164 and 3166 F Road

Page 8 of 8

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
26	240170	33	TC	2.7		*	
		36	TC	2.7		*	
		39	TC	2.6		*	
		42	TC	2.6		*	
		45	TC	2.7		*	
		48	BH	2.6	1.2	*	
		51	TC	2.6		*	
27	240250	03	TC	2.5		*	Front yard on dirt
		06	TC	2.8		*	DC = 0 inches
		09	TC	3.1		*	
		12	BH	3.2	<1.0	*	
		15	TC	3.2		*	
		18	BH	3.2	<1.0	*	
		21	TC	3.3		*	
		24	BH	3.4	<1.0	*	
		27	TC	3.4		*	
		30	TC	3.4		*	
		33	TC	3.5		*	
		36	TC	3.6		*	

Measurement 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 = 03-05-85  
 Team Leader = PAT



## Radium Concentrations at Exterior Locations

DOE ID #GJ-14635-MR

3164 and 3166 F 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.		
28	116288	00	DS	3.7		*	In flume
		00-03	SS			2.7	
29	118288	00	DS	2.9		*	NE corner of field
		06	DS	2.3		*	DC = 9 inches
		12	DS	1.3		*	
		06-12	SS			3.5	Moist top soil

Measurement GB = GAD-6 Borehole  
Types: 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 = 03-05-85  
Team Leader = PAT

## Radium Concentrations at Interior Locations

DOE ID #GJ-14635-MR

3164 and 3166 F 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		00-05	SS			9.7	Fruit cellar/core
		05-11	SS			1.9	Hard & dry
		03	TC	6.4		*	Cellar floor
		06	TC	5.1		*	DC = 5 inches
		09	TC	4.1		*	Based on the soil
		12	BH	3.7	1.5	*	sample analyses
		15	TC	3.5		*	
		18	BH	3.3	1.4	*	
		21	TC	3.3		*	
		24	TC	3.2		*	
		27	TC	3.3		*	
		30	BH	3.2	1.3	*	
		33	TC	3.3		*	
		36	TC	3.3		*	
2		00	DS	<1.0		*	Top step going down into fruit cellar
3		00	DS	<1.0		*	4 steps down from top
4		00	DS	7.2		*	4 steps down on landing

Measurement 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 = 03-05-85

Team Leader = PAT

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	05	34-40	37	05	30-41	36
STAIRWAY	01	22-22	22	01	21-21	21
ROOM A	05	11-13	12	05	12-16	14
ROOM B	05	12-13	12	05	13-15	14
ROOM C	05	12-15	13	05	12-19	15
ROOM D	06	11-13	13	06	12-17	14
ROOM E	05	11-13	12	05	12-15	14
Room F	01	11-11	11	01	13-13	13
GARAGE	08	11-14	11	09	11-30	14
=====	=====	=====	=====	=====	=====	=====

\*Exposure Rates and Room Locations Shown in Appendix Figures 3.3a and 3.3b

Table 3.3b

## Summary of Interior Gamma Exposure Rates

DOE ID #GJ-14635-MR

3166 F Road

Page 1 of 1

=====

Location	Number of Readings Taken at Waist *	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)
GROUND FLOOR	*	*	*	*	12-13	*

=====

\* The CDH and ORNL data indicate the absence of interior contamination in this structure. This information was investigated by performing a walking gamma scan of the interior. This area and the range of gamma measurements are shown in Appendix Figure 3.3c.

Table 4.1  
Area and Volume Calculations  
DOE ID No. GJ-14635-MR

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>
INTERIOR					
	Concrete				
A	10 x 10 =	100	x 0.4 =	40	
B*	Not included in this remedial action				
	Volume of Concrete		=	<u>40</u> =	40/27 = 1
EXTERIOR					
C	3 X 4 =	12			
	4 X 5 =	20			
	Volume of Fill	<u>32</u>	x 0.8 =	26 =	26/27 = 1
	TOTAL VOLUME - EXTERIOR				= 1
	TOTAL VOLUME - INTERIOR				= 1

See Appendix Figures 3.5a and 3.5b for Areas

Table 4.2  
Estimated Cost of Decontamination and Restoration  
DOE ID No. GJ-14635-MR

Page 1 of 1

---

INTERIOR

Remove/replace owner's property and shelving	
Lump sum	\$ 200
Sawcut concrete slab	
37 lf @ \$.92/lf x 2	68
Remove/replace concrete basement floor (5")	
100 sf @ \$6/sf	600
	<hr/>
TOTAL INTERIOR	\$ 868

EXTERIOR

Remove identified residual radioactive material	
1 cy @ \$14.50/cy	15
Replace area with compacted roadbase	
1 cy @ \$11.50/cy	12
	<hr/>
TOTAL EXTERIOR	\$ 27
TOTAL INTERIOR	868
ACCESS CONTROL	100
	<hr/>
SUBTOTAL	\$ 995
CONTINGENCY @ 10%	100
	<hr/>
SUBTOTAL	\$ 1,095
CONTRACTOR OVERHEAD & PROFIT @ 40%	438
	<hr/>
GRAND TOTAL	\$ 1,533

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AB081585  
RE A14635/REA-AB008:AP



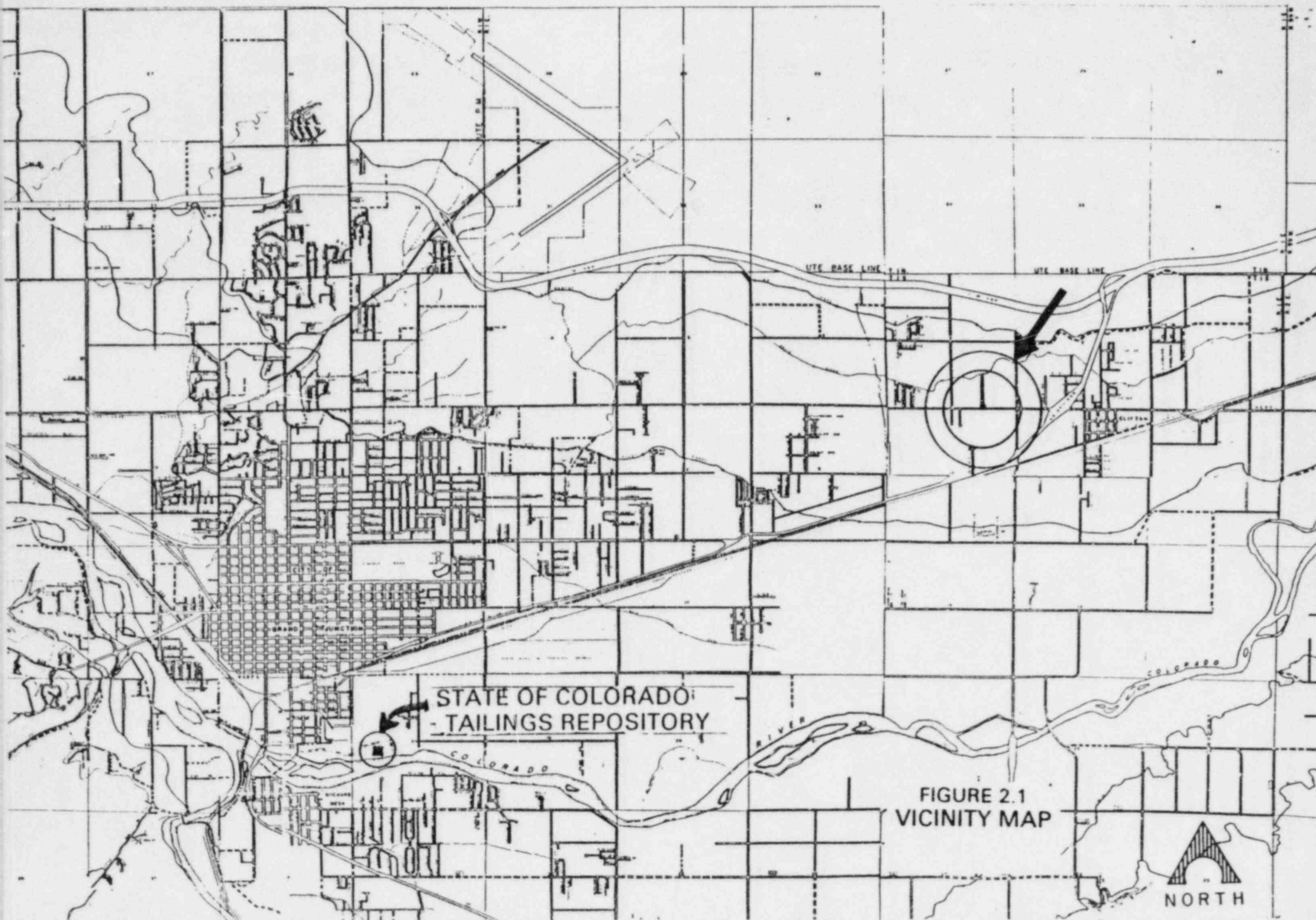


FIGURE 2.1  
VICINITY MAP



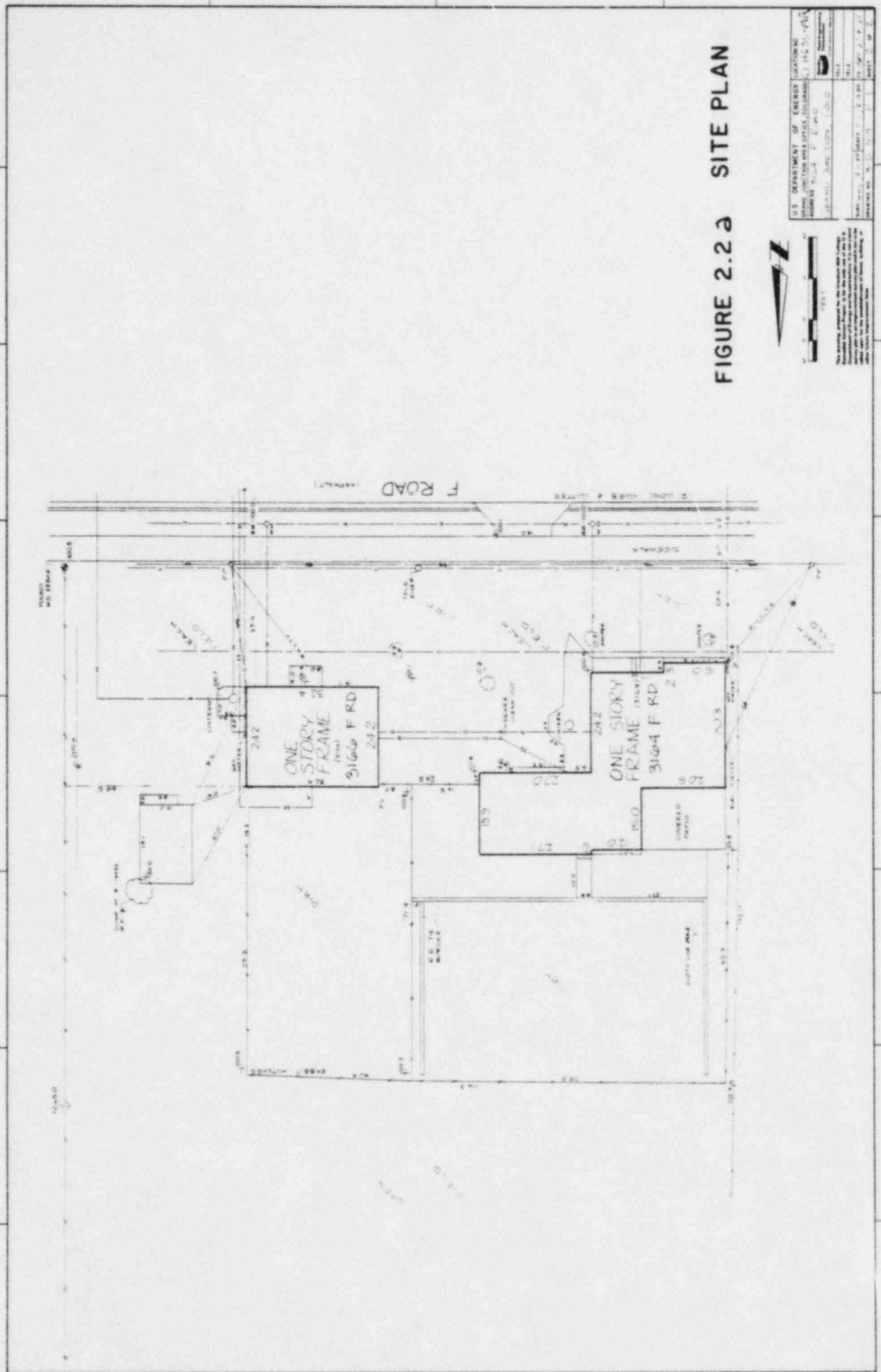
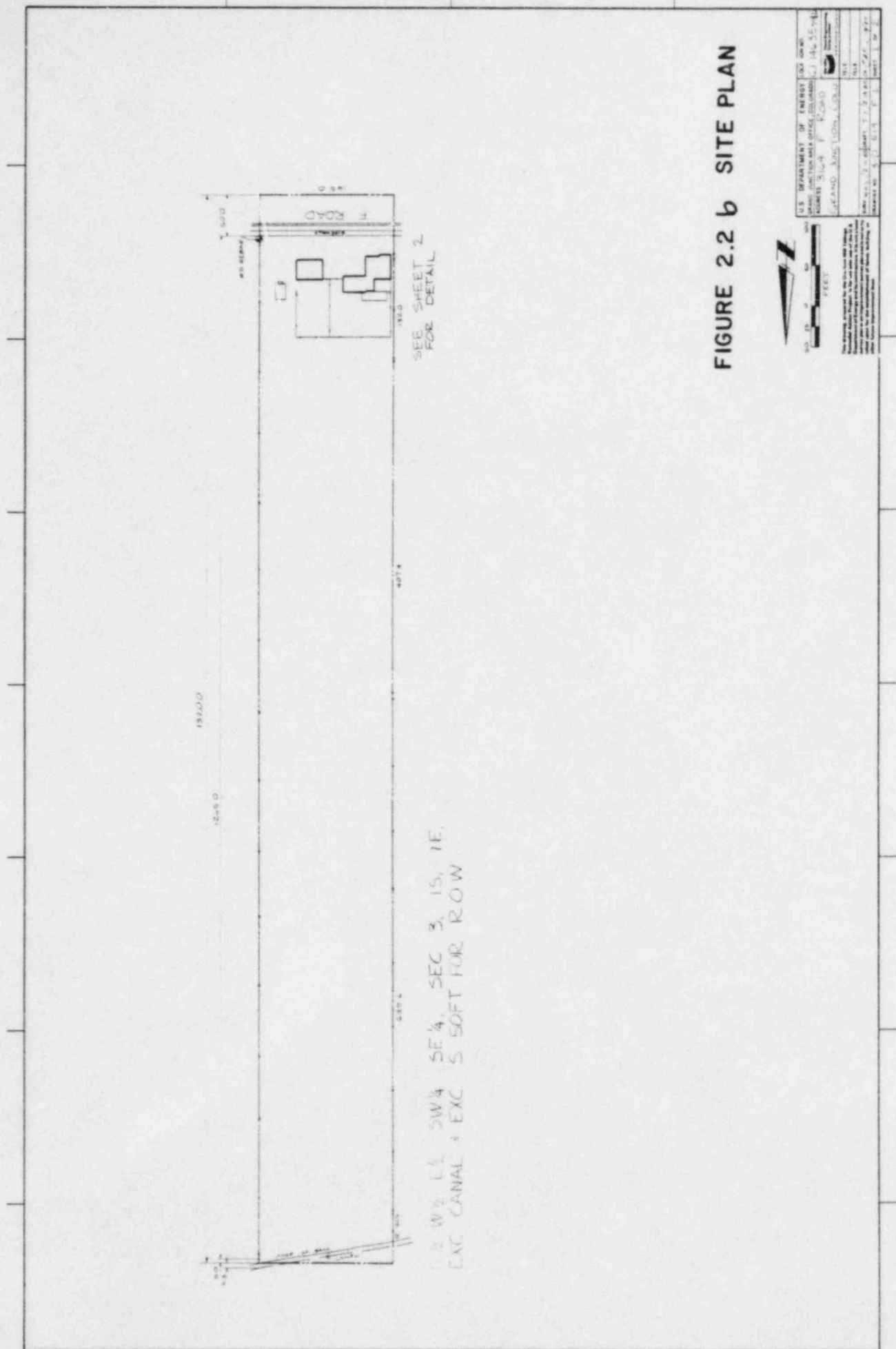


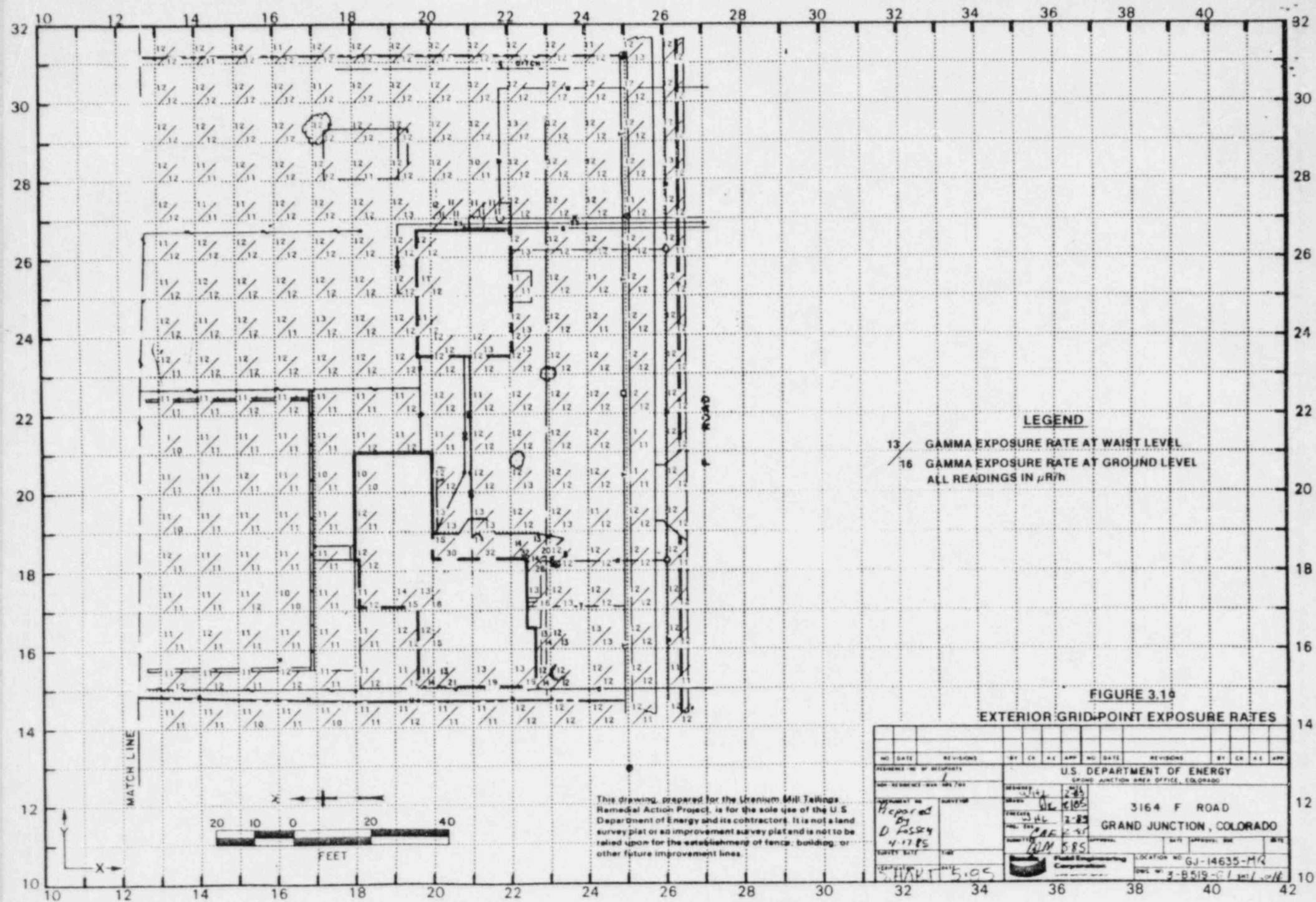
FIGURE 2.2a SITE PLAN



U.S. DEPARTMENT OF ENERGY		LOCATION NO.
BRAND, LOCATION AND OFFICE, (CONTRACT)		104-21-101
PROJECT NO.		104-21-101
DATE		10/1/71
BY		104-21-101
CHECKED BY		104-21-101
APPROVED BY		104-21-101
SCALE		1" = 100'
SHEET NO.		1 OF 1

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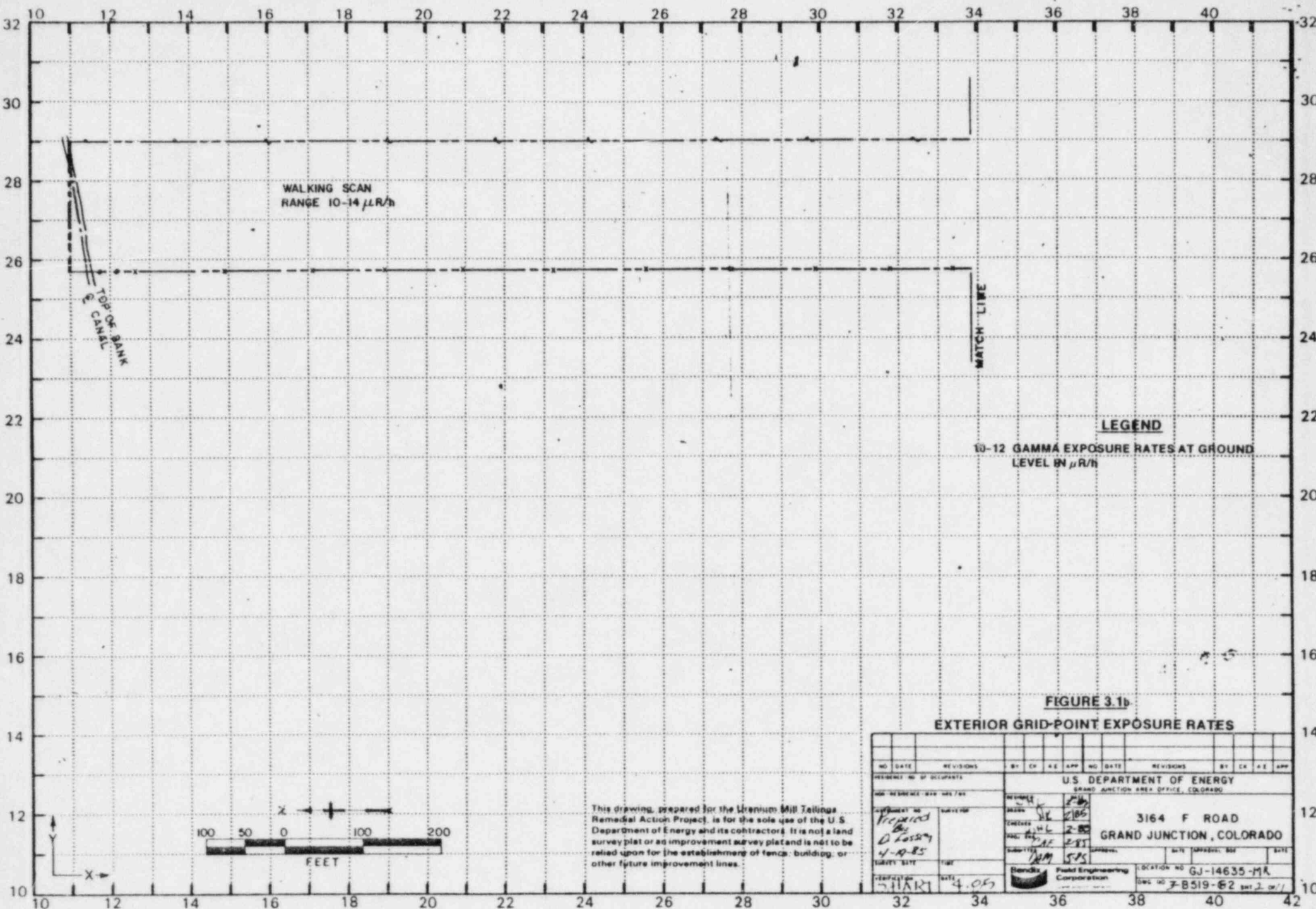


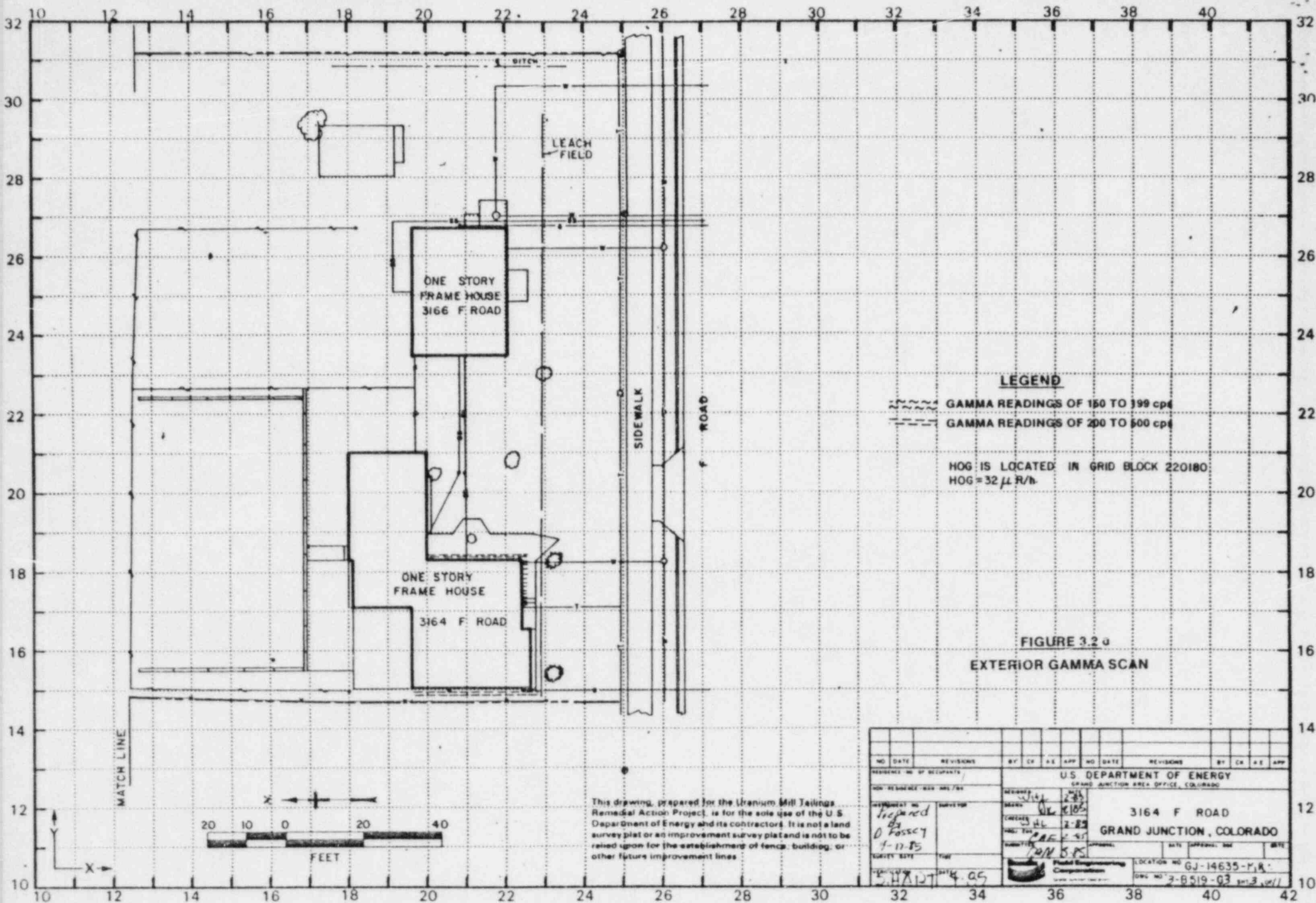
FIGURE 3.1b

EXTERIOR GRID-POINT EXPOSURE RATES

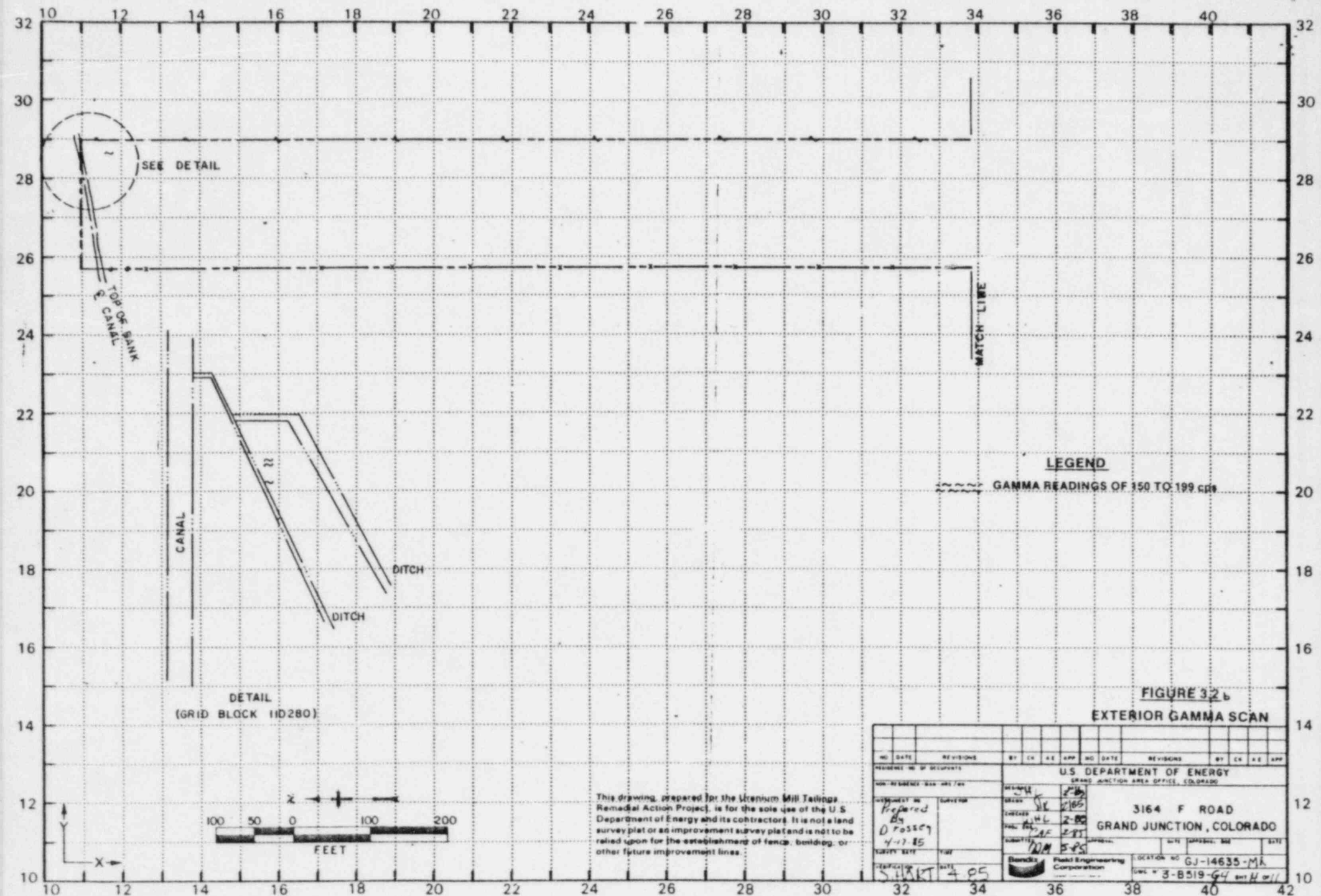
NO. DATE				REVISIONS				BY CH. A.E. APP.				NO. DATE				REVISIONS				BY CH. A.E. APP.											
RESIDENT NO. OF OCCUPANTS																U.S. DEPARTMENT OF ENERGY															
HOW IN SOURCE: DAY NTS / Wk																GRAND JUNCTION AREA OFFICE, COLORADO															
APPROVED BY: <i>Proctor</i>								SURVEYOR: <i>DLoss</i>								3164 F ROAD															
DATE: <i>4-28-85</i>								DATE: <i>4-28-85</i>								GRAND JUNCTION, COLORADO															
SUBJECT: <i>W-R-85</i>								DATE: <i>4-28-85</i>								DATE: <i>4-28-85</i>															
SURVEY SITE								TIME								DATE: <i>4-28-85</i>															
VERIFICATION: <i>MARK</i>								DATE: <i>4-28-85</i>								LOCATION NO: GJ-14635-MR															
DATE: <i>4-28-85</i>								DATE: <i>4-28-85</i>								DWS NO: 7-B519-82 SHT 2 OF 1															

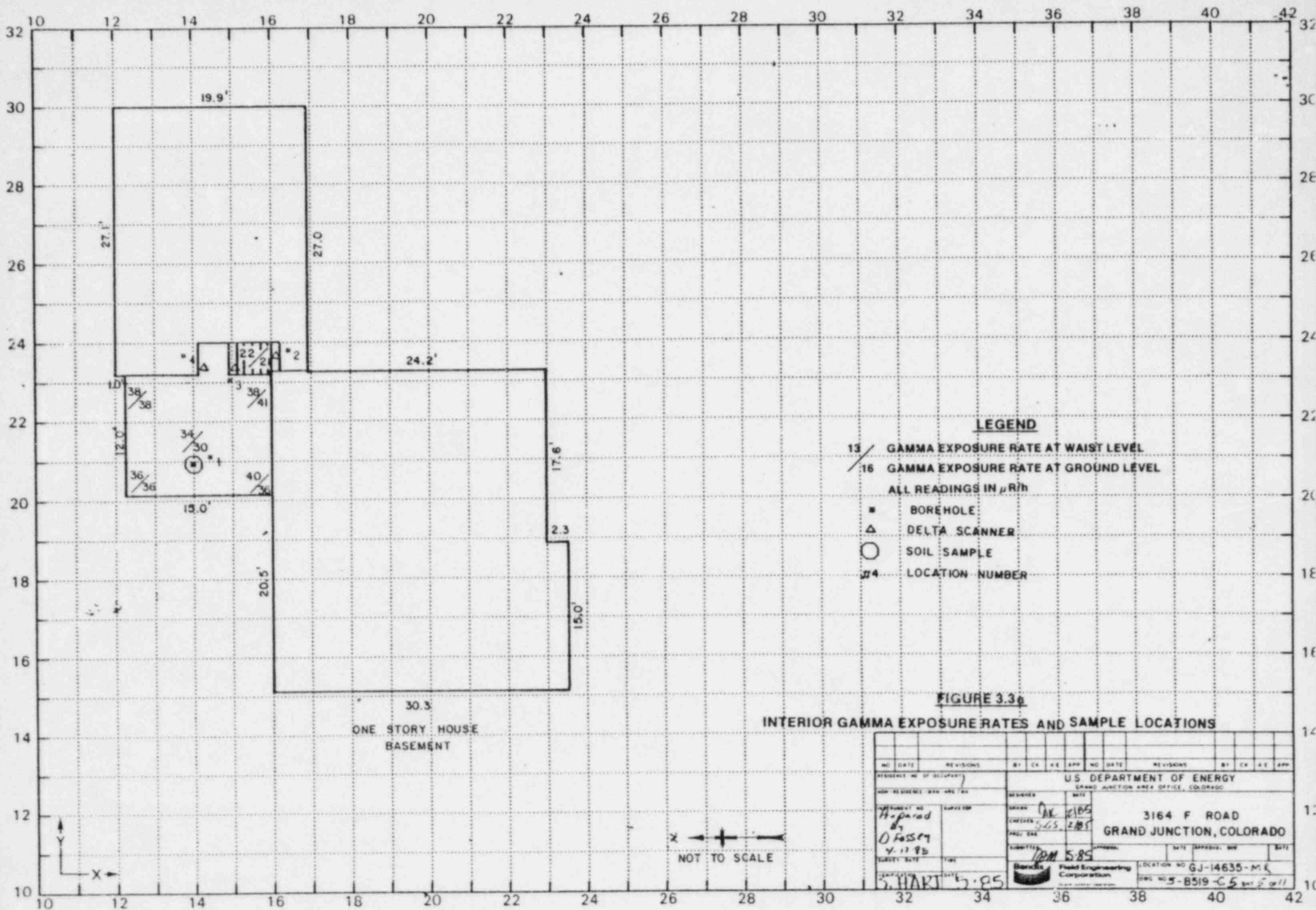
This drawing, prepared for the Uranium Mill Tailings Remedial Action Project, is for the sole use of the U.S. Department of Energy and its contractors. It is not a land survey plat or an improvement survey plat and is not to be relied upon for the establishment of fence, building, or other future improvement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





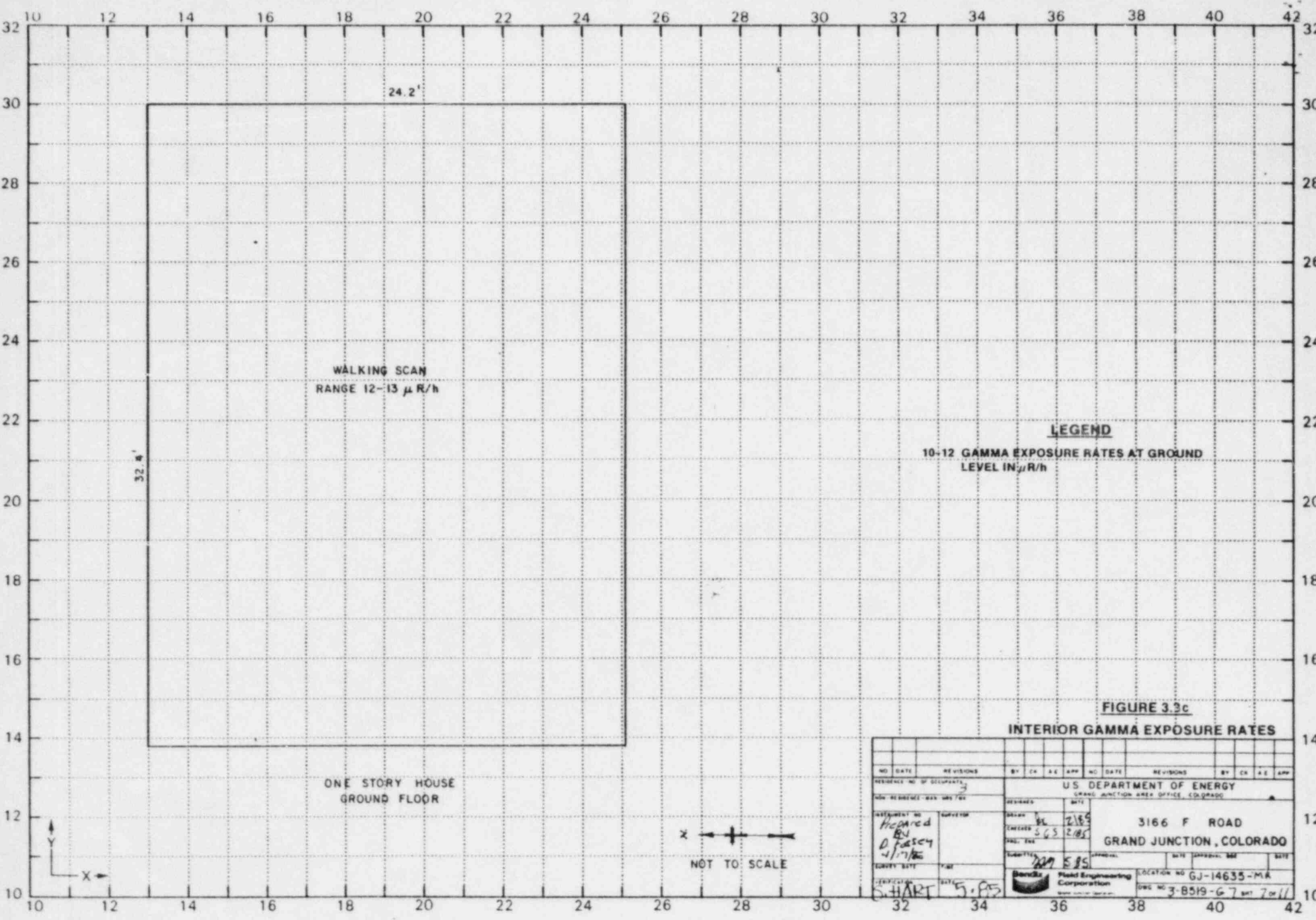
NO. DATE REVISIONS BY CH AE APP NO. DATE REVISIONS BY CH AE APP									
RESIDENCE NO. OF OCCUPANTS									
NON-RESIDENTIAL - YES / NO									
RECEIVED BY: <i>W. H. H. 2/85</i> CHECKED: <i>W. H. H. 2/85</i> DATE: <i>2-85</i> TIME: <i>10:00</i> BY: <i>W. H. H. 2/85</i> DATE: <i>2-85</i>									
U.S. DEPARTMENT OF ENERGY GRAND JUNCTION AREA OFFICE, COLORADO 3164 F ROAD GRAND JUNCTION, COLORADO									
LOCATION NO. GJ-14635-P, R. DRAW NO. 2-8519-03 SHEET 3 OF 1									











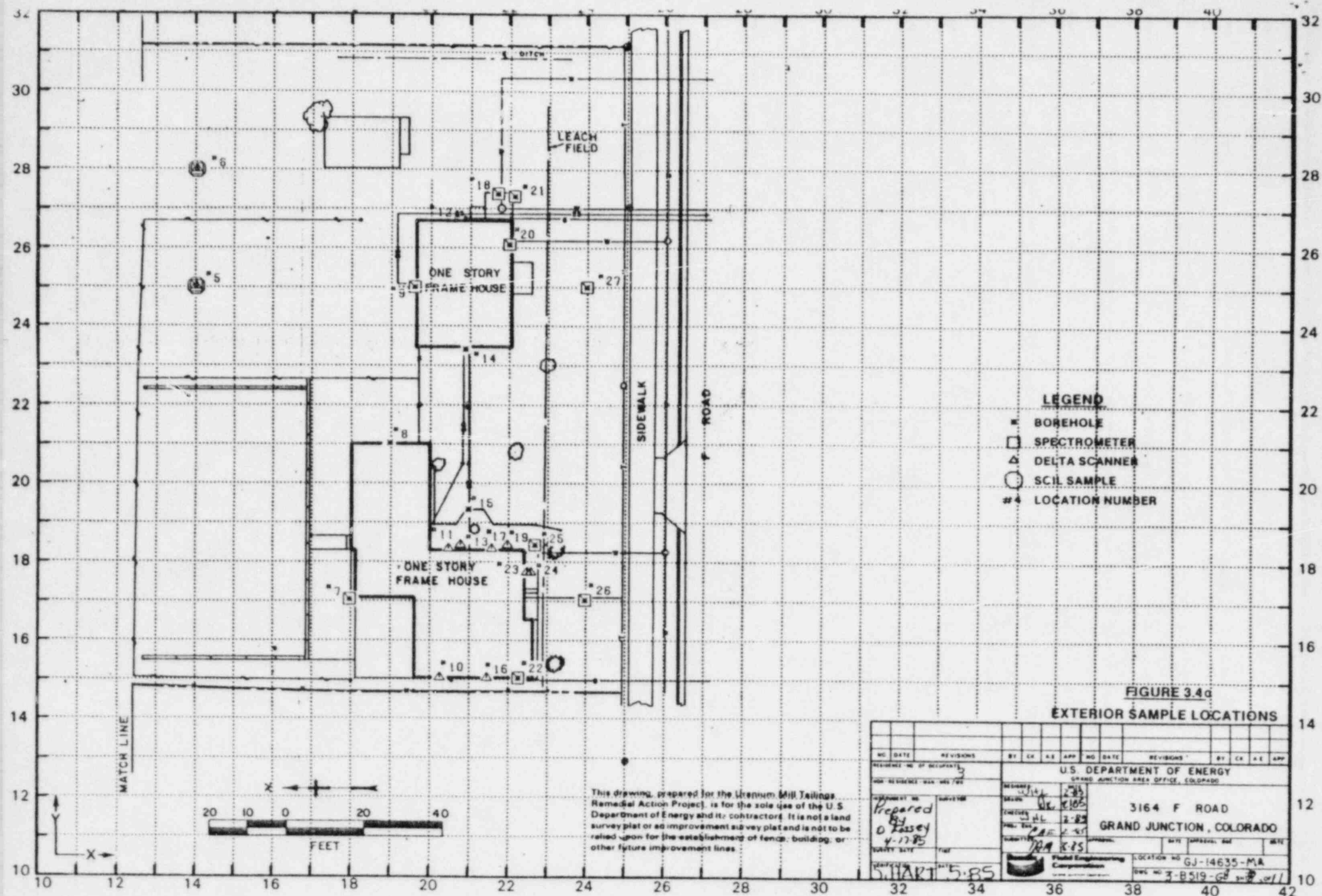
**LEGEND**

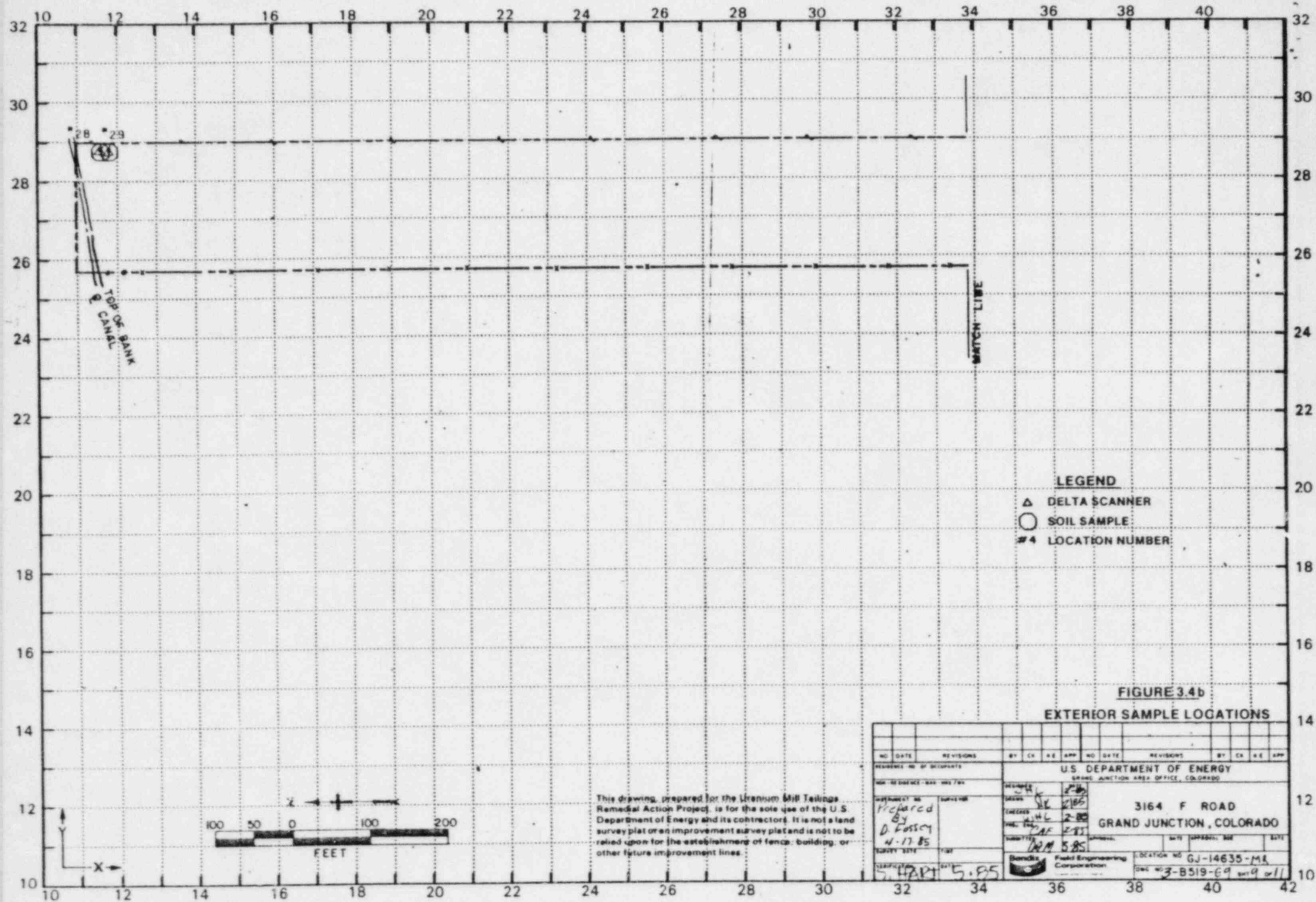
10-12 GAMMA EXPOSURE RATES AT GROUND  
LEVEL IN  $\mu$ R/h

**FIGURE 3.3c**

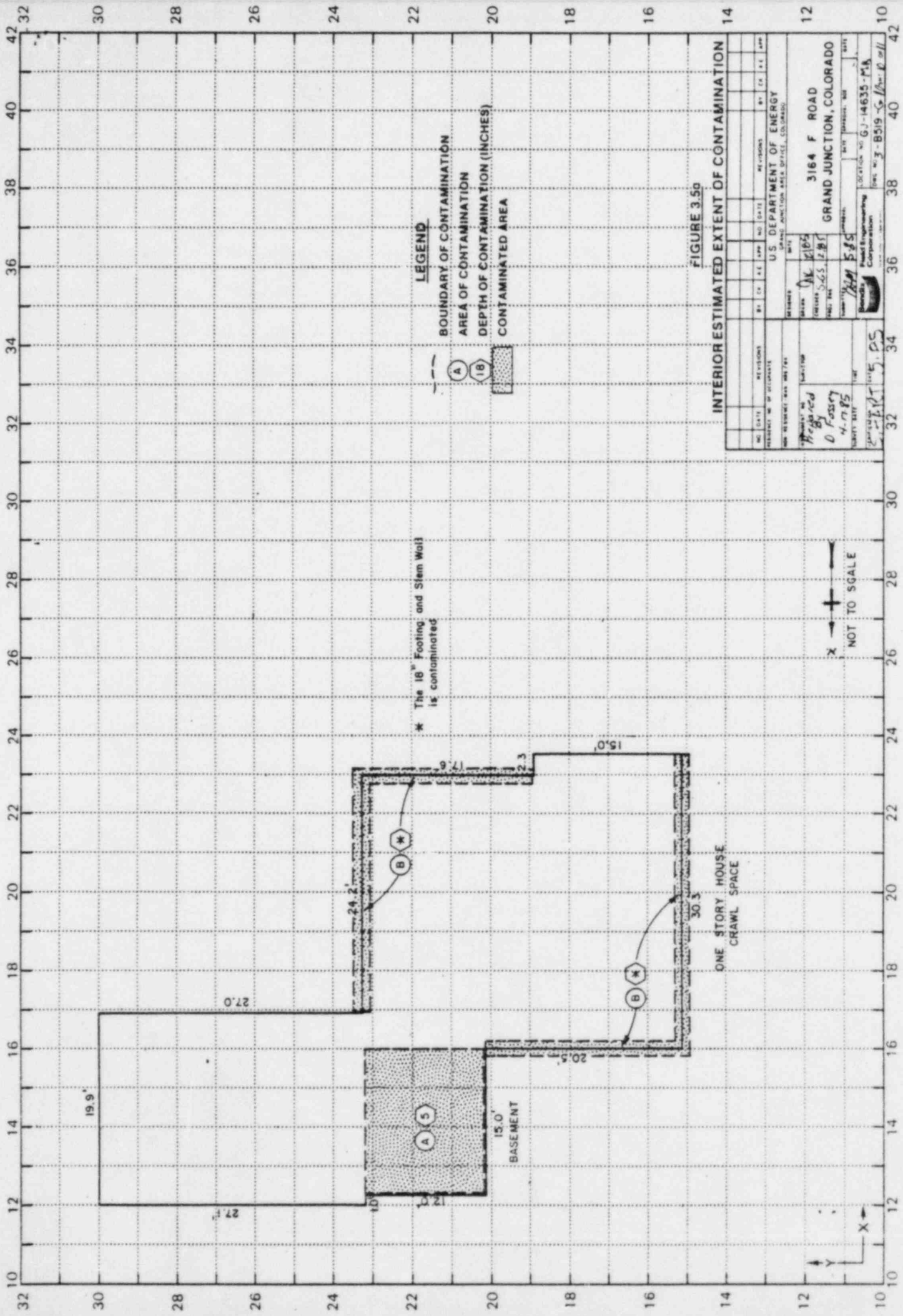
**INTERIOR GAMMA EXPOSURE RATES**

NO. DATE		REVISIONS		BY	CHK	DATE	APP	NO. DATE		REVISIONS		BY	CHK	DATE	APP
RESIDENCE NO. OF OCCUPANTS		3													
OWN. RESIDENCE - MAX. GRS. / YR.															
DESIGNED BY		DATE		U.S. DEPARTMENT OF ENERGY GRAND JUNCTION AREA OFFICE, COLORADO											
CHECKED BY		DATE		3166 F ROAD GRAND JUNCTION, COLORADO											
SUBMITTED BY		DATE		3-8519-G7											
APPROVED BY		DATE		7 of 11											
FIELD ENGINEERING CORPORATION		DATE		GJ-14635-MA											
DRAWN BY		DATE		3-8519-G7											









**LEGEND**

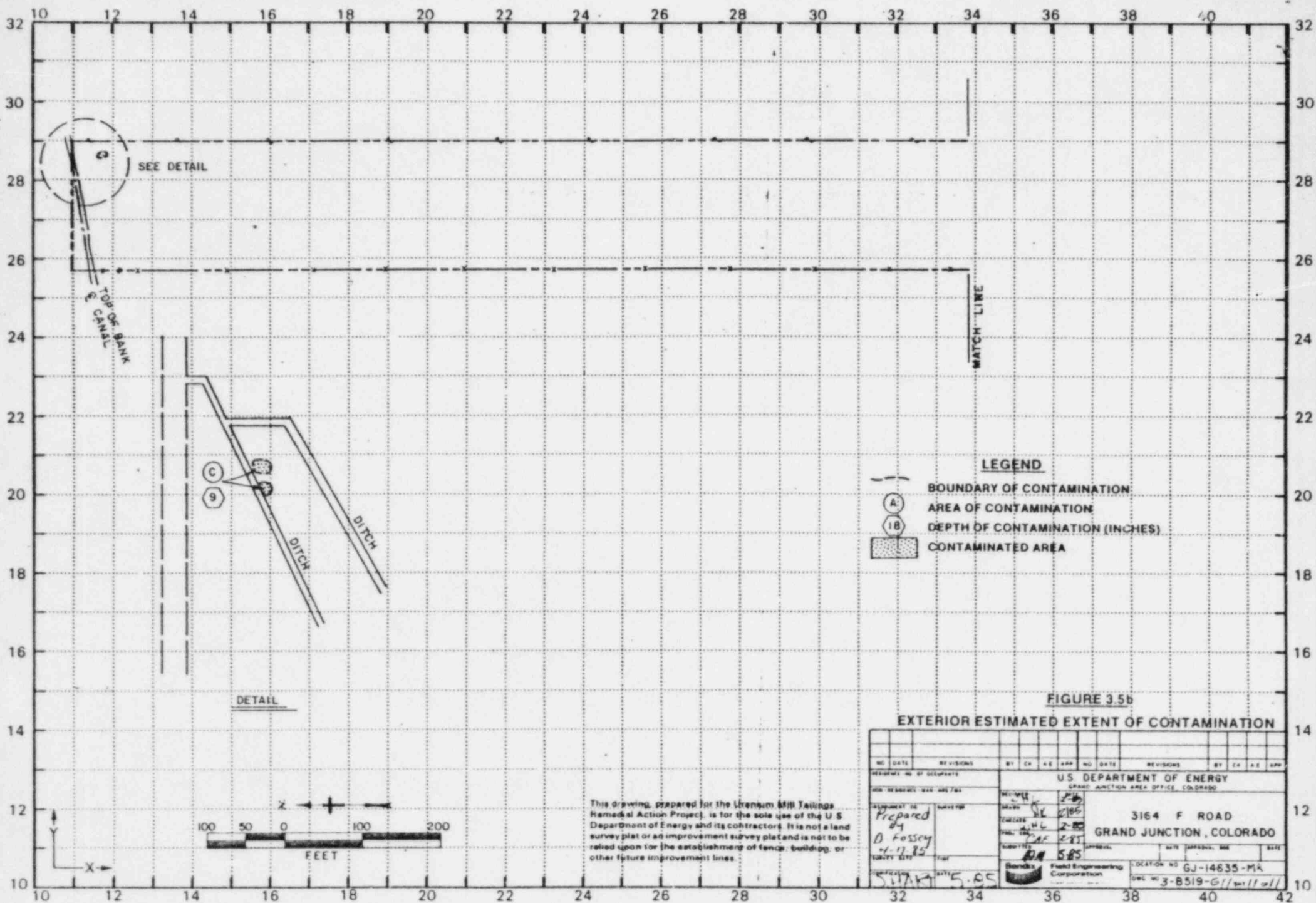
- BOUNDARY OF CONTAMINATION
- AREA OF CONTAMINATION
- (A) ○ (B) ○ (C) DEPTH OF CONTAMINATION (INCHES)
- CONTAMINATED AREA

**FIGURE 3.5a**

**INTERIOR ESTIMATED EXTENT OF CONTAMINATION**

NO.	DATE	REVISIONS	BY	DATE	NO.	DATE	REVISIONS	BY	DATE
1	4/1/85	1	OK	4/1/85	2	4/1/85	2	OK	4/1/85
<p>U.S. DEPARTMENT OF ENERGY          GRAND JUNCTION AREA OFFICE, COLORADO</p> <p>3164 F ROAD          GRAND JUNCTION, COLORADO</p> <p>Project: 3164 F Road          Date: 4/1/85          By: [Signature]          Title: [Title]</p> <p>Location: 3164 F Road          Date: 4/1/85          By: [Signature]          Title: [Title]</p>									

NOT TO SCALE





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

Official Survey Report

Property Address 3164 and 3166 F Road

Property Owner Triad Enterprises

Address of Owner (if different from above)

Report Prepared By Daniel P. Fossey

I. PRESENCE/ABSENCE OF RESIDUAL RADIOACTIVE MATERIALS

☐ 1 No evidence of residual radioactive material on surveyed property.

☒ 1 Residual radioactive materials found at the following locations:

☒ 1 In open areas.

☒ 1 Under or around exterior improvements.

☐ 1 Under or around a typically nonoccupied structure.

☒ 1 Under or around a typically occupied structure.

II. RESULTS OF RADIOLOGIC ASSESSMENT

☐ 1 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.

☒ 1 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 = 41 uR/h  
HOG = 32 uR/h



**Field Engineering  
Corporation**

Grand Junction Operations

P.O. Box 1569  
Grand Junction, CO 81502  
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: Elaine Brummett

SUBJECT: GJ-14635-MR

Dear Elaine:

Regarding the issues discussed at the Technical Review on Department of Energy (DOE) Identification (ID) number GJ-14635-MR (3164 and 3166 "F" Road). The areas requiring additional work or comments are as follows:

1. After further investigation we have determined the landing under the stairs is not contaminated.
2. The landing is a different pour than the slab in the basement.
3. The house located at 3166 "F" Road in the Radiologic and Engineering Assessment chapter 3, section 3.1, paragraph 2.

Sincerely,

Daniel Fossey  
RSD Survey Team

DF:dk

INTERNAL  
MEMORANDUM

Bendix Field Engineering Corporation  
Grand Junction Projects Office

Date: March 5, 1985

To: Files

From: Peter A. Trujillo IV

Subject: Team Leader Files - GJ-14635-<sup>54 5-85</sup>~~B8~~MR

---

Owner: Triad Enterprises (Bette Eskelson)

Address: 3164 and 3166 F Road

Occupancy: 3164 - 1  
3166 - 4

Team Members

H. Mattison	D. Bell
C. Adams	N. Wallace
B. Wilkins	S. Southern
B. Beltz	M. Heronema
S. Larsen	P. Tuhey
V. Young	T. Unrein
D. Fossey	D. Herrera
P. Hardy	

Instruments

See Equipment Summary Sheet

Colorado Department of Health (CDH) and Oak Ridge National Laboratory (ORNL) data indicate contamination in the basement and the foundation at 3164 F Road, and 3166 F Road was identified as a 'tailing free' property.

Bendix field crew set-up grids at 10-foot intervals around the structure (an area with approximate dimensions of 135-feet by 165-feet) the remaining property and/or acreage was walking scanned, (an area approximately 1260-feet by 165-feet).

Team Leader Notes  
Peter A. Trujillo IV  
GJ-14635-RS  
March 5, 1985  
Page 2

At grid block 110280 (on second map - walking scan area) showed elevated gamma. The area was less than a single 10-foot grid block in accordance with section 5.8 Grand Junction Vicinity Properties Radiologic Support Outline Procedures Manual GJ 07-(84), the area did not require gridding. The area identified in grid block 110280 was investigated with soil samples and delta scintillometer measurements. The contamination appears to be associated with the soil in and around an irrigation flume.

Health and Safety arrived on the site at 11:00 A.M. Tom Carter (ORNL) arrived on the site at 11:05 A.M. and allowed the survey team access to 3164 F Road (interior survey). The survey confirmed the findings of CDH and ORNL. No access could be gained to the crawl space (3164 F Road).

Lunch time, all team members were frisked and found clean of contamination.

No Health and Safety policy violations were noted.

The address of 3164 F Road, is a slab-on-grade structure.

A core was taken in the basement of 3164 F Road.

A survey of these basement walls (3164 F Road) showed a range of 110 to 130 cps.

Investigations of buried utilities showed no contamination.

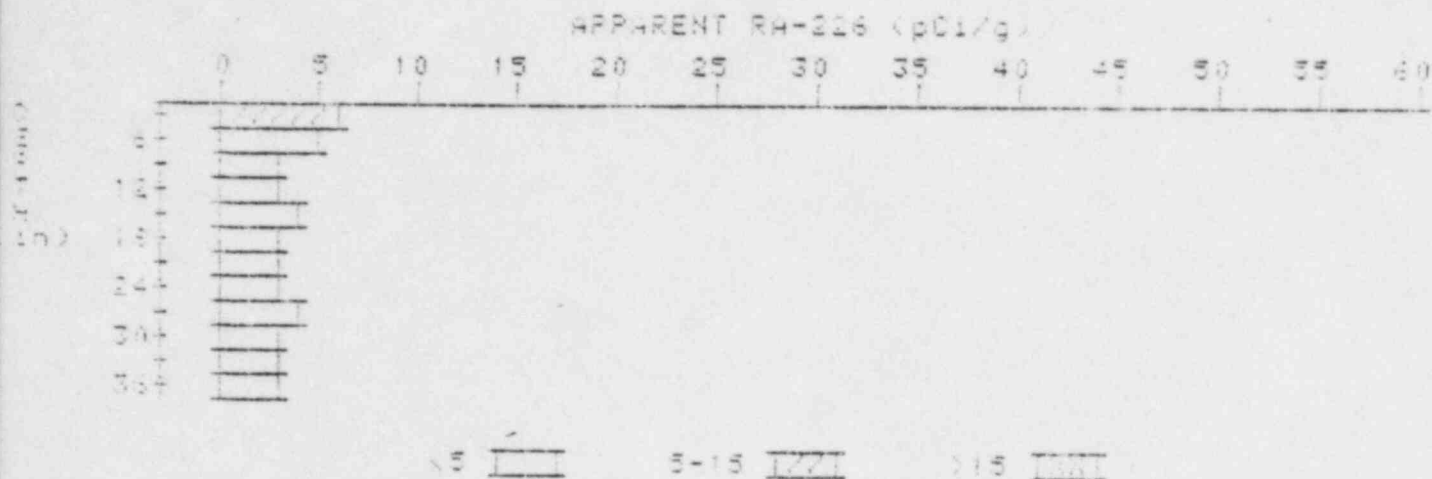
DECON VAS 1 (850117.1233)

# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

PROPERTY NUMBER: 31-14633-MP

HOLE NUMBER: 1

LOCATION:



Depth (ft)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
0	55.4	55.4
2	48.1	48.6
4	44.1	44.0
6	43.4	43.0
8	43.0	43.0
10	43.0	43.0
12	43.0	43.0
14	43.0	43.0
16	43.0	43.0
18	43.0	43.0
20	43.0	43.0
22	43.0	43.0
24	43.0	43.0
26	43.0	43.0
28	43.0	43.0
30	43.0	43.0
32	43.0	43.0
34	43.0	43.0
36	43.0	43.0

# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

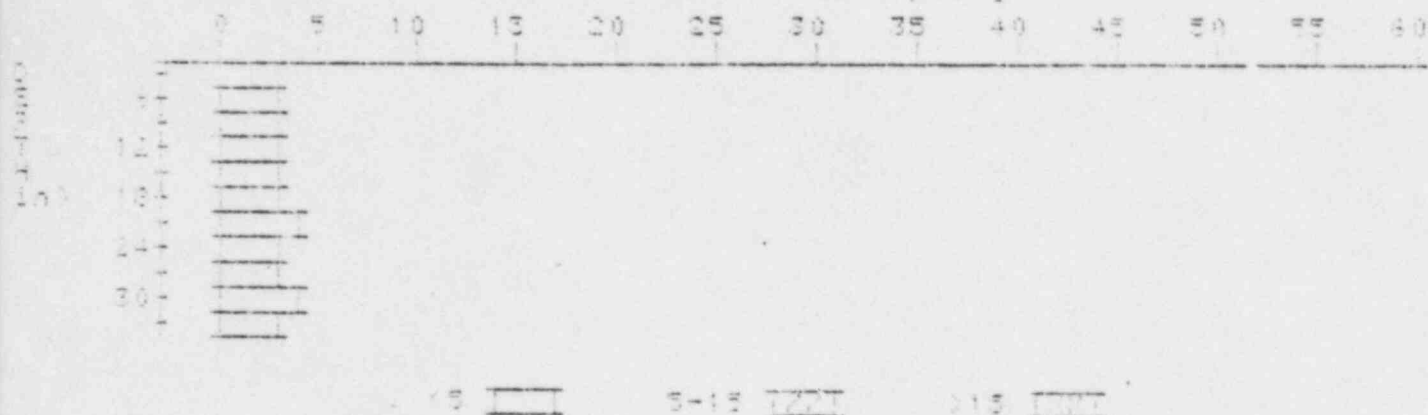
3

PROPERTY NUMBER: GU-14635-R3

HOLE NUMBER: 5

LOCATION: 140250

APPARENT RA-226 (pCi/g)



Depth (in)	Apparent Radium-226 (pCi/g)	Apparent Radium-226 (pCi/g)
	Unconvolved	Deconvolved
3	2.8	2.8
6	2.9	3.4
9	3.0	3.0
12	3.1	3.1
15	3.6	3.4
18	3.6	2.8
21	3.4	3.0
24	3.4	3.4
27	3.5	3.2
30	3.8	3.4
33	3.4	3.4



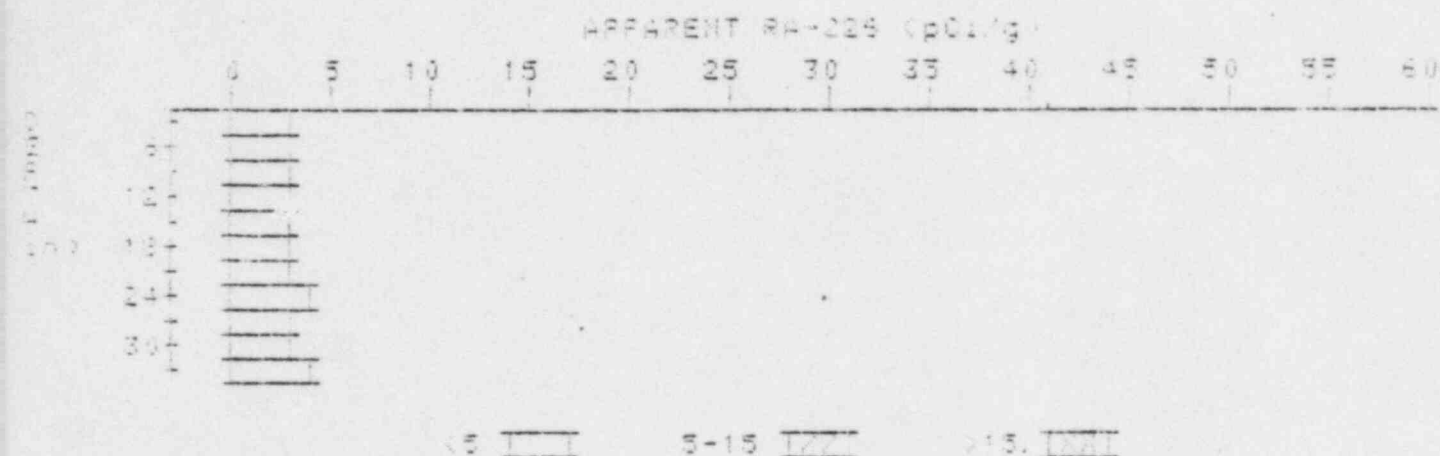
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

6

AS PART NUMBER: 0J-14635-MR

HOLE NUMBER: 6

LOCATION: 140260



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.6	2.6
6	2.9	3.1
9	3.1	3.6
12	3.1	3.9
15	3.2	3.4
18	3.3	3.0
21	3.3	3.4
24	3.4	3.3
27	3.4	3.4
30	3.4	3.1
33	3.5	3.5

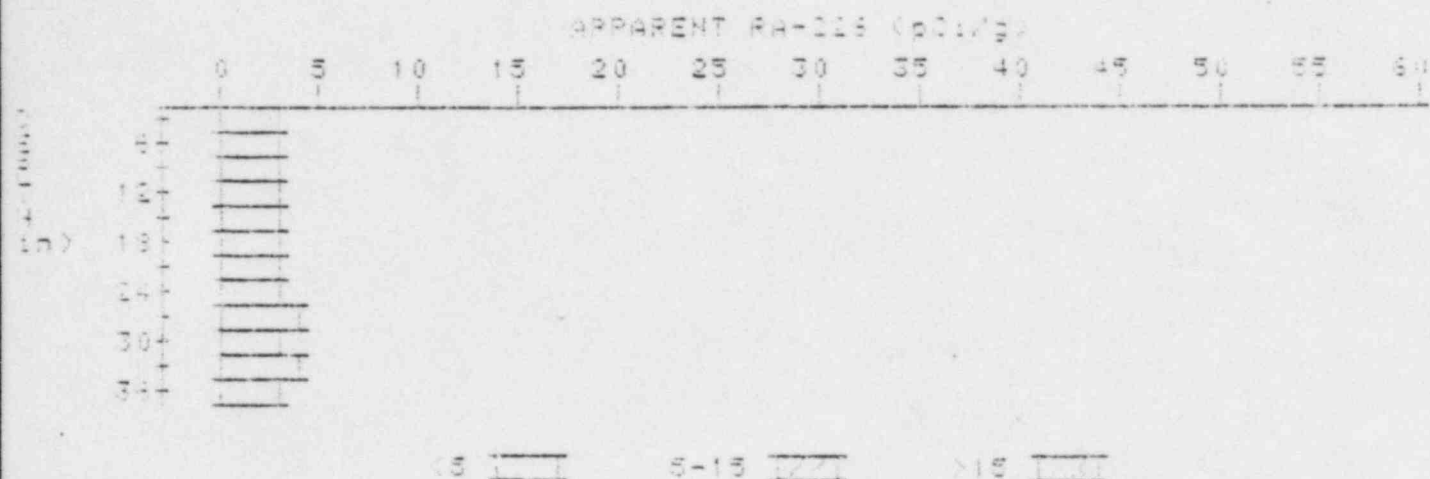
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

7

PROPERTY NUMBER: GW-14603-WR

HOLE NUMBER: 7

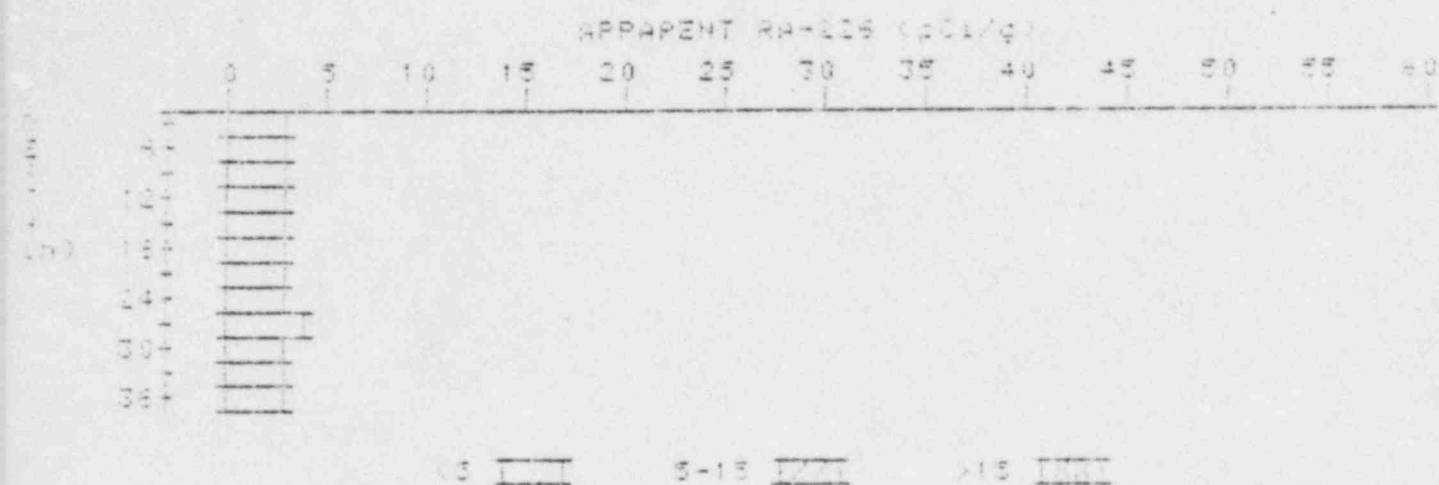
LOCATION: 180170



Depth (in)	Apparent Radium-226 (pCi/g)	Apparent Radium-226 (pCi/g)
	Undeconvolved	Deconvolved
3	6.7	6.7
6	6.0	6.4
9	6.1	6.1
12	6.6	6.4
15	6.6	6.2
18	6.6	6.0
21	6.6	6.6
24	6.6	6.1
27	6.4	6.6
30	6.4	6.4
33	6.6	6.6
36	6.4	6.4

# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

PLATE: 485.1 (85M17.1273)  
HOLE NUMBER: 9  
LOCATION: 190210



Depth (ft)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.8	2.8
6	2.7	2.7
9	2.9	2.9
12	2.9	2.7
15	3.0	3.0
18	3.1	3.1
21	3.1	3.1
24	3.1	3.1
27	3.1	3.1
30	3.1	3.1
33	3.1	3.1
36	3.1	3.1

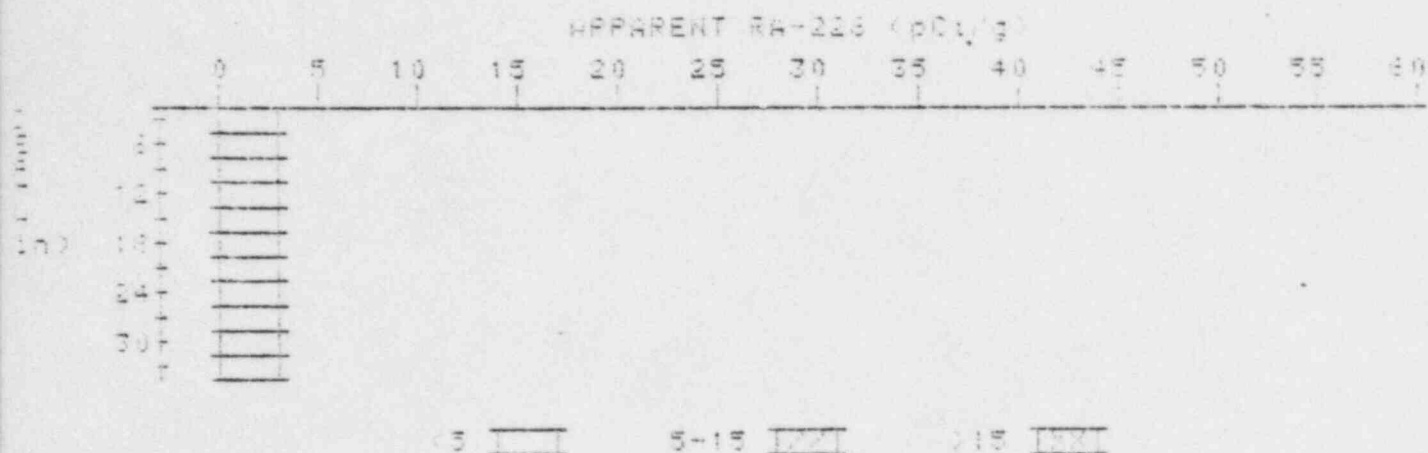
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

5

REPORT NUMBER: 31-14630-08

FILE NUMBER: 5

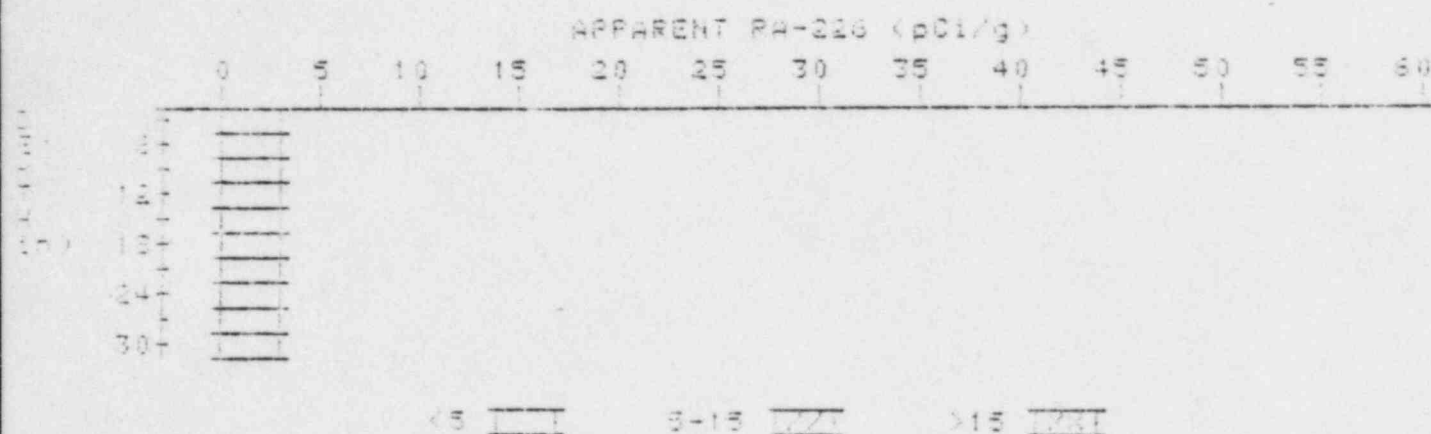
LOCATION: 196250



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.8	2.5
6	2.8	2.3
9	2.6	2.6
12	2.9	3.1
15	2.9	2.7
18	3.0	3.0
21	3.1	3.3
24	3.1	2.9
27	3.2	3.4
30	3.2	3.3
33	3.2	3.2

# APPARENT RADIUM-226 CONCENTRATION 12 DECONVOLUTION GRAPH

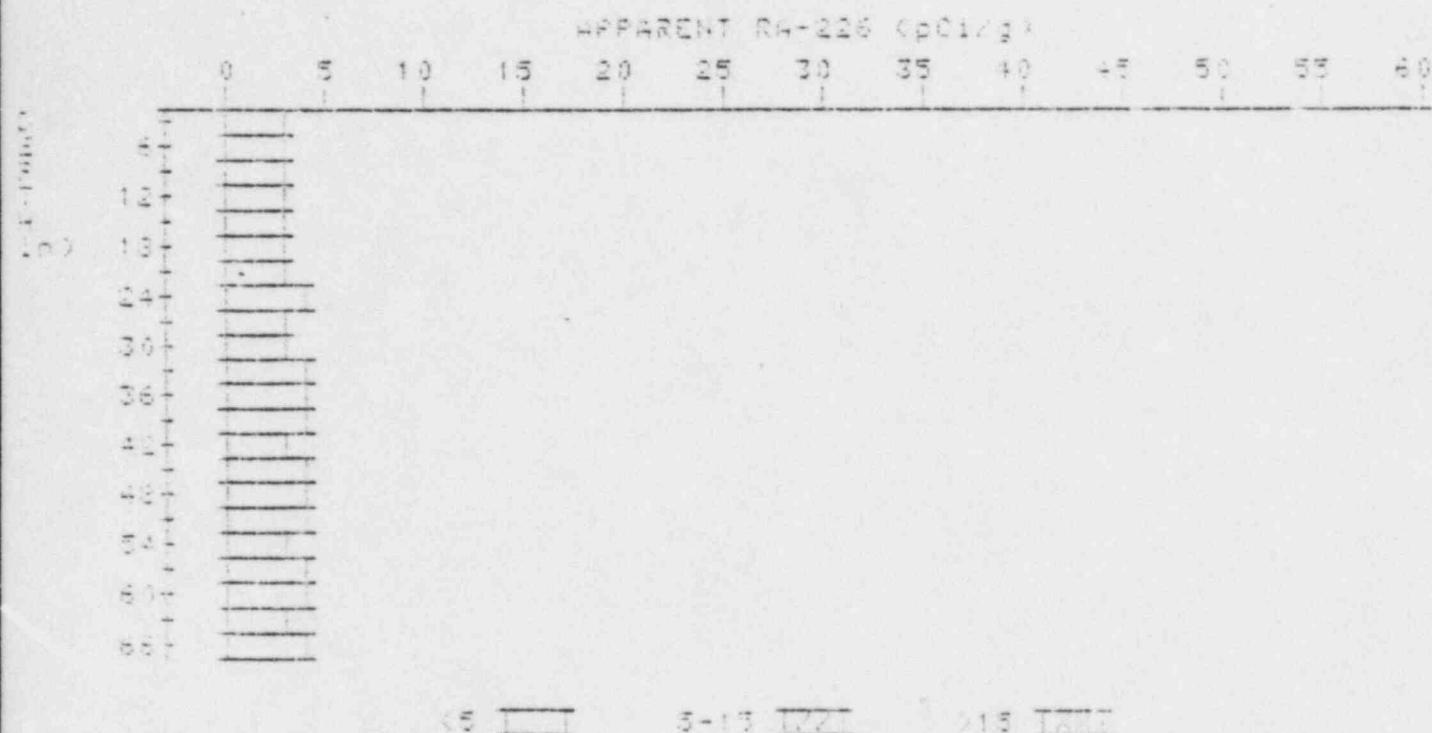
PROPERTY NUMBER: 00-14835-MR  
HOLE NUMBER: 12  
LOCATION: 207277



Depth (ft)	Apparent Radium-226 (pCi/g) Unconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.6	2.6
6	2.9	3.3
9	3.0	3.0
12	3.1	3.3
15	3.1	2.9
18	3.2	3.4
21	3.2	3.4
24	3.1	2.7
27	3.2	3.2
30	3.3	3.3

# APPARENT RADIUM-226 CONCENTRATION 14 DECONVOLUTION GRAPH

PROPERTY NUMBER: QJ-14635-MR  
HOLE NUMBER: 14  
LOCATION: 209234



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvoluted	Apparent Radium-226 (pCi/g) Deconvoluted
0	2.8	2.8
3	3.1	3.5
6	3.2	3.4
12	3.0	3.0
15	3.0	3.0
18	3.0	3.3
21	3.1	3.7
24	3.4	3.8
27	3.5	3.4
30	3.7	3.0
33	3.8	3.7
36	3.8	3.8
39	3.8	3.8
42	3.6	3.3
45	3.6	3.3
48	3.6	3.3



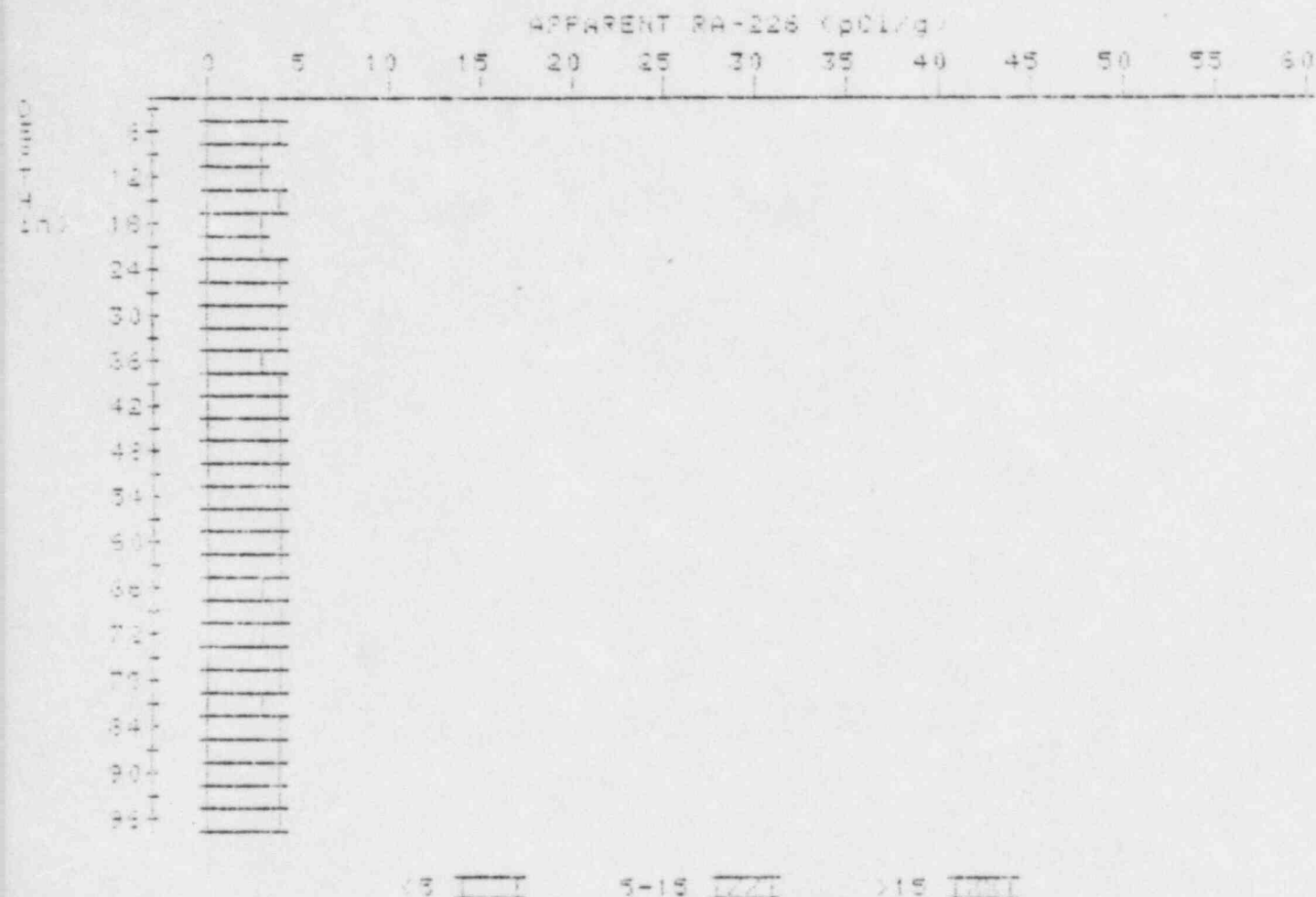
06 05 06 04 03 02  
01 00 99 98 97 96

05 04 03 02 01 00  
99 98 97 96 95 94

04 03 02 01 00 99  
98 97 96 95 94 93

# APPARENT RADIUM-226 CONCENTRATION 15 DECONVOLUTION GRAPH

PROPERTY NUMBER: 00-14635-MR  
HOLE NUMBER: 15  
LOCATION: 210193



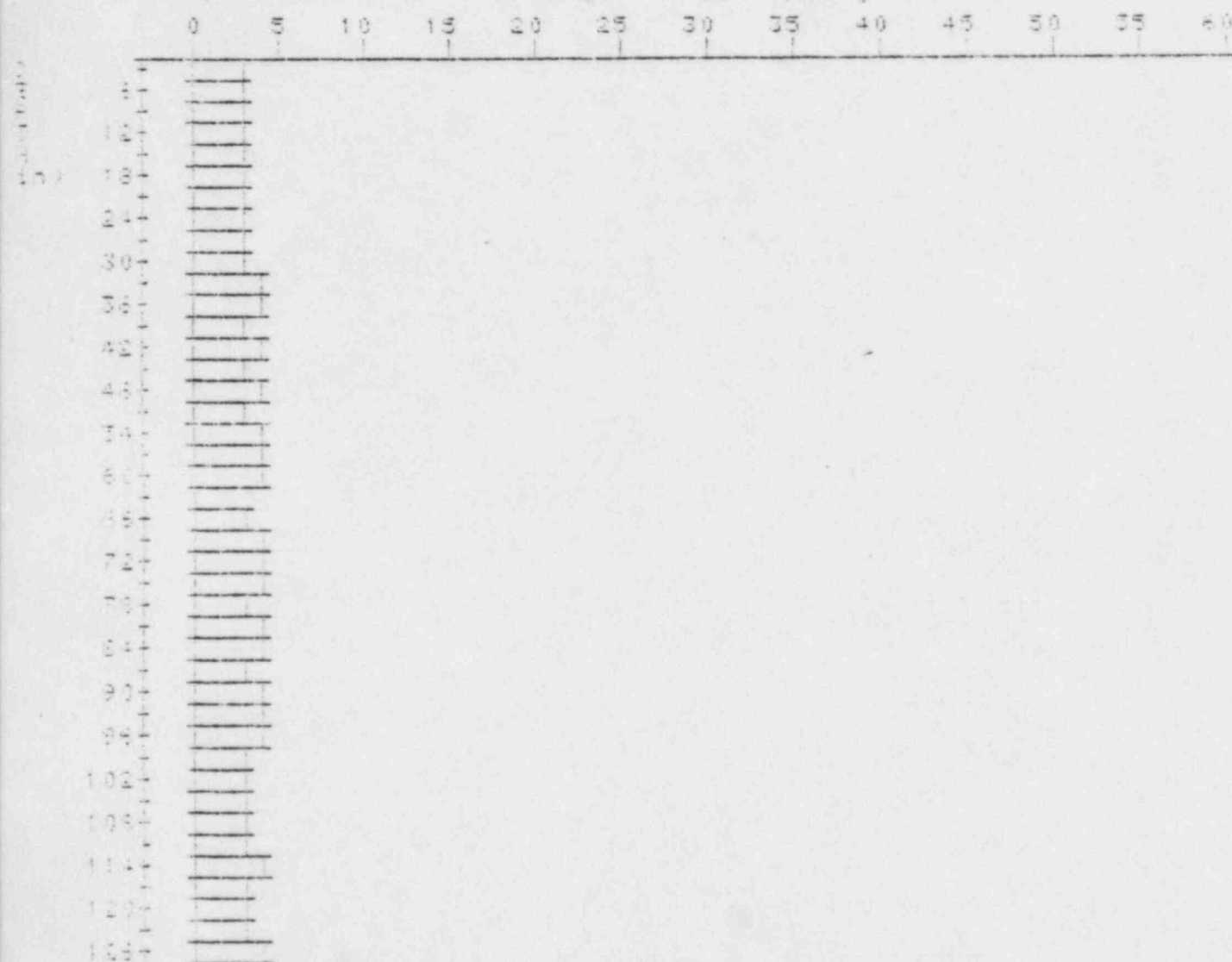
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
0	0.0	0.0
3	0.0	0.0
6	0.0	0.0
9	0.0	0.0
12	0.0	0.0
15	0.0	0.0
18	0.0	0.0
21	0.0	0.0
24	0.0	0.0
27	0.0	0.0
30	0.0	0.0
33	0.0	0.0
36	0.0	0.0
39	0.0	0.0
42	0.0	0.0
45	0.0	0.0
48	0.0	0.0
51	0.0	0.0
54	0.0	0.0
57	0.0	0.0
60	0.0	0.0
63	0.0	0.0
66	0.0	0.0
69	0.0	0.0
72	0.0	0.0
75	0.0	0.0
78	0.0	0.0
81	0.0	0.0
84	0.0	0.0
87	0.0	0.0
90	0.0	0.0
93	0.0	0.0
96	0.0	0.0

[illegible]

(a) (b) (c) (d) (e) (f) (g) (h) (i) (j) (k) (l) (m) (n) (o) (p) (q) (r) (s) (t) (u) (v) (w) (x) (y) (z)

[illegible]

APPARENT RA-226 (pCi/g)

 $\frac{CH}{\text{---}} \quad CH = | - CH \quad \begin{array}{c} \text{---} \\ / \backslash \\ \text{---} \end{array}$ 

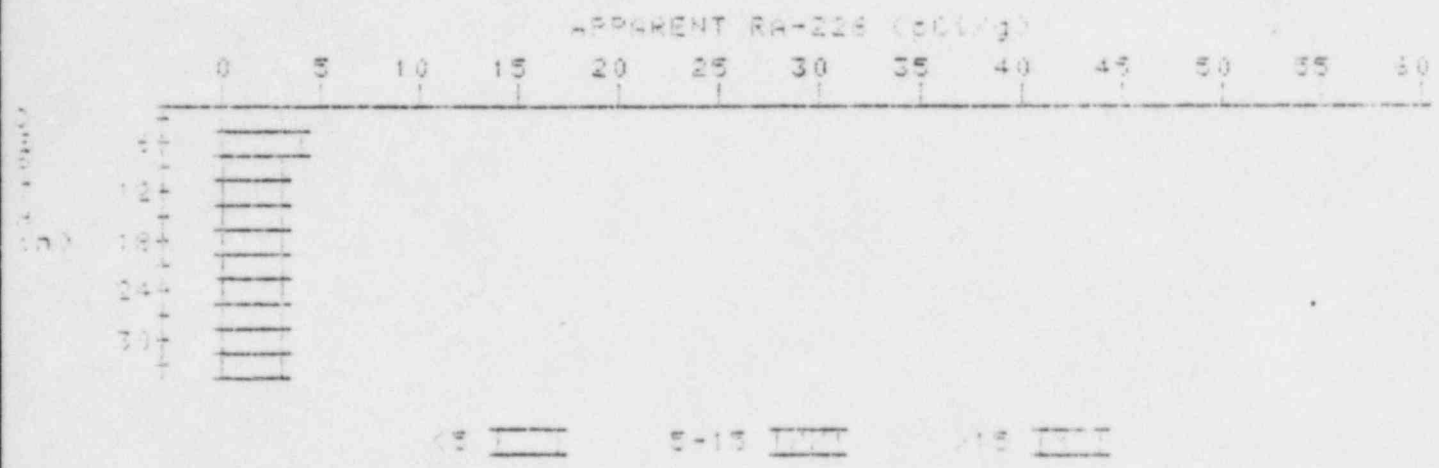
> : CH<sub>2</sub> --- CH<sub>2</sub> ---

[illegible]



# APPARENT RADIUM-226 CONCENTRATION 20 DECONVOLUTION GRAPH

REPORT NUMBER: 20-14437-MR  
HOLE NUMBER: 20  
LOCATION: 220261

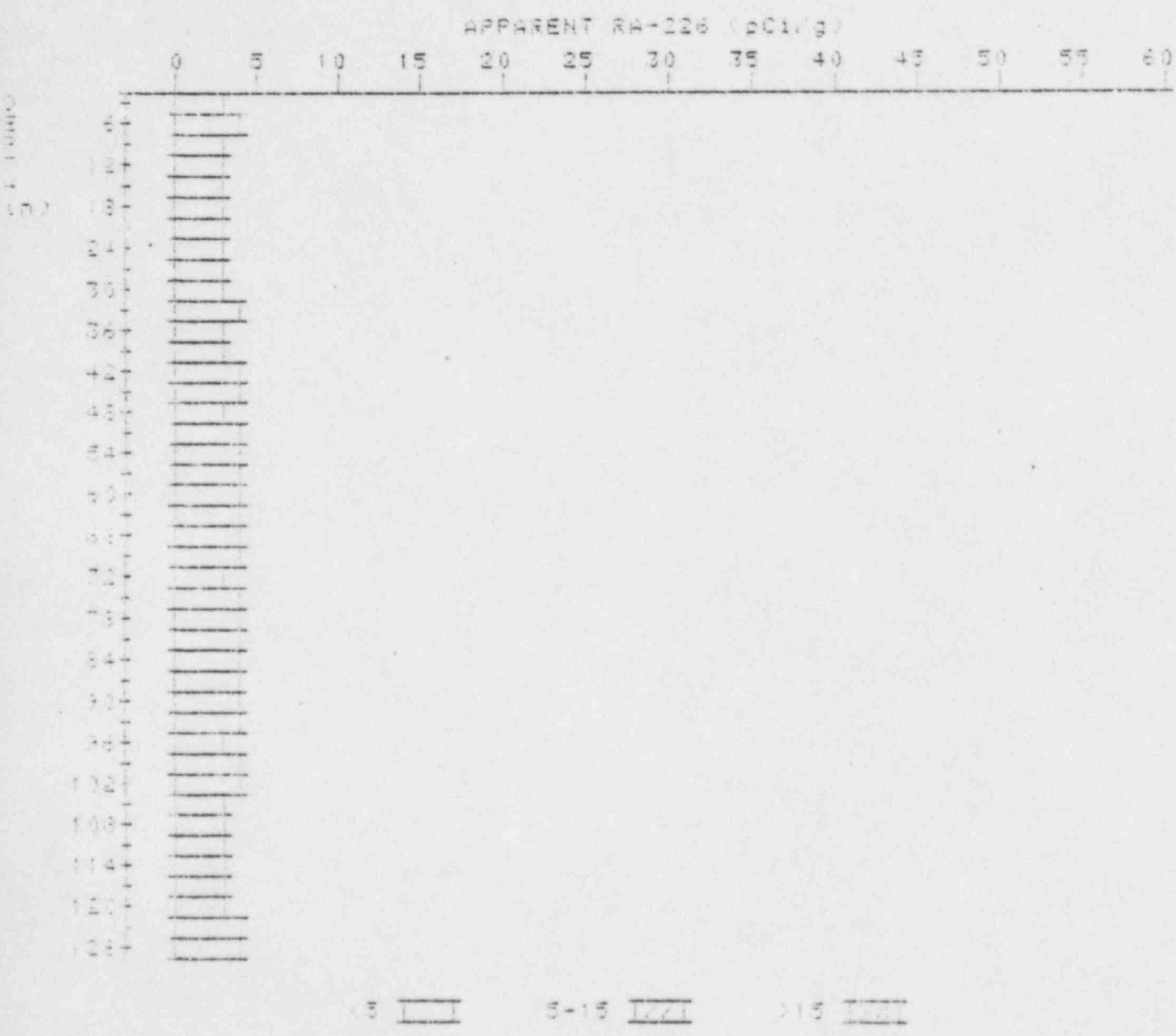


Depth (in)	Apparent Radium-226 (pCi/g)	Apparent Radium-226 (pCi/g)
	Undeconvolved	Deconvolved
3	2.6	2.6
6	3.0	3.0
9	3.1	3.1
12	3.2	3.2
15	3.3	3.3
18	3.4	3.4
21	3.5	3.5
24	3.6	3.6
27	3.7	3.7
30	3.8	3.8



# APPARENT RADIUM-226 CONCENTRATION 21 DECONVOLUTION GRAPH

PROPERTY NUMBER: 00-14635-MR  
HOLE NUMBER: 21  
LOCATION: 221273



Depth (ft)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.6	2.6

[illegible][illegible]

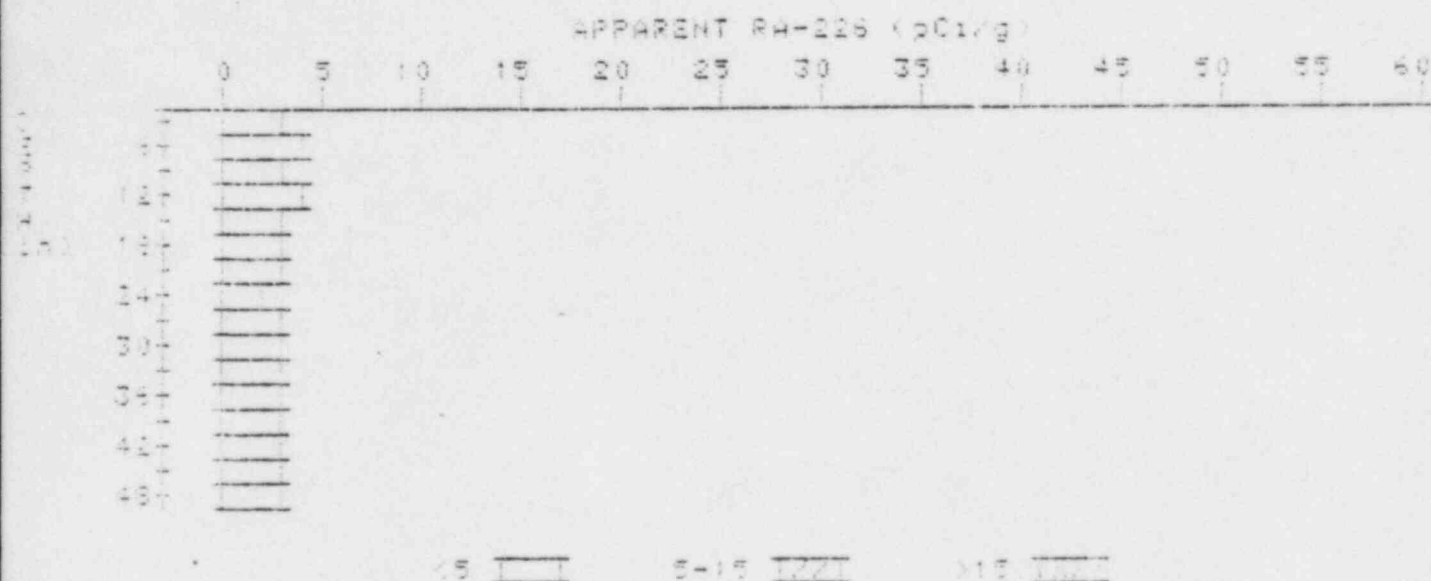
6a. 6d. 6f. 6g. 6h. 6i. 6j. 6k. 6l. 6m. 6n. 6o. 6p. 6q. 6r. 6s. 6t. 6u. 6v. 6w. 6x. 6y. 6z. 6aa. 6ab. 6ac. 6ad. 6ae. 6af. 6ag. 6ah. 6ai. 6aj. 6ak. 6al. 6am. 6an. 6ao. 6ap. 6aq. 6ar. 6as. 6at. 6au. 6av. 6aw. 6ax. 6ay. 6az. 6ba. 6bb. 6bc. 6bd. 6be. 6bf. 6bg. 6bh. 6bi. 6bj. 6bk. 6bl. 6bm. 6bn. 6bo. 6bp. 6bq. 6br. 6bs. 6bt. 6bu. 6bv. 6bw. 6bx. 6by. 6bz. 6ca. 6cb. 6cc. 6cd. 6ce. 6cf. 6cg. 6ch. 6ci. 6cj. 6ck. 6cl. 6cm. 6cn. 6co. 6cp. 6cq. 6cr. 6cs. 6ct. 6cu. 6cv. 6cw. 6cx. 6cy. 6cz. 6da. 6db. 6dc. 6dd. 6de. 6df. 6dg. 6dh. 6di. 6dj. 6dk. 6dl. 6dm. 6dn. 6do. 6dp. 6dq. 6dr. 6ds. 6dt. 6du. 6dv. 6dw. 6dx. 6dy. 6dz. 6ea. 6eb. 6ec. 6ed. 6ee. 6ef. 6eg. 6eh. 6ei. 6ej. 6ek. 6el. 6em. 6en. 6eo. 6ep. 6eq. 6er. 6es. 6et. 6eu. 6ev. 6ew. 6ex. 6ey. 6ez. 6fa. 6fb. 6fc. 6fd. 6fe. 6ff. 6fg. 6fh. 6fi. 6fj. 6fk. 6fl. 6fm. 6fn. 6fo. 6fp. 6fq. 6fr. 6fs. 6ft. 6fu. 6fv. 6fw. 6fx. 6fy. 6fz. 6ga. 6gb. 6gc. 6gd. 6ge. 6gf. 6gg. 6gh. 6gi. 6gj. 6gk. 6gl. 6gm. 6gn. 6go. 6gp. 6gq. 6gr. 6gs. 6gt. 6gu. 6gv. 6gw. 6gx. 6gy. 6gz. 6ha. 6hb. 6hc. 6hd. 6he. 6hf. 6hg. 6hh. 6hi. 6hj. 6hk. 6hl. 6hm. 6hn. 6ho. 6hp. 6hq. 6hr. 6hs. 6ht. 6hu. 6hv. 6hw. 6hx. 6hy. 6hz. 6ia. 6ib. 6ic. 6id. 6ie. 6if. 6ig. 6ih. 6ii. 6ij. 6ik. 6il. 6im. 6in. 6io. 6ip. 6iq. 6ir. 6is. 6it. 6iu. 6iv. 6iw. 6ix. 6iy. 6iz. 6ja. 6jb. 6jc. 6jd. 6je. 6jf. 6jg. 6jh. 6ji. 6jj. 6jk. 6jl. 6jm. 6jn. 6jo. 6jp. 6jq. 6jr. 6js. 6jt. 6ju. 6jv. 6jw. 6jx. 6jy. 6jz. 6ka. 6kb. 6kc. 6kd. 6ke. 6kf. 6kg. 6kh. 6ki. 6kj. 6kk. 6kl. 6km. 6kn. 6ko. 6kp. 6kq. 6kr. 6ks. 6kt. 6ku. 6kv. 6kw. 6kx. 6ky. 6kz. 6la. 6lb. 6lc. 6ld. 6le. 6lf. 6lg. 6lh. 6li. 6lj. 6lk. 6ll. 6lm. 6ln. 6lo. 6lp. 6lq. 6lr. 6ls. 6lt. 6lu. 6lv. 6lw. 6lx. 6ly. 6lz. 6ma. 6mb. 6mc. 6md. 6me. 6mf. 6mg. 6mh. 6mi. 6mj. 6mk. 6ml. 6mn. 6mo. 6mp. 6mq. 6mr. 6ms. 6mt. 6mu. 6mv. 6mw. 6mx. 6my. 6mz. 6na. 6nb. 6nc. 6nd. 6ne. 6nf. 6ng. 6nh. 6ni. 6nj. 6nk. 6nl. 6nm. 6nn. 6no. 6np. 6nq. 6nr. 6ns. 6nt. 6nu. 6nv. 6nw. 6nx. 6ny. 6nz. 6oa. 6ob. 6oc. 6od. 6oe. 6of. 6og. 6oh. 6oi. 6oj. 6ok. 6ol. 6om. 6on. 6oo. 6op. 6oq. 6or. 6os. 6ot. 6ou. 6ov. 6ow. 6ox. 6oy. 6oz. 6pa. 6pb. 6pc. 6pd. 6pe. 6pf. 6pg. 6ph. 6pi. 6pj. 6pk. 6pl. 6pm. 6pn. 6po. 6pp. 6pq. 6pr. 6ps. 6pt. 6pu. 6pv. 6pw. 6px. 6py. 6pz. 6qa. 6qb. 6qc. 6qd. 6qe. 6qf. 6qg. 6qh. 6qi. 6qj. 6qk. 6ql. 6qm. 6qn. 6qo. 6qp. 6qq. 6qr. 6qs. 6qt. 6qu. 6qv. 6qw. 6qx. 6qy. 6qz. 6ra. 6rb. 6rc. 6rd. 6re. 6rf. 6rg. 6rh. 6ri. 6rj. 6rk. 6rl. 6rm. 6rn. 6ro. 6rp. 6rq. 6rr. 6rs. 6rt. 6ru. 6rv. 6rw. 6rx. 6ry. 6rz. 6sa. 6sb. 6sc. 6sd. 6se. 6sf. 6sg. 6sh. 6si. 6sj. 6sk. 6sl. 6sm. 6sn. 6so. 6sp. 6sq. 6sr. 6ss. 6st. 6su. 6sv. 6sw. 6sx. 6sy. 6sz. 6ta. 6tb. 6tc. 6td. 6te. 6tf. 6tg. 6th. 6ti. 6tj. 6tk. 6tl. 6tm. 6tn. 6to. 6tp. 6tq. 6tr. 6ts. 6tt. 6tu. 6tv. 6tw. 6tx. 6ty. 6tz. 6ua. 6ub. 6uc. 6ud. 6ue. 6uf. 6ug. 6uh. 6ui. 6uj. 6uk. 6ul. 6um. 6un. 6uo. 6up. 6uq. 6ur. 6us. 6ut. 6uu. 6uv. 6uw. 6ux. 6uy. 6uz. 6va. 6vb. 6vc. 6vd. 6ve. 6vf. 6vg. 6vh. 6vi. 6vj. 6vk. 6vl. 6vm. 6vn. 6vo. 6vp. 6vq. 6vr. 6vs. 6vt. 6vu. 6vv. 6vw. 6vx. 6vy. 6vz. 6wa. 6wb. 6wc. 6wd. 6we. 6wf. 6wg. 6wh. 6wi. 6wj. 6wk. 6wl. 6wm. 6wn. 6wo. 6wp. 6wq. 6wr. 6ws. 6wt. 6wu. 6wv. 6ww. 6wx. 6wy. 6wz. 6xa. 6xb. 6xc. 6xd. 6xe. 6xf. 6xg. 6xh. 6xi. 6xj. 6xk. 6xl. 6xm. 6xn. 6xo. 6xp. 6xq. 6xr. 6xs. 6xt. 6xu. 6xv. 6xw. 6xx. 6xy. 6xz. 6ya. 6yb. 6yc. 6yd. 6ye. 6yf. 6yg. 6yh. 6yi. 6yj. 6yk. 6yl. 6ym. 6yn. 6yo. 6yp. 6yq. 6yr. 6ys. 6yt. 6yu. 6yv. 6yw. 6yx. 6yy. 6yz. 6za. 6zb. 6zc. 6zd. 6ze. 6zf. 6zg. 6zh. 6zi. 6zj. 6zk. 6zl. 6zm. 6zn. 6zo. 6zp. 6zq. 6zr. 6zs. 6zt. 6zu. 6zv. 6zw. 6zx. 6zy. 6zz. 7a. 7b. 7c. 7d. 7e. 7f. 7g. 7h. 7i. 7j. 7k. 7l. 7m. 7n. 7o. 7p. 7q. 7r. 7s. 7t. 7u. 7v. 7w. 7x. 7y. 7z. 7aa. 7ab. 7ac. 7ad. 7ae. 7af. 7ag. 7ah. 7ai. 7aj. 7ak. 7al. 7am. 7an. 7ao. 7ap. 7aq. 7ar. 7as. 7at. 7au. 7av. 7aw. 7ax. 7ay. 7az. 7ba. 7bb. 7bc. 7bd. 7be. 7bf. 7bg. 7bh. 7bi. 7bj. 7bk. 7bl. 7bm. 7bn. 7bo. 7bp. 7bq. 7br. 7bs. 7bt. 7bu. 7bv. 7bw. 7bx. 7by. 7bz. 7ca. 7cb. 7cc. 7cd. 7ce. 7cf. 7cg. 7ch. 7ci. 7cj. 7ck. 7cl. 7cm. 7cn. 7co. 7cp. 7cq. 7cr. 7cs. 7ct. 7cu. 7cv. 7cw. 7cx. 7cy. 7cz. 7da. 7db. 7dc. 7dd. 7de. 7df. 7dg. 7dh. 7di. 7dj. 7dk. 7dl. 7dm. 7dn. 7do. 7dp. 7dq. 7dr. 7ds. 7dt. 7du. 7dv. 7dw. 7dx. 7dy. 7dz. 7ea. 7eb. 7ec. 7ed. 7ee. 7ef. 7eg. 7eh. 7ei. 7ej. 7ek. 7el. 7em. 7en. 7eo. 7ep. 7eq. 7er. 7es. 7et. 7eu. 7ev. 7ew. 7ex. 7ey. 7ez. 7fa. 7fb. 7fc. 7fd. 7fe. 7ff. 7fg. 7fh. 7fi. 7fj. 7fk. 7fl. 7fm. 7fn. 7fo. 7fp. 7fq. 7fr. 7fs. 7ft. 7fu. 7fv. 7fw. 7fx. 7fy. 7fz. 7ga. 7gb. 7gc. 7gd. 7ge. 7gf. 7gg. 7gh. 7gi. 7gj. 7gk. 7gl. 7gm. 7gn. 7go. 7gp. 7gq. 7gr. 7gs. 7gt. 7gu. 7gv. 7gw. 7gx. 7gy. 7gz. 7ha. 7hb. 7hc. 7hd. 7he. 7hf. 7hg. 7hh. 7hi. 7hj. 7hk. 7hl. 7hm. 7hn. 7ho. 7hp. 7hq. 7hr. 7hs. 7ht. 7hu. 7hv. 7hw. 7hx. 7hy. 7hz. 7ia. 7ib. 7ic. 7id. 7ie. 7if. 7ig. 7ih. 7ii. 7ij. 7ik. 7il. 7im. 7in. 7io. 7ip. 7iq. 7ir. 7is. 7it. 7iu. 7iv. 7iw. 7ix. 7iy. 7iz. 7ja. 7jb. 7jc. 7jd. 7je. 7jf. 7jg. 7jh. 7ji. 7jj. 7jk. 7jl. 7jm. 7jn. 7jo. 7jp. 7jq. 7jr. 7js. 7jt. 7ju. 7jv. 7jw. 7jx. 7jy. 7jz. 7ka. 7kb. 7kc. 7kd. 7ke. 7kf. 7kg. 7kh. 7ki. 7kj. 7kk. 7kl. 7km. 7kn. 7ko. 7kp. 7kq. 7kr. 7ks. 7kt. 7ku. 7kv. 7kw. 7kx. 7

# APPARENT RADIUM-226 CONCENTRATION 22 DECONVOLUTION GRAPH

PROPERTY NUMBER: 20-14433-MR

HOLE NUMBER: 21

LOCATION: 223150



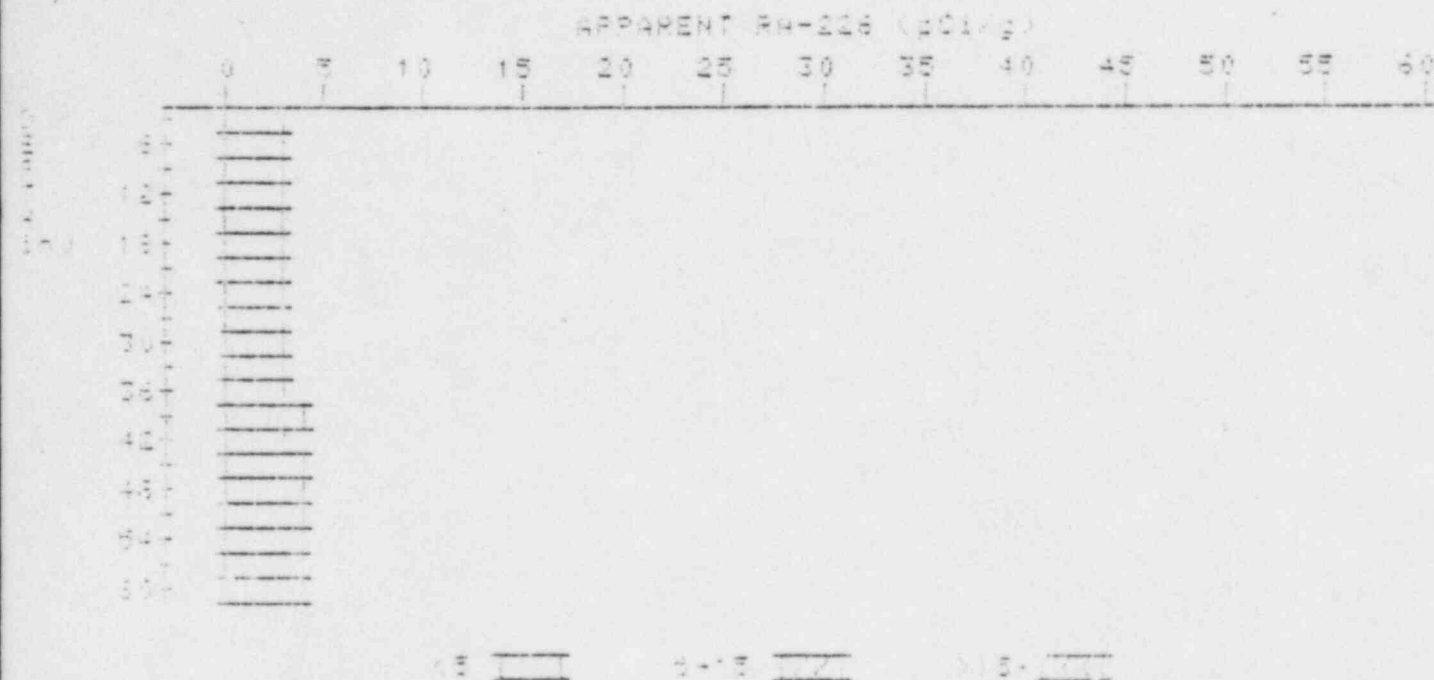
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
0	2.8	2.8
6	3.1	3.6
9	3.1	2.9
12	3.2	3.7
15	3.0	2.6
18	2.9	2.6
21	2.9	2.6
24	2.7	2.9
27	2.9	2.9
30	2.9	2.9
33	3.0	2.4
36	2.9	2.0
39	3.0	2.0
42	3.1	1.1
45	2.2	2.2
48	2.2	2.5

# APPARENT RADIUM-226 CONCENTRATION 25 DECONVOLUTION GRAPH

REPORT NUMBER: 07-11435-RR

HOLE NUMBER: 25

LOCATION: 227134



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
0	5.7	5.7
2	5.0	5.0
4	4.1	4.1
6	3.1	3.1
8	2.9	2.9
10	2.7	2.7
12	2.4	2.4
14	2.3	2.3
16	2.2	2.2
18	2.1	2.1
20	2.0	2.0
22	1.9	1.9
24	1.8	1.8
26	1.7	1.7
28	1.6	1.6
30	1.5	1.5
32	1.4	1.4
34	1.3	1.3
36	1.2	1.2
38	1.1	1.1
40	1.0	1.0
42	0.9	0.9
44	0.8	0.8
46	0.7	0.7
48	0.6	0.6
50	0.5	0.5
52	0.4	0.4
54	0.3	0.3
56	0.2	0.2
58	0.1	0.1
60	0.0	0.0

57  
50

57  
50

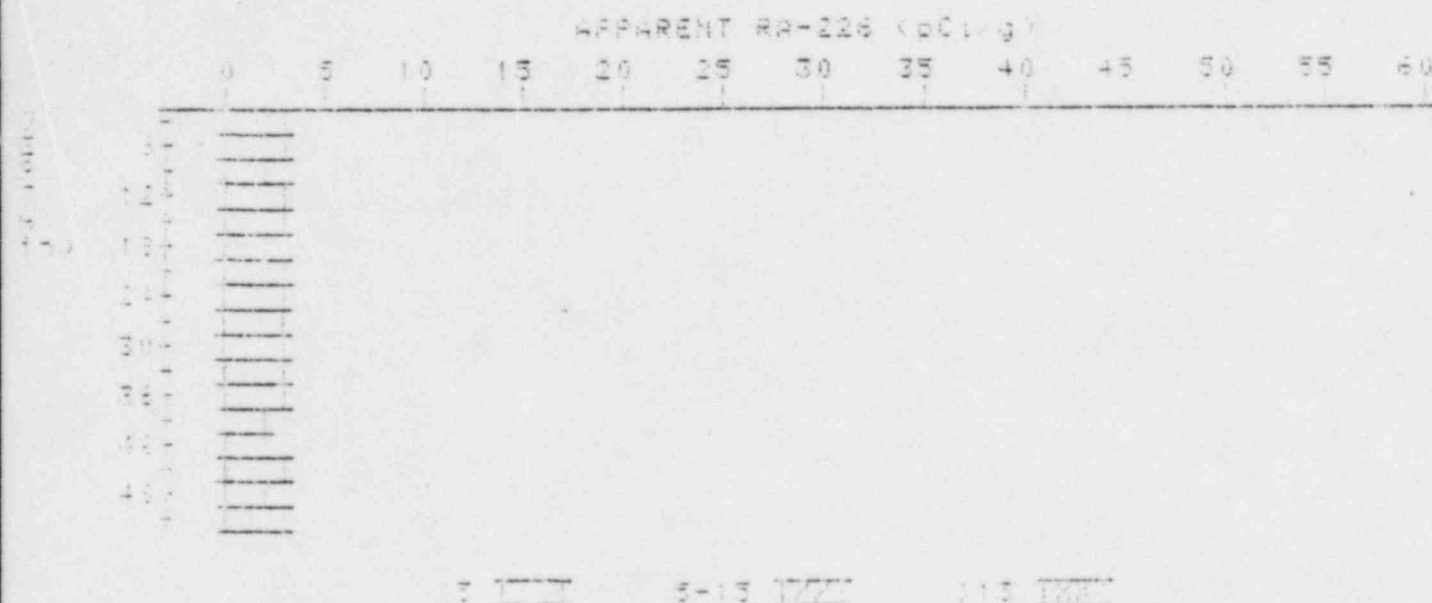
57  
50

# APPARENT RADIUM-226 CONCENTRATION 26 DECONVOLUTION GRAPH

PROPERTY NUMBER: 30-14035-019

HOLE NUMBER: 2:

LOCATION: 240170



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
0.0	2.6	2.6
0.5	2.6	2.6
1.0	2.6	2.6
1.5	2.6	2.6
2.0	2.6	2.6
2.5	2.6	2.6
3.0	2.6	2.6
3.5	2.6	2.6
4.0	2.6	2.6
4.5	2.6	2.6
5.0	2.6	2.6
5.5	2.6	2.6
6.0	2.6	2.6
6.5	2.6	2.6
7.0	2.6	2.6
7.5	2.6	2.6
8.0	2.6	2.6
8.5	2.6	2.6
9.0	2.6	2.6
9.5	2.6	2.6
10.0	2.6	2.6
10.5	2.6	2.6
11.0	2.6	2.6
11.5	2.6	2.6
12.0	2.6	2.6
12.5	2.6	2.6
13.0	2.6	2.6
13.5	2.6	2.6
14.0	2.6	2.6
14.5	2.6	2.6
15.0	2.6	2.6
15.5	2.6	2.6
16.0	2.6	2.6
16.5	2.6	2.6
17.0	2.6	2.6
17.5	2.6	2.6
18.0	2.6	2.6
18.5	2.6	2.6
19.0	2.6	2.6
19.5	2.6	2.6
20.0	2.6	2.6
20.5	2.6	2.6
21.0	2.6	2.6
21.5	2.6	2.6
22.0	2.6	2.6
22.5	2.6	2.6
23.0	2.6	2.6
23.5	2.6	2.6
24.0	2.6	2.6
24.5	2.6	2.6
25.0	2.6	2.6
25.5	2.6	2.6
26.0	2.6	2.6
26.5	2.6	2.6
27.0	2.6	2.6
27.5	2.6	2.6
28.0	2.6	2.6
28.5	2.6	2.6
29.0	2.6	2.6
29.5	2.6	2.6
30.0	2.6	2.6
30.5	2.6	2.6
31.0	2.6	2.6
31.5	2.6	2.6
32.0	2.6	2.6
32.5	2.6	2.6
33.0	2.6	2.6
33.5	2.6	2.6
34.0	2.6	2.6
34.5	2.6	2.6
35.0	2.6	2.6
35.5	2.6	2.6
36.0	2.6	2.6
36.5	2.6	2.6
37.0	2.6	2.6
37.5	2.6	2.6
38.0	2.6	2.6
38.5	2.6	2.6
39.0	2.6	2.6
39.5	2.6	2.6
40.0	2.6	2.6
40.5	2.6	2.6
41.0	2.6	2.6
41.5	2.6	2.6
42.0	2.6	2.6
42.5	2.6	2.6
43.0	2.6	2.6
43.5	2.6	2.6
44.0	2.6	2.6
44.5	2.6	2.6
45.0	2.6	2.6
45.5	2.6	2.6
46.0	2.6	2.6
46.5	2.6	2.6
47.0	2.6	2.6
47.5	2.6	2.6
48.0	2.6	2.6
48.5	2.6	2.6
49.0	2.6	2.6
49.5	2.6	2.6
50.0	2.6	2.6
50.5	2.6	2.6
51.0	2.6	2.6
51.5	2.6	2.6
52.0	2.6	2.6
52.5	2.6	2.6
53.0	2.6	2.6
53.5	2.6	2.6
54.0	2.6	2.6
54.5	2.6	2.6
55.0	2.6	2.6
55.5	2.6	2.6
56.0	2.6	2.6
56.5	2.6	2.6
57.0	2.6	2.6
57.5	2.6	2.6
58.0	2.6	2.6
58.5	2.6	2.6
59.0	2.6	2.6
59.5	2.6	2.6
60.0	2.6	2.6

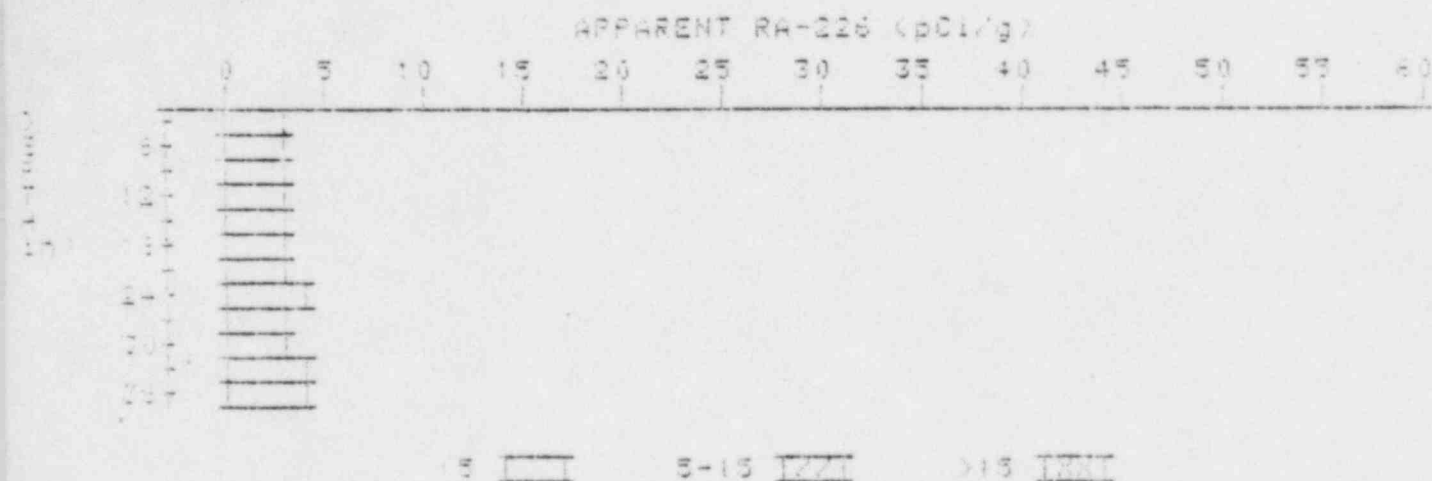


# APPARENT RADIUM-226 CONCENTRATION 27 DECONVOLUTION GRAPH

PROPERTY NUMBER: DJ-1433-MR

HOLE NUMBER: 27

LOCATION: 240250



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
0	2.8	2.8
2	2.8	2.8
4	3.1	3.8
6	3.2	3.4
8	3.2	3.2
10	3.2	3.0
12	3.3	3.3
14	3.4	3.5
16	3.4	3.4
18	3.4	4.1
20	3.8	3.8
22	3.6	3.6