RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-03635-RS
ADDRESS: 459 BELFORD AVENUE

JULY 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

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

APPROVED BY MK Tucker by CDH
M. TUCKER
DOE PROJECT ENGINEER

DATE July 15, 1985

REA03635:REA-AAB005

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

The location, DOE ID No. GJ-03635-RS, is a single-family residence located at 459 Belford Avenue, 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, 34 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is $5,230. Remedial action on this property will take approximately 10 days to complete.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 459 Belford Avenue, Grand Junction, Colorado

Zoning: Residential (RMF-32)

Lot Size: Approximately 3,125 sf (0.07 acre)

Legal Description: North 1/2 of Lots 12 and 13, Block 15, City of Grand Junction, 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:	None

Bordering Properties:

North:	Belford Avenue
South:	Single-family residence
East:	Single-family residence
West:	Single-family residence

2.2 Existing Facilities and Structures

Primary Structure:

Type:	Two-story single-family residence
Size:	Approximately 906 sf
Construction Date:	1900
Construction:	Wood-frame
Foundation:	Concrete stemwall on spread footing
Footing Depth:	Approximately 10" to bottom of footing from grade
Basement:	Yes - partial
Crawl Space:	Yes
Condition:	Fair

Other Structures:

Type:	Storage shed
Size:	Approximately 61 sf
Construction:	Prefabricated metal
Foundation:	None
Condition:	Good

Type:	Animal pens
Size:	Approximately 27 sf
Construction:	Wood frame and wire
Foundation:	None
Condition:	Fair

General Remarks:

Tailings contamination is spotted over the property and appears as individual pockets of fill. Structures, utilities, landscaping, and other special features of this property are included in Appendix Figure 2.2.

Historical Data:

This structure is over 50 years old. Therefore, it does meet the eligibility criteria for consideration of inclusion on the National Register of Historic Places.

Alterations to Structure: None known

Architectural Significance: None known

Historical Significance: None known

3.0 RADIOLOGIC SURVEY

3.1 Introduction

Radiologic data were collected by Bendix at DOE ID No. GJ-03635-RS on March 26, 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 levels on the city sidewalk, the northern part of the driveway, and two areas in the south lawn. A complete gamma scan of the ground floor in the primary structure showed that all measurements were within background range.

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: 14 to 16 uR/h
Highest Outside Gamma Reading (HOG): 48 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: 12 to 15 R/h
Highest Inside Gamma Reading (HIG): 17 uR/h

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

3.3 Boreholes, Soil Samples, and Other Measurements

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

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) The soil beneath the uncontaminated 6-inch-thick concrete city sidewalk and driveway is contaminated to a total depth of 12 inches (approximately 418 sf).

(AREA B) A deposit east of the driveway, extending along the north side of the sidewalk, is contaminated to a depth of 12 inches (approximately 137 sf).

(AREA C) A narrow strip of soil along the south side of the sidewalk is contaminated to a depth of 6 inches (approximately 105 sf).

(AREA D) The flower bed at the northwest corner of the primary structure is contaminated to a depth of 6 inches (approximately 24 sf).

(AREA E) A small deposit west of the concrete driveway is contaminated to a depth of 15 inches (approximately 14 sf).

(AREA F) A deposit in the southwest corner of the property, extending under the shed, is contaminated to a depth of 9 inches (approximately 161 sf).

(AREA G) An area adjacent to the east side of Area F is contaminated to a depth of 6 inches (approximately 56 sf).

(AREA H) Adjacent to the southeast corner of the primary structure, a portion of the lawn is contaminated to a depth of 6 inches (approximately 144 sf).

(AREAS REQUIRING FURTHER INVESTIGATION DURING REMEDIAL ACTION)

The shed in the southwest corner of the property will have to be moved. The dirt floor in the shed should be further investigated during remedial action, because it was not assessable during the radiological survey.

There is contamination under the city sidewalk which covers the sewer line. This area should be further investigated during remedial action.

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-03635-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 $5,230.

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

Appendix Figures:

Figure 2.1	Vicinity Map
Figure 2.2	Site Plan
Figure 3.1	Exterior Grid-Point Exposure Rates
Figure 3.2	Exterior Gamma Scan
Figure 3.3a	Interior Gamma Exposure Rates and Sample Locations - 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)

RADRPT V85.1<850225.1330> Table 3.1
Radium Concentrations at Exterior Locations
DOE ID #GJ-03635-RS 459 Belford Avenue

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
2	136252	03	TC	9.3		*	West of driveway
		06	TC	12.2		*	DC = 15 inches
		09	TC	10.3		*	Based on the
		12	TC	7.6		*	deconvolution graph
		15	TC	5.8		*	
		18	TC	4.8		*	
		21	TC	4.4		*	
		24	TC	4.1		*	
		27	TC	4.2		*	
		30	TC	4.1		*	
		33	TC	3.9		*	
		36	TC	3.9		*	
3	136254	04	DS	2.0		*	Horizontal
		18	DS	2.1		*	
4	136294	00	DS	1.9		*	NW corner property
5	144285	00-06	SS			3.1	Concrete core
		06-12	SS			34.6	Soil under concrete
		03	TC	16.5		*	Sidewalk middle
		06	BH	24.7	20.4	*	of driveway
		09	TC	17.8		*	DC = 12 inches
		12	TC	11.7		*	Based on the
		15	TC	8.8		*	deconvolution graph
		18	TC	7.5		*	
		21	TC	6.7		*	
		24	TC	6.1		*	
		27	TC	5.9		*	
		30	TC	5.6		*	
		33	TC	5.3		*	
		36	BH	5.2	3.4	*	
		39	TC	5.1		*	
		42	TC	4.9		*	
		45	TC	4.7		*	
		48	TC	4.8		*	
		51	TC	4.7		*	
		54	TC	4.6		*	
		57	TC	4.6		*	
		60	TC	4.6		*	
		63	TC	4.5		*	
		66	TC	4.4		*	
		69	TC	4.3		*	

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Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
5	144285	72	TC	4.3		*	
		75	TC	4.2		*	
		78	TC	4.1		*	
		81	TC	3.9		*	
		84	TC	3.8		*	
		87	TC	3.7		*	
		90	BH	3.7	1.6	*	
		93	TC	3.7		*	
		96	TC	3.8		*	
		99	TC	3.8		*	
6	147215	03	TC	7.1		*	South backyard
		06	BH	6.3	4.7	*	Near fence
		09	TC	5.5		*	DC = 9 inches
		12	TC	5.1		*	Based on the
		15	TC	4.8		*	deconvolution graph
		18	TC	4.7		*	
		21	TC	4.6		*	
		24	TC	4.4		*	
		27	TC	4.4		*	
		30	TC	4.2		*	
		33	TC	4.0		*	
		36	BH	3.9	1.6	*	
		39	TC	3.8		*	
		42	TC	3.8		*	
		45	TC	3.7		*	
		48	TC	3.6		*	
		51	TC	3.7		*	
		54	TC	3.8		*	
		57	TC	3.8		*	
		60	TC	3.9		*	
		63	TC	3.9		*	
7	147224	00	DS	6.7		*	Backyard next
		06	DS	2.3		*	to fence
		12	DS	1.9		*	
8	149250	03	TC	4.2		*	West of house
		06	TC	4.2		*	Next to footing
		09	TC	4.2		*	DC = 0 inches
		12	TC	4.1		*	
		15	TC	4.1		*	
		18	TC	4.1		*	
		21	TC	4.1		*	

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Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	In Situ Ra-226 (pCi/g) Spectr.	Chem Ra-226 (pCi/g)	Comments
8	149250	24	TC	4.1		*	
		27	TC	4.1		*	
		30	TC	4.1		*	
		33	TC	4.2		*	
		36	TC	4.1		*	
		39	TC	3.9		*	
		42	TC	3.8		*	
		45	TC	3.8		*	
		48	TC	3.7		*	
		51	TC	3.6		*	
		54	TC	3.6		*	
		57	TC	3.8		*	
		60	TC	3.8		*	
		63	TC	3.8		*	
		66	TC	3.9		*	
		69	TC	4.0		*	
		72	TC	4.3		*	
		75	TC	4.0		*	
		78	TC	4.1		*	
		81	TC	4.1		*	
		84	TC	4.0		*	
		87	TC	4.1		*	
		90	TC	4.1		*	
		93	TC	3.9		*	
9	152236	03	TC	4.2		*	Footing check
		06	BH	4.4	1.9	*	DC = 0 inches
		09	TC	4.3		*	
		12	TC	4.2		*	
		15	TC	4.0		*	
		18	TC	4.0		*	
		21	TC	4.0		*	
		24	TC	4.0		*	
		27	TC	4.0		*	
		30	TC	4.0		*	
		33	TC	3.9		*	
		36	BH	3.8	1.0	*	
		39	TC	3.7		*	
		42	TC	3.6		*	
		45	TC	3.6		*	
		48	TC	3.7		*	
		51	TC	3.7		*	
		54	TC	3.8		*	
		57	TC	3.8		*	

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Radium Concentrations at Exterior Locations
DOE ID #GJ-03635-RS 459 Belford Avenue

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
9	152236	60	TC	5.0		*	
		63	TC	4.0		*	
		66	BH	4.0	1.8	*	
		69	TC	3.9		*	
		72	TC	4.0		*	
		75	TC	4.0		*	
		78	TC	3.9		*	
		81	TC	4.0		*	
		84	TC	3.9		*	
		87	TC	4.0		*	
10	153226	00	DS	1.1		*	Backyard
11	153288	00	DS	9.2		*	2 ft east of
		06	DS	4.1		*	driveway
		12	DS	3.1		*	
		15	DS	2.3		*	
12	154216	00	DS	6.8		*	Backyard along
		06	DS	1.8		*	the fence
13	154283	00	DS	28.4		*	City sidewalk
14	155265	00	DS	3.1		*	North of house
		06	DS	1.2		*	in flower garden
15	155270	00	DS	1.7		*	North of flower bed
16	160230	03	TC	3.3		*	Back of house
		06	TC	3.4		*	Near steps
		09	TC	3.6		*	Next to gas line
		12	TC	3.8		*	DC = 0 inches
		15	TC	3.9		*	
		18	TC	4.0		*	
		21	TC	4.0		*	
		24	TC	4.1		*	
		27	TC	4.0		*	
		30	TC	3.9		*	
		33	TC	3.8		*	
		36	TC	3.7		*	
		39	TC	3.6		*	
		42	TC	3.5		*	
		45	TC	3.5		*	
		48	TC	3.6		*	

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Radium Concentrations at Exterior Locations
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Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
16	160230	51	TC	3.7		*	
		54	TC	3.9		*	
		57	TC	3.9		*	
		60	TC	3.9		*	
		63	TC	4.0		*	
		66	TC	4.0		*	
		69	TC	4.1		*	
		72	TC	4.0		*	
		75	TC	4.0		*	
		78	TC	4.1		*	
		81	TC	4.1		*	
		84	TC	4.1		*	
		87	TC	4.0		*	
		90	TC	4.0		*	
		93	TC	4.0		*	
17	166287	00	DS	5.9		*	North of
		06	DS	3.8		*	sidewalk
		12	DS	1.8		*	
18	166296	03	TC	3.2		*	N of property
		06	TC	3.6		*	Next to water meter
		09	TC	3.9		*	DC = 0 inches
		12	TC	3.9		*	
		15	TC	4.0		*	
		18	TC	4.0		*	
		21	TC	4.0		*	
		24	TC	3.9		*	
		27	TC	3.9		*	
		30	TC	3.9		*	
19	168222	03	TC	5.3		*	Backyard
		06	BH	4.9	1.7	*	DC = 6 inches
		09	TC	4.4		*	Based on the
		12	TC	4.3		*	deconvolution graph
		15	TC	4.2		*	
		18	TC	4.1		*	
		21	TC	4.1		*	
		24	BH	4.0	1.4	*	
		27	TC	4.0		*	
		30	TC	3.9		*	
		33	TC	3.8		*	

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Radium Concentrations at Exterior Locations
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Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	In Situ Ra-226 (pCi/g) Spectr.	Chem Ra-226 (pCi/g)	Comments
20	170280	00	DS	2.7		*	South of
		06	DS	2.2		*	sidewalk
21	174223	00	DS	5.3		*	Southeast of house
		06	DS	1.3		*	
22	174251	03	TC	3.4		*	Next to sewer
		06	TC	3.3		*	line
		09	TC	3.5		*	DC = 0 inches
		12	TC	3.6		*	
		15	TC	3.6		*	
		18	TC	3.6		*	
		21	TC	3.6		*	
		24	TC	3.6		*	
		27	TC	3.8		*	
		30	TC	3.6		*	
		33	TC	3.5		*	
		36	TC	3.5		*	
		39	TC	3.4		*	
		42	TC	3.4		*	
		45	TC	3.4		*	
		48	TC	3.5		*	
		51	TC	3.5		*	
		54	TC	3.5		*	
		57	TC	3.5		*	
		60	TC	3.6		*	
		63	TC	3.7		*	
		66	TC	3.7		*	
		69	TC	3.9		*	
		72	TC	3.9		*	
		75	TC	3.9		*	
23	175233	00	DS	4.1		*	Southeast corner
		06	DS	<1.0		*	of the house
24	180245	00	DS	1.4		*	Background
		00-06	SS			2.6	DC = 0 inches
		03	TC	3.2		*	
		06	BH	3.4	<1.0	*	
		09	TC	3.5		*	
		12	TC	3.6		*	
		15	TC	3.6		*	
		18	TC	3.6		*	

RADRPT V85.1<850225.1330> Table 3.1
Radium Concentrations at Exterior Locations
DOE ID #GJ-03635-RS 459 Belford Avenue

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
24	180245	21	TC	3.7		*	
		24	TC	3.6		*	
		27	TC	3.7		*	
		30	TC	3.7		*	
		33	TC	3.8		*	
		36	BH	3.6	1.7	*	
		39	TC	3.6		*	
		42	TC	3.6		*	
		45	TC	3.5		*	
		48	TC	3.5		*	
		51	TC	3.4		*	
		54	TC	3.5		*	
		57	TC	3.5		*	
		60	TC	3.6		*	
25	180294	00	DS	1.6		*	Northeast property
26	183284	00-05	SS			3.1	Concrete core
		05-10	SS			4.7	Soil under core
		03	TC	35.0		*	On east sidewalk
		06	BH	44.1	28.9	*	DC = 12 inches
		09	TC	30.4		*	Based on the
		12	TC	19.6		*	deconvolution graph
		15	TC	13.2		*	
		18	TC	9.8		*	
		21	TC	7.8		*	
		24	TC	7.5		*	
		27	TC	5.8		*	
		30	TC	5.4		*	
		33	TC	5.1		*	
		36	BH	4.8	2.7	*	
		39	TC	4.8		*	
		42	TC	4.6		*	
		45	TC	4.5		*	
		48	TC	5.3		*	
		51	TC	4.4		*	
		54	BH	4.3	1.9	*	
		57	TC	4.2		*	

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Radium Concentrations at Exterior Locations
DOE ID #GJ-03635-RS 459 Belford Avenue

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	In Situ Ra-226 (pCi/g) Spectr.	Chem Ra-226 (pCi/g)	Comments
26	183284	60	TC	4.2		*	
		63	TC	4.1		*	
		66	TC	4.2		*	
		69	TC	4.2		*	

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 = 03-26-85
Team Leader = WCM

RADRPT V85.1<850225.1330> Table 3.2

Radium Concentrations at Interior Locations

DOE ID #GJ-03635-RS 459 Belford Avenue

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
1		[04]	DS	<1.0		*	Basement steps

Measurement Types:
- CB = 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 = 03-26-85
- Team Leader = WCM

Table 3.3
Summary of Interior Gamma Exposure Rates
DOE ID No. GJ-03635-RS 459 Belford Avenue Page 1 of 1

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	06	12-15	14	07	14-17	15
GROUND FLOOR *	*	*	*	*	12-13	*

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

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-03635-RS

AREA	CALCULATIONS(ft)		SF		DEPTH(ft)		CF		CUBIC YARDS
EXTERIOR									
	Concrete								
A	4 x 5	=	20						
	36 x 5	=	180						
	13 x 25	=	325						
			525	x	0.5	=	263		
	Volume of Fill					=	263	= 263/27	= 10
	Contaminated Fill								
A	13 x 16	=	208						
	5 x 6	=	30						
	36 x 5	=	180						
			418	x	0.5	=	209		
B	4 x 11	=	44						
	3 x 31	=	93						
			137	x	1.0	=	137		
C	35 x 3	=	105	x	0.5	=	53		
D	8 x 3	=	24	x	0.5	=	12		
E	2 x 7	=	14	x	1.3	=	18		
F	8 x 7	=	56						
	7 x 15	=	105						
			161	x	0.8	=	129		

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-03635-RS

AREA	CALCULATIONS(ft)		SF		DEPTH(ft)		CF				CUBIC YARDS
G	8 x 7	=	56	x	0.5	=	28				
H	6 x 5	=	30								
	6 x 19	=	114								
			144	x	0.5	=	72				
	Volume of Fill					=	658	=	658/27	=	24
	TOTAL VOLUME - EXTERIOR									=	34

See Appendix Figure 3.5 For Areas

Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-03635-RS

EXTERIOR		
Saw-cut driveway and walk		
25 lf @ $3/lf	$	75
Remove concrete driveway and walk		
525 sf @ $2/sf (6")		1,050
Remove and replace wood fence		
13 lf @ $2.60/lf		34
Remove/replace and store on site:		
Metal shed and contents		150
Pet houses		50
Flagstone - 15 sf @ $4/sf		60
Remove contaminated residual radioactive material		
22 cy @ $14.50/cy (machine - open)		319
2 cy @ $44/cy (manual - open)		88
Remove large tree		
1 @ $100 each		100
Replace topsoil		
16 cy @ $9.50/cy		152
Replace road base		
8 cy @ $11.50/cy		92
Replace concrete flatwork		
525 sf @ $2/sf		1,050
Replace sod		
242 sf @ $0.50/sf		121
Replace plantings and landscaping		
Lump sum		240
TOTAL EXTERIOR	$	3,581

Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-03635-RS

TOTAL EXTERIOR	$ 3,581
TOTAL INTERIOR	0
ACCESS CONTROL	250
SUBTOTAL	$ 3,831
CONTINGENCY @ 5%	192
SUBTOTAL	$ 4,023
CONTRACTOR OVERHEAD & PROFIT @ 30%	1,207
GRAND TOTAL	$ 5,230

AAB071/52
REA03635/REA-AAB005/LAJ

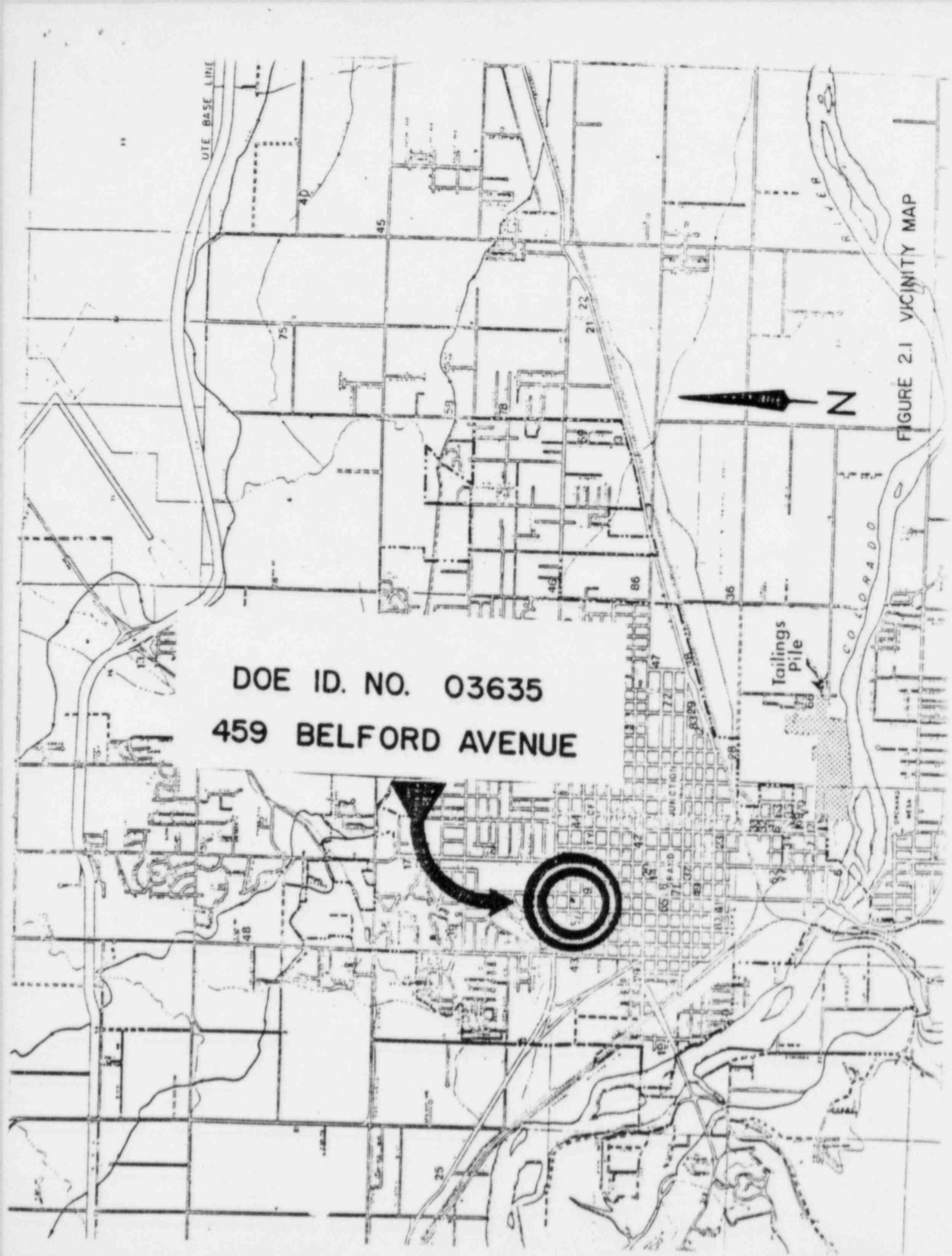
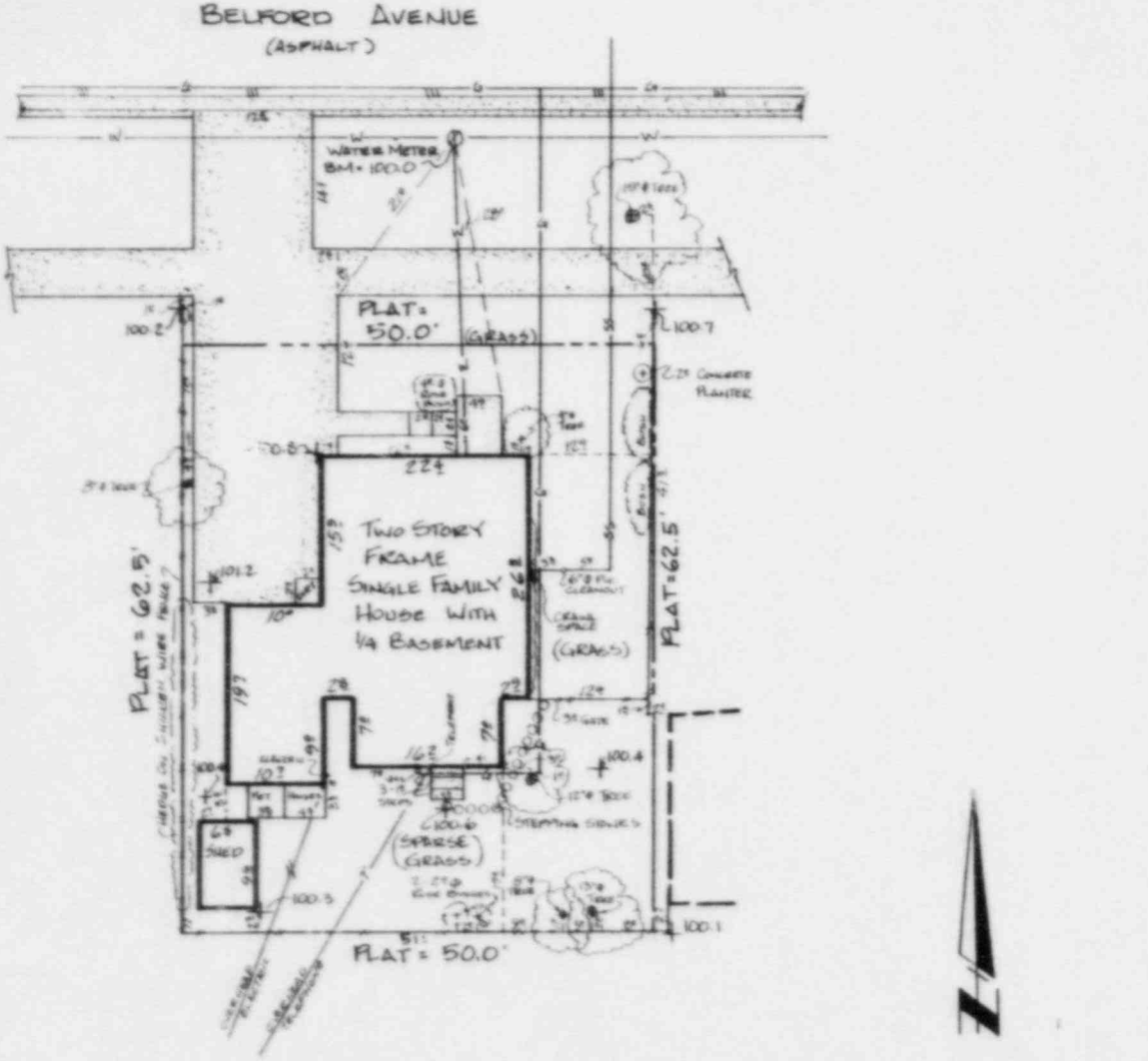


FIGURE 2.1 VICINITY MAP

THE NORTH HALF OF LOTS 12 AND 13 BLOCK 15,
CITY OF GRAND JUNCTION, MESA COUNTY, COLORADO.



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.

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION PROJECT OFFICE, COLORADO					DOE ID NO. GJ03635RS
ADDRESS 459 BELFORD AVENUE GRAND JUNCTION, COLORADO					ALLIED
SURV WHL	3-12-85	DRAFT RSK	3-15-85	CK CAF 3-17-85	
DRAWING NO. 3.C.556.F1				SHEET 1 OF 1	

FIGURE 2.2 SITE PLAN

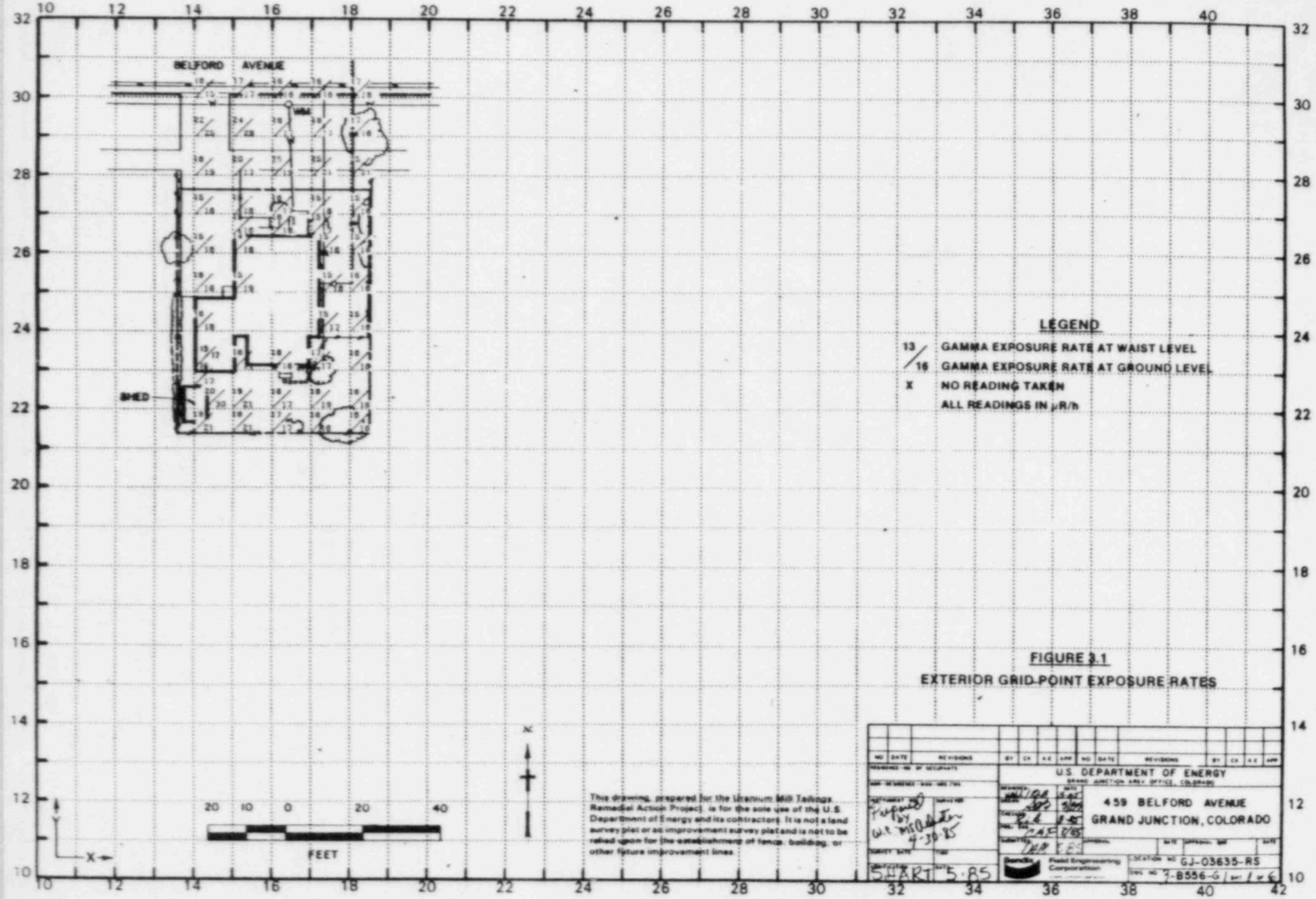


FIGURE 3.1

EXTERIOR GRID-POINT EXPOSURE RATES

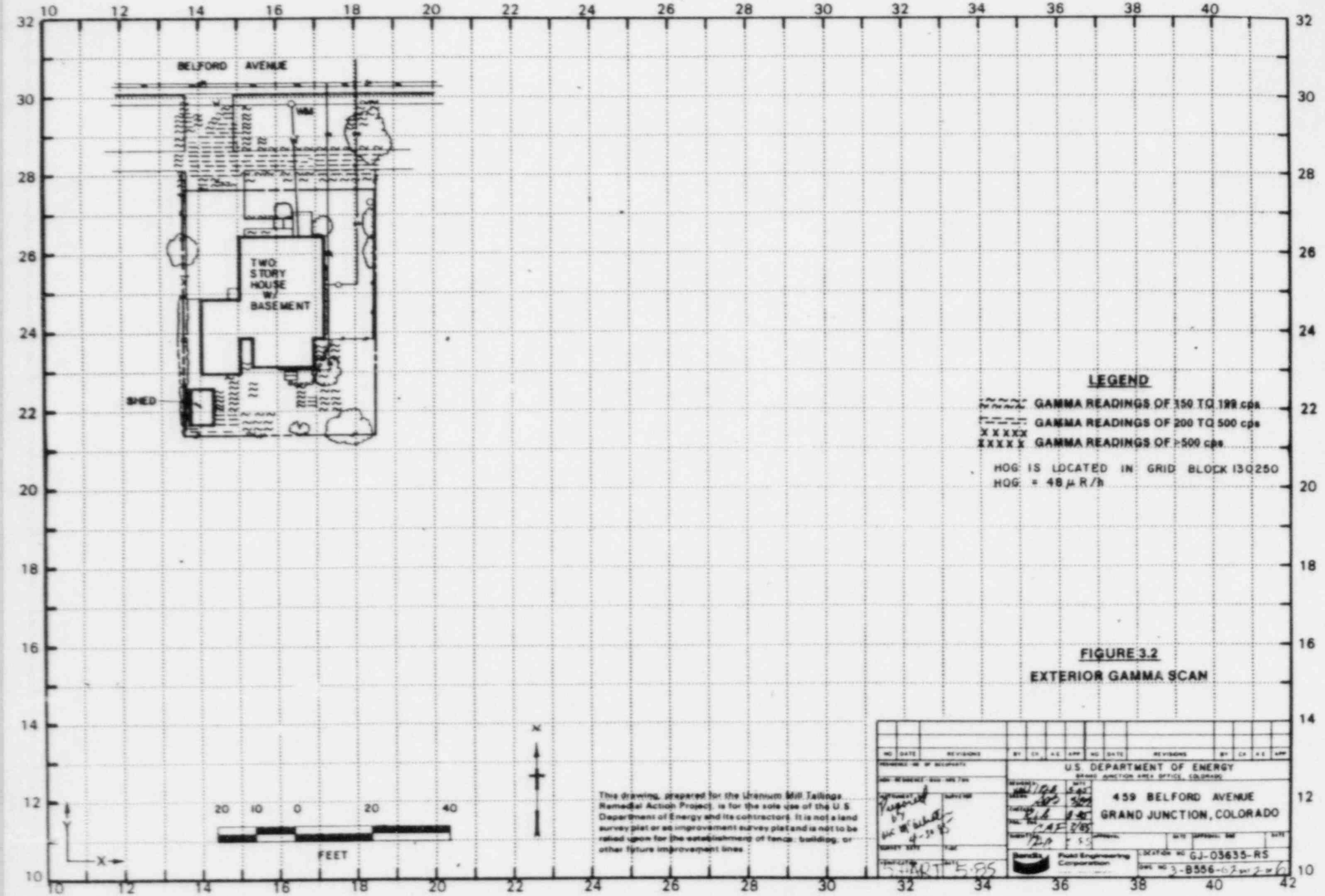


FIGURE 3.2

EXTERIOR GAMMA SCAN

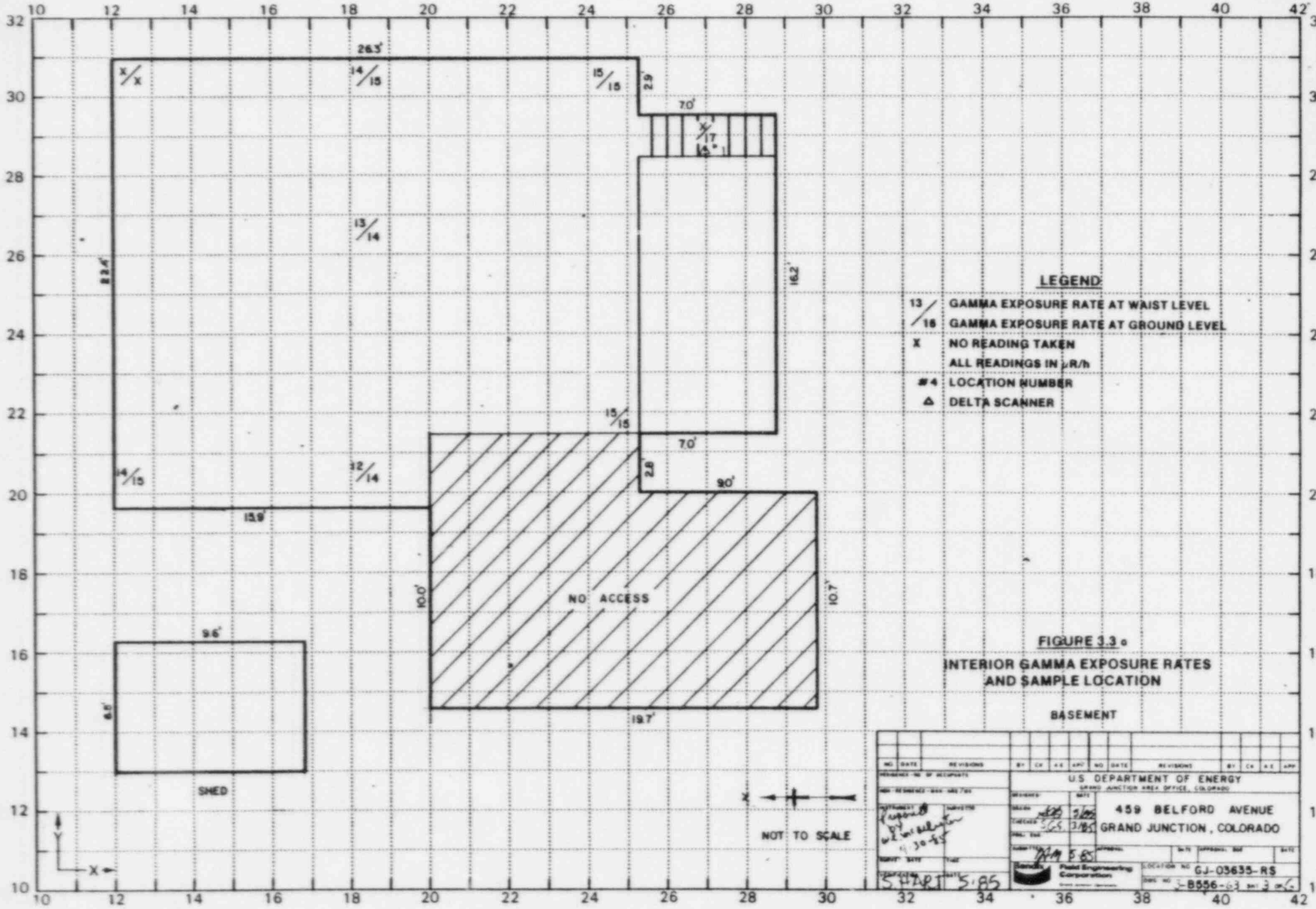


FIGURE 3.3 c

INTERIOR GAMMA EXPOSURE RATES AND SAMPLE LOCATION

BASEMENT

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION AREA OFFICE, COLORADO

459 BELFORD AVENUE
GRAND JUNCTION, COLORADO

Rust Engineering Corporation

GJ-03635-RS

B556-63

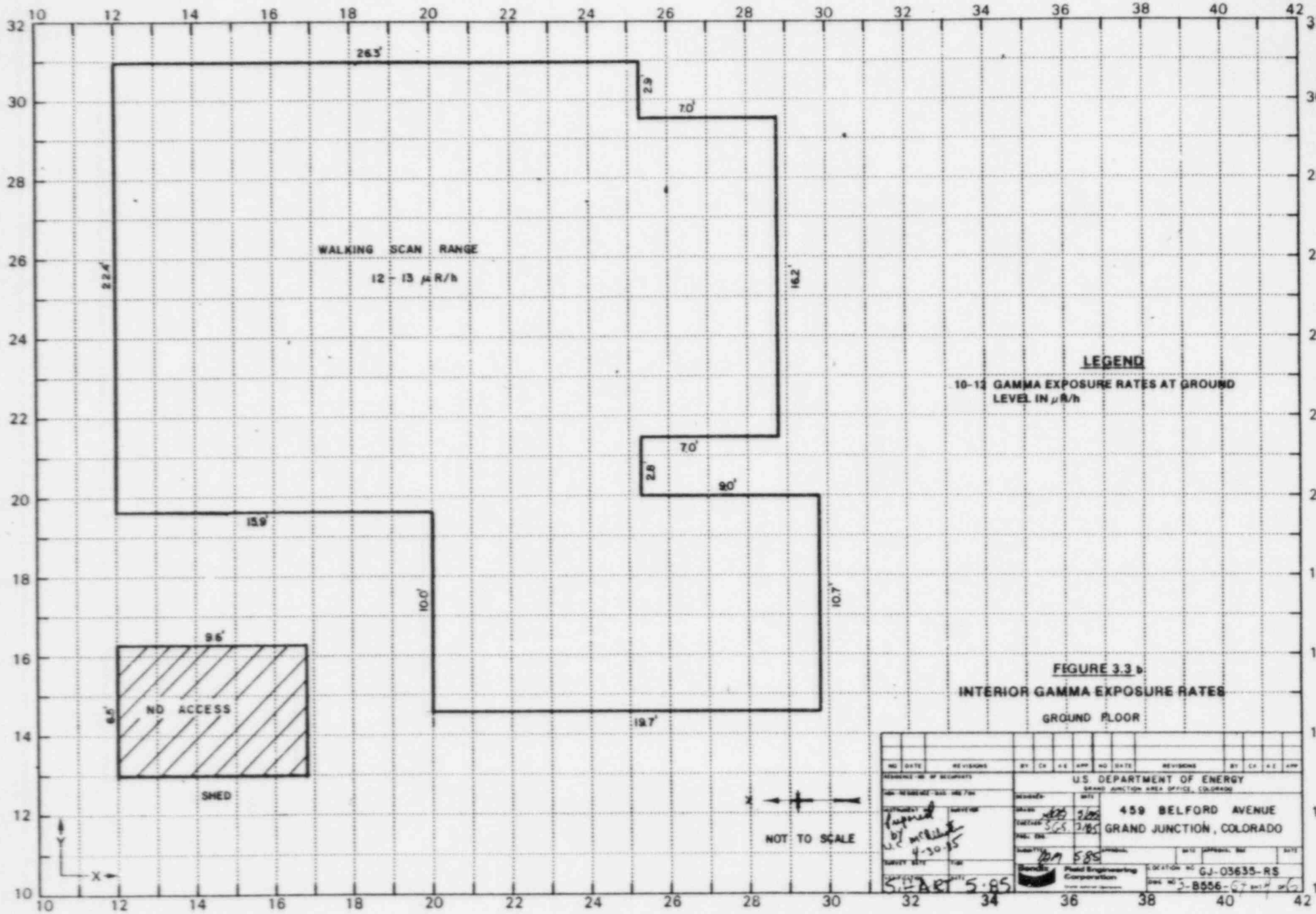


FIGURE 3.3 b

INTERIOR GAMMA EXPOSURE RATES

GROUND FLOOR

U.S. DEPARTMENT OF ENERGY

GRAND JUNCTION AREA OFFICE, COLORADO

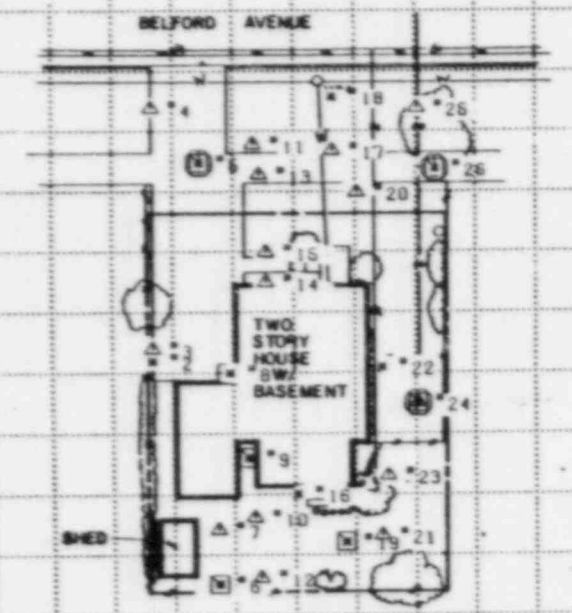
459 BELFORD AVENUE

GRAND JUNCTION, COLORADO

Bendix Field Engineering Corporation

LOCATION NO. GJ-03635-RS

DRWG NO. S-8556-67



LEGEND

- BOREHOLE
- SPECTROMETER
- DELTA SCANNER
- SOIL SAMPLE
- #4 LOCATION NUMBER

FEET

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U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION AREA OFFICE, COLORADO

459 BELFORD AVENUE
GRAND JUNCTION, COLORADO

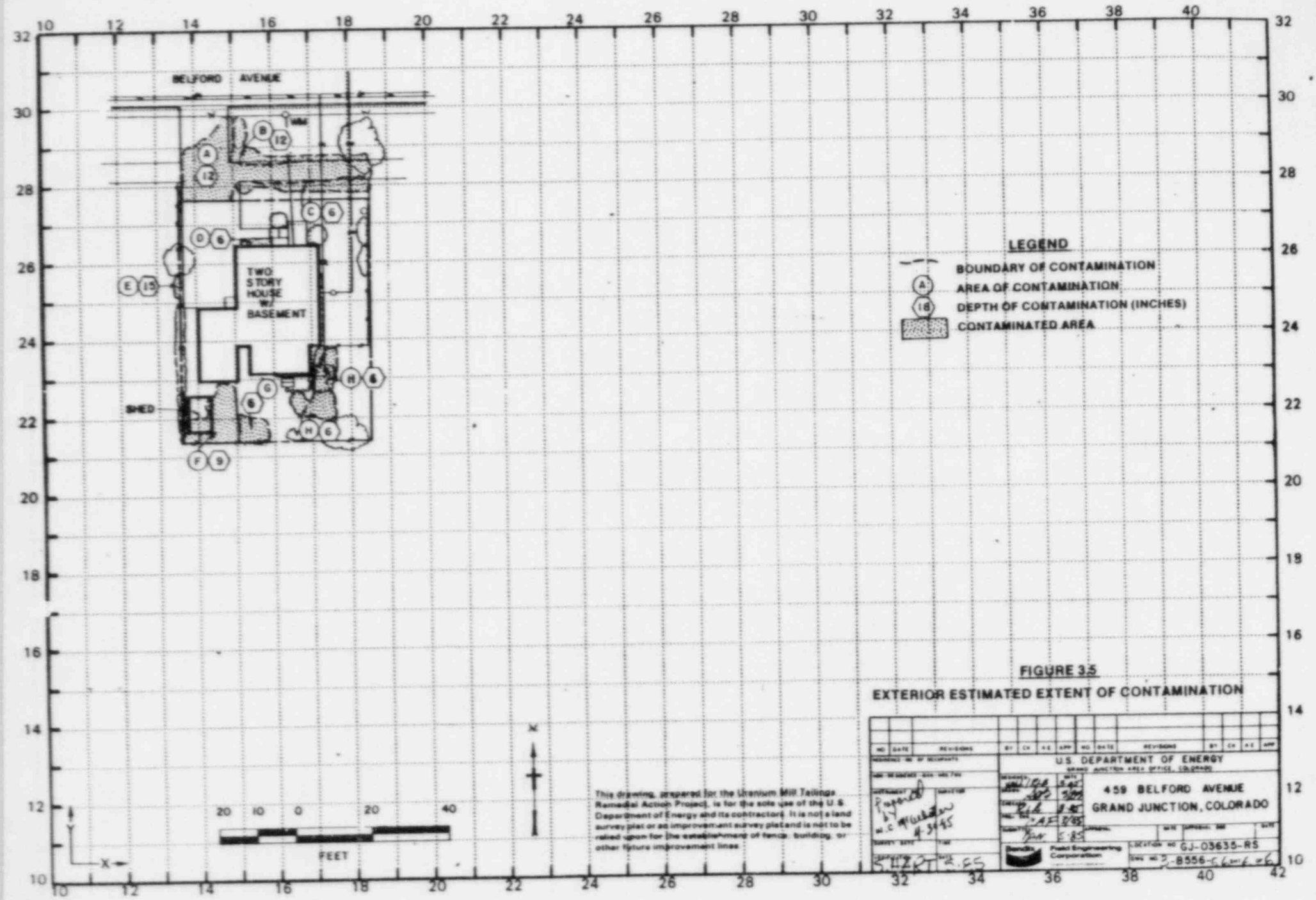
Bendix Field Engineering Corporation

LOCATION NO GJ-03635-RS

DWG NO 2-8556-G

FIGURE 3.4

EXTERIDR SAMPLE LOCATIONS



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U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION AREA OFFICE, COLORADO

459 BELFORD AVENUE
GRAND JUNCTION, COLORADO

Bendix Field Engineering Corporation

LOCATION NO. GJ-03635-RS

DWG NO. S-8556-E-6 of 6

FIGURE 3.5

EXTERIOR ESTIMATED EXTENT OF CONTAMINATION

3/85

DOE ID NO. GJ-03635-RS Date May 1 1985

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

Official Survey Report

Property Address 459 Belford Av., Grand Junction, CO. 81501

Property Owner D. Jackson

Address of Owner (if different from above) 961 Lakeside Dr. Apt. 108 Grand Jct.

Report Prepared By W. E. McAllister

I. PRESENCE/ABSENCE OF RESIDUAL RADIOACTIVE MATERIALS

[ ] No evidence of residual radioactive material on surveyed property.

[X] Residual ractioactive materials found at the following locations:

- [X] In open areas.
- [X] Under or around exterior improvements.
- [ ] Under or around a typically nonoccupied structure.
- [X] 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.

[X] 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 = 17 uR/h
HOG = 48 uR/h

Bendix
Aerospace

Bendix Field Engineering Corporation
P O Box 1569
Grand Junction CO 81502-1569
Telephone (303) 242-8621
Telex 454-338

April 30, 1985

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

ATTN: Coleen Campbell

Dear Coleen:

The following is in response to your questions and comments during the Technical Review concerning Department of Energy (DOE) Identification (ID) number GJ-03635-RS (459 Belford Avenue), conducted 19 April 1985.

1. A new area of contamination map has been made, Area 'C' was added [illegible] 19 (grid location 170280) was taken. Description for delta 19 (northwest corner of property) was an error.

2. A revisit was made on 22 April 1985. The north edge of the sidewalk was investigated and included in the new estimated extent of contamination map.

3. The section of the sidewalk that showed no contamination was reinvestigated and was determined to be contaminated to the same extent as the rest of the sidewalk. This area was not a different pour.

4. The shed area will be included as an area for further investigation during remedial action.

5. The area of contamination over the sewer line will be included as an area for further investigation during remedial action.

6. A more legible sample location map is included with this letter.

7. The contamination under the city sidewalk ends at the east and west end of the property lines.

Enclosed you will find a new copy of Figure 3.5 - Estimated Extent of Contamination, Figure 3.4 - Exterior Sample Locations, and an updated Table 3.1 - Radium Concentrations at Exterior Locations.

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

Sincerely,

W.C. McAllister
RAD Survey Team

WCM:pr

MEMORANDUM

ALLIED Bendix Aerospace

Bendix Field Engineering Corporation
Grand Junction Operations
Grand Junction, Colorado 81501

DATE: April 22, 1985

TO: Files

FROM: Wilbur C. McAllister

SUBJECT: Team Leader Notes - GJ-03635-RS

Address: 459 Belford Avenue

Owner: Dorothy D. Jackson

Telephone: 245-4654

Tenant: Shirley Rega

Occupancy: Two

Telephone: 245-3814

Weather: Rainy and wet

Team Members

W.C. McAllister (Team Leader)
T. Flores
B. Wilkins
M. Dexter
M. Gilfillan
D. Fossey
D. Herrera
N. Wallace
L. Kula

Instruments

Scintillometer - C-1163
Delta - C-3940

Date: March 26, 1985

CDH data indicates contamination in the yard and city sidewalk. No interior contamination was found.

ORNL background information indicates elevated gamma readings under the concrete driveway and the city sidewalk.

Arrival on site 0830. The high gamma readings were found on the city sidewalk and where the sidewalk goes through the concrete driveway. Two core samples were taken through the sidewalk.

The shed in the backyard was padlocked. Contamination was found at the south and the southeast corner of the shed. The doors on the shed could be opened enough to insert the scintillometer wand. This confirmed that the contamination extended under the shed. The shed is small and can be moved easily.

The tenants were not home, so an interior scan cannot be done until after 3:30.

The tenants could not find the key to the shed. The shed has no floor and can and will have to be moved during remedial action so no problem exists.

The basement is not concrete. The house sits on a concrete foundation; shovel holes found the top of the footing 10 inches below the soil line.

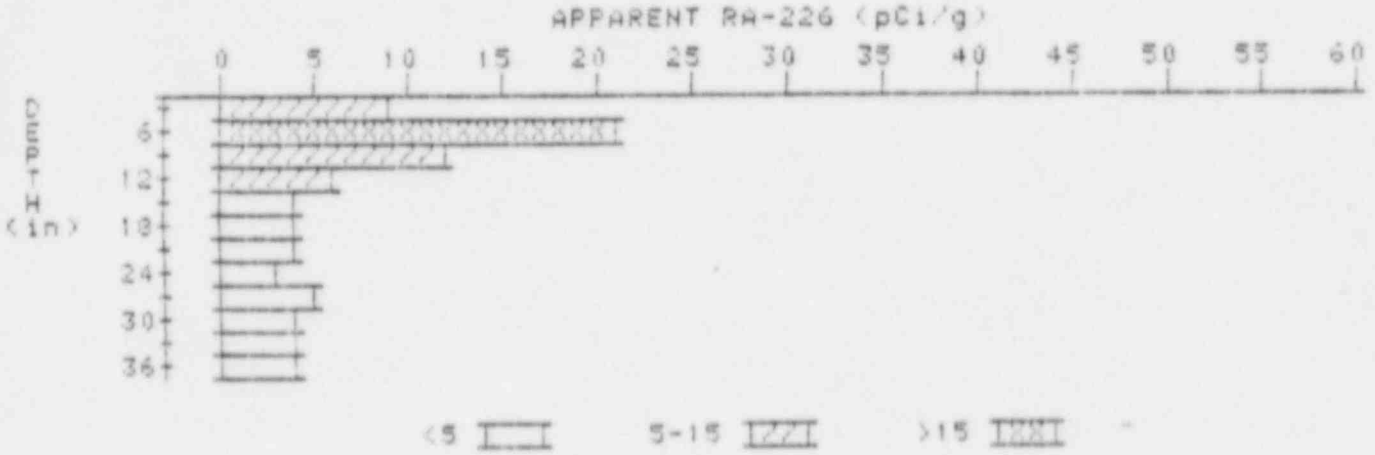
A walking scan was performed on the ground floor. No elevated readings were found. A gamma survey was performed in the basement. An elevated reading was found on the fourth step, approximately 17 uR/h. The steps are wood with carpet covering them. A knot hole in the stairs displayed what appears as old brick. Under the wood stairs, the delta taken on the step showed no contamination.

Date: April 22, 1985

A revisit was made 4/22/85 to check the portion of the city sidewalk where the water line goes under. This area was not marked by the RAD survey team as having elevated readings. Scintillometer C-1163 was used. The entire sidewalk has elevated readings from 300 to 450 cps. A delta was taken on the north side of the sidewalk where the squiggles were recorded. Delta C-3940 was used for this measurement.

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-03635-RS
HOLE NUMBER: 2
LOCATION: 136252

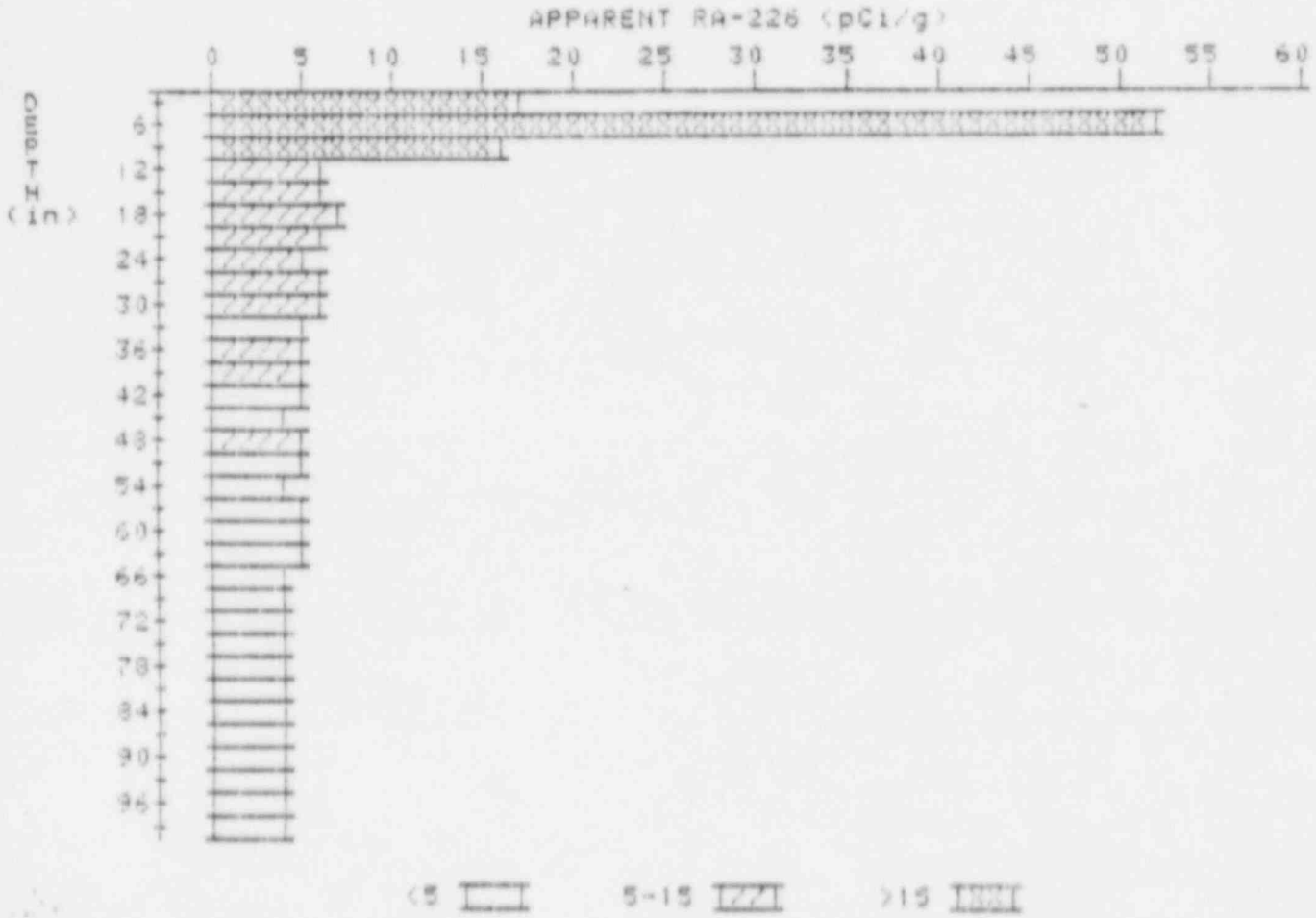


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	9.3	9.3
6	12.2	20.7
9	10.3	11.7
12	7.6	6.0
15	5.8	4.4
18	4.8	3.7
21	4.4	4.2
24	4.1	3.4
27	4.2	4.6
30	4.1	4.3
33	3.9	3.5
36	3.9	3.9

DECON V05.1(850117.1233)

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 5

PROPERTY NUMBER: GJ-03635-RS
HOLE NUMBER: 5
LOCATION: 144285



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	16.5	16.5
6	24.7	51.5
9	17.8	16.4
12	11.7	6.0
15	8.8	6.0
18	7.5	6.6
21	6.7	6.3
24	6.1	5.4

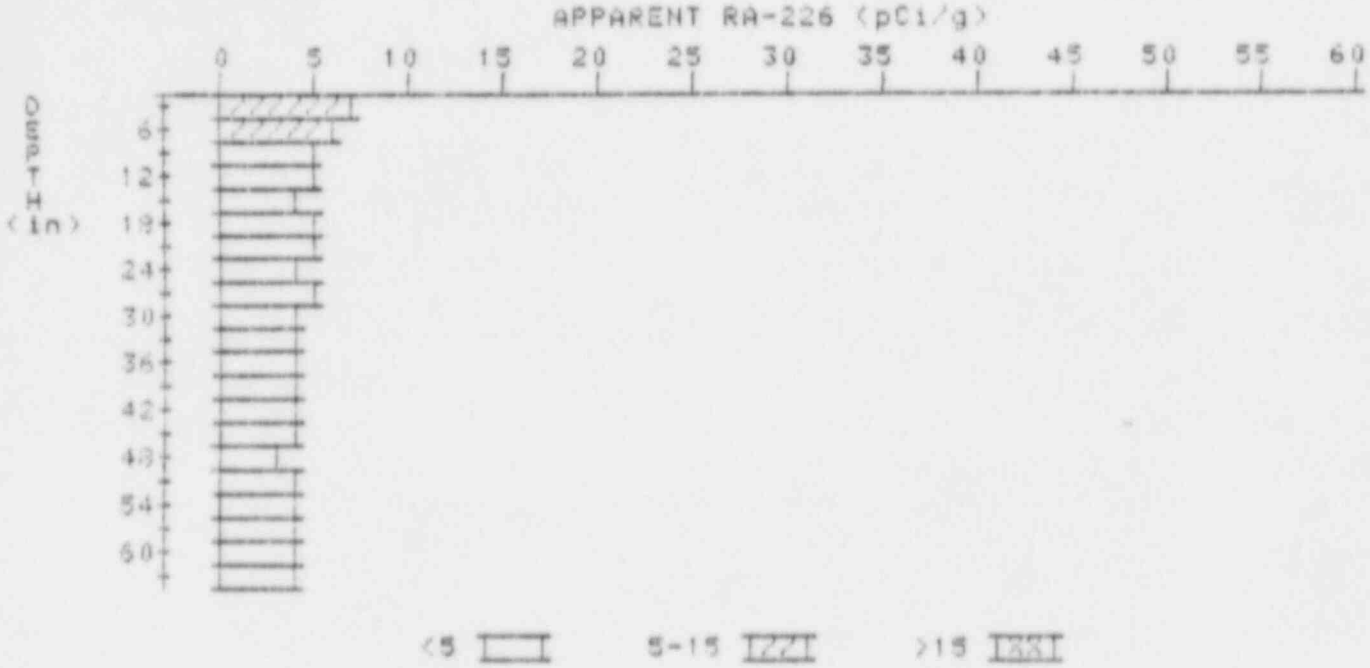
27	5.9	6.1
30	5.6	5.6
33	5.3	4.9
36	5.2	5.2
39	5.1	5.3
42	4.9	4.9
45	4.7	4.2
48	4.8	5.2
51	4.7	4.7
54	4.6	4.4
57	4.6	4.6
60	4.6	4.8
63	4.5	4.5
66	4.4	4.4
69	4.3	4.1
72	4.3	4.5
75	4.2	4.2
78	4.1	4.3
81	3.9	3.7
84	3.8	3.8
87	3.7	3.5
90	3.7	3.7
93	3.7	3.5
96	3.8	4.0
99	3.8	3.8

DECON V85.1(850117.1233)

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

6

PROPERTY NUMBER: GJ-03635-RS
HOLE NUMBER: 6
LOCATION: 147215



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	7.1	7.1
6	6.3	6.3
9	5.5	4.8
12	5.1	4.9
15	4.8	4.4
18	4.7	4.7
21	4.6	4.8
24	4.4	4.0
27	4.4	4.8
30	4.2	4.2
33	4.0	3.8
36	3.9	3.9
39	3.8	3.6
42	3.8	4.0
45	3.7	3.7
48	3.6	3.2
51	3.7	3.7

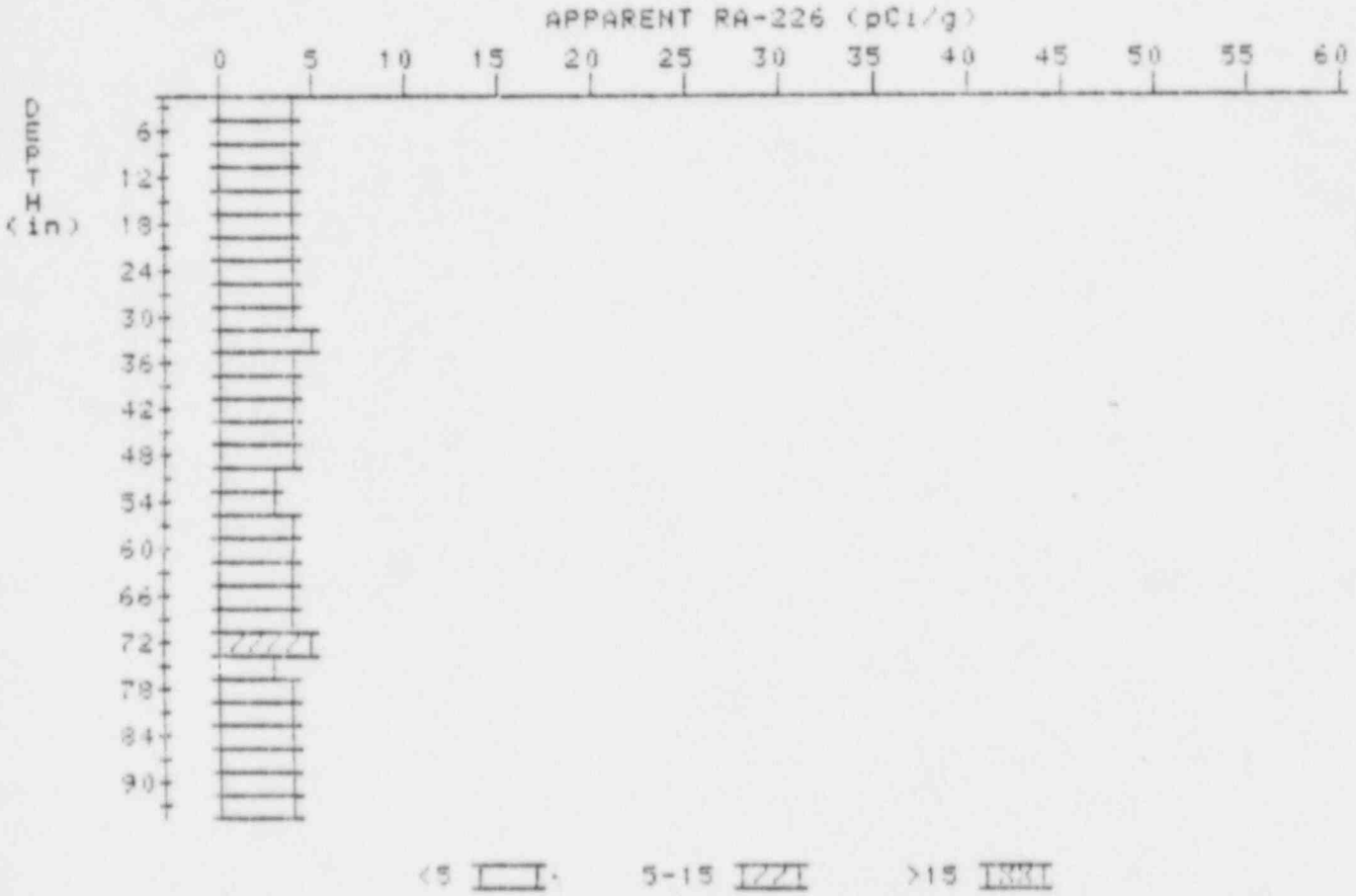
54	3.8	4.0
57	3.8	3.6
60	3.9	4.1
63	3.9	3.9

DECON V85.1(850117.1233)

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

8

PROPERTY NUMBER: GJ-03635-RS
HOLE NUMBER: 8
LOCATION: 149250



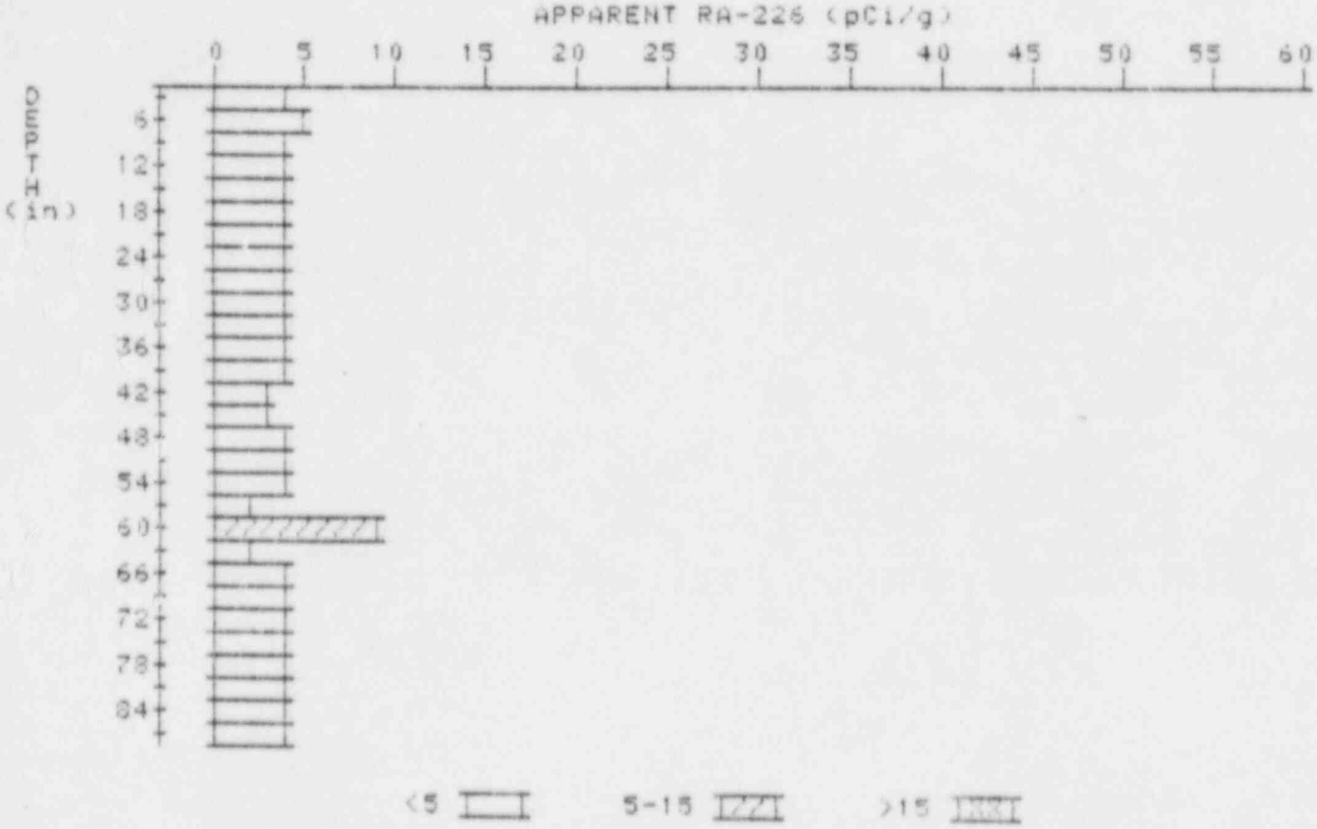
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.2	4.2
6	4.2	4.2
9	4.2	4.4
12	4.1	3.9
15	4.1	4.1
18	4.1	4.1
21	4.1	4.1
24	4.1	4.1
27	4.1	4.1

30	4.1	3.9
33	4.2	4.6
36	4.1	4.3
39	3.9	3.7
42	3.8	3.6
45	3.8	4.0
48	3.7	3.7
51	3.6	3.4
54	3.6	3.2
57	3.8	4.2
60	3.8	3.8
63	3.8	3.6
66	3.9	3.9
69	4.0	3.6
72	4.3	5.4
75	4.0	3.3
78	4.1	4.3
81	4.1	4.3
84	4.0	3.6
87	4.1	4.3
90	4.1	4.5
93	3.9	3.9

DECON V85.1(850117.1233)

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-03635-RS
HOLE NUMBER: 9
LOCATION: 152236



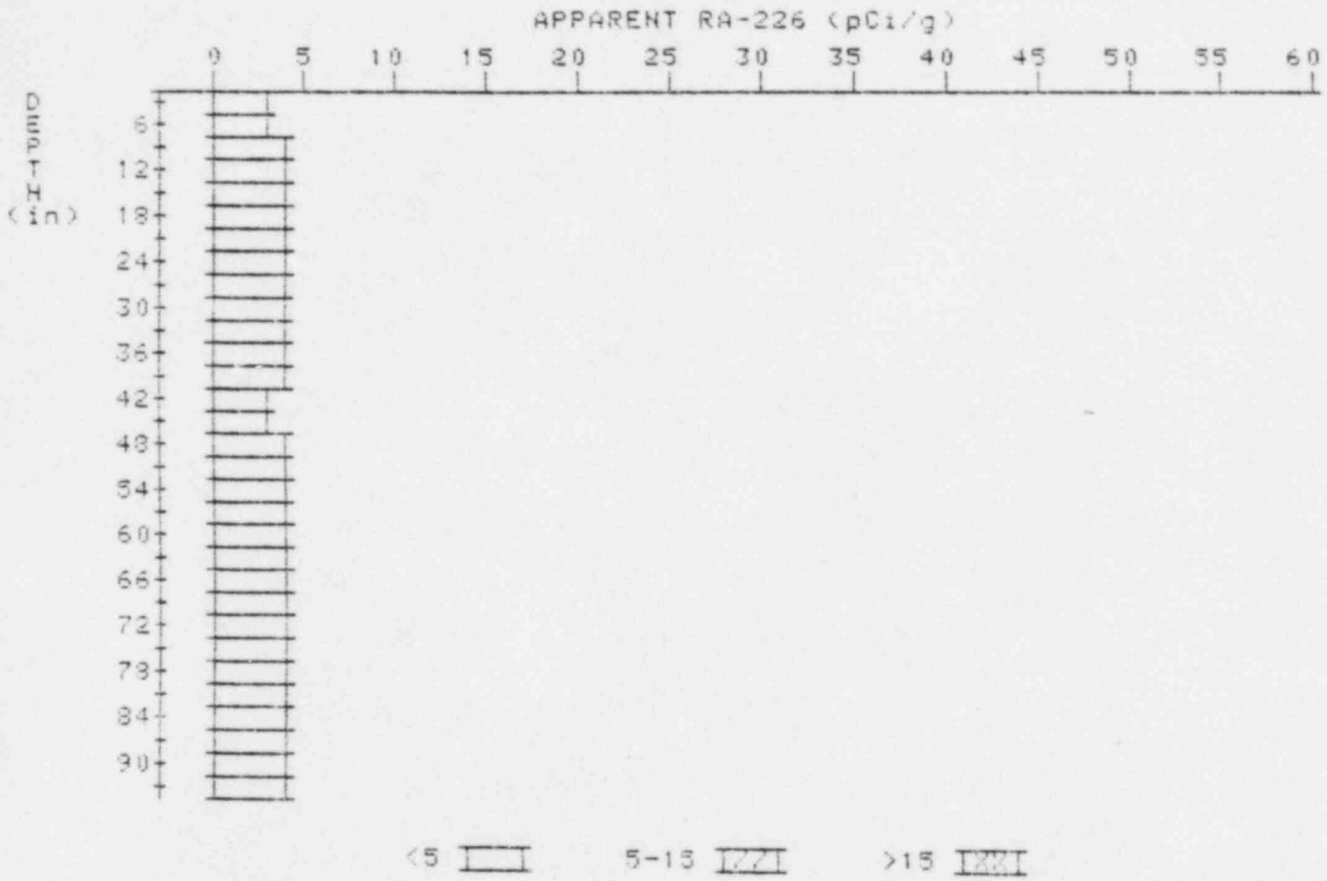
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.2	4.2
6	4.4	4.9
9	4.3	4.3
12	4.2	4.4
15	4.0	3.6
18	4.0	4.0
21	4.0	4.0
24	4.0	4.0
27	4.0	4.0
30	4.0	4.2
33	3.9	3.9

36	3.8	3.8
39	3.7	3.7
42	3.6	3.4
45	3.6	3.4
48	3.7	3.9
51	3.7	3.5
54	3.8	4.0
57	3.8	1.7
60	5.0	8.9
63	4.0	2.2
66	4.0	4.2
69	3.9	3.5
72	4.0	4.2
75	4.0	4.2
78	3.9	3.5
81	4.0	4.4
84	3.9	3.5
87	4.0	4.0

DECON V85.1(850117.1233)

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 16

PROPERTY NUMBER: GJ-03635-RS
HOLE NUMBER: 16
LOCATION: 160230



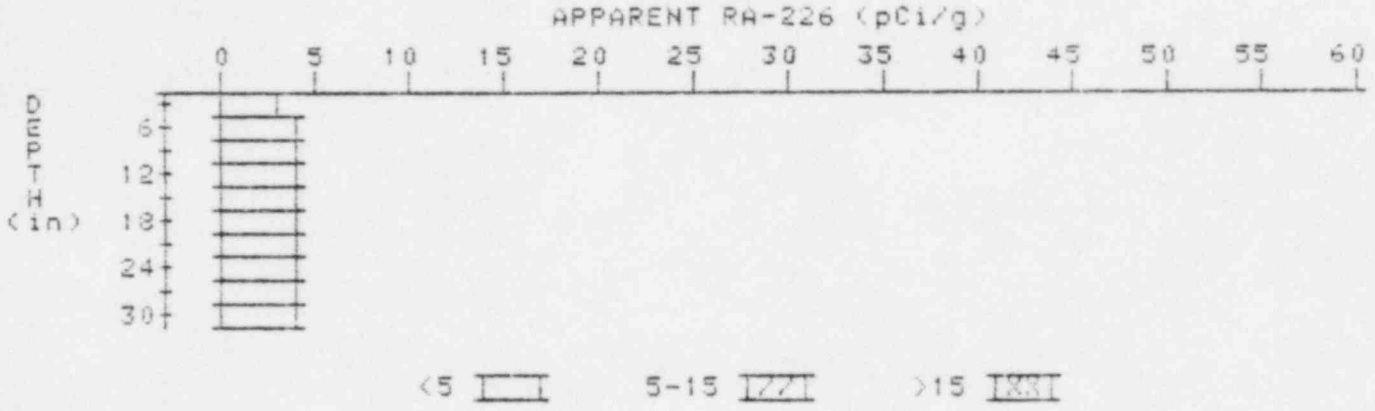
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.3	3.3
6	3.4	3.2
9	3.6	3.6
12	3.8	4.0
15	3.9	3.9
18	4.0	4.2
21	4.0	3.8
24	4.1	4.5
27	4.0	4.0

30	3.9	3.9
33	3.8	3.8
36	3.7	3.7
39	3.6	3.6
42	3.5	3.3
45	3.5	3.3
48	3.6	3.6
51	3.7	3.5
54	3.9	4.3
57	3.9	3.9
60	3.9	3.7
63	4.0	4.2
66	4.0	3.8
69	4.1	4.5
72	4.0	3.8
75	4.0	3.8
78	4.1	4.3
81	4.1	4.1
84	4.1	4.3
87	4.0	3.8
90	4.0	4.0
93	4.0	4.0

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION 18
DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-03635-RS
HOLE NUMBER: 18
LOCATION: 166296

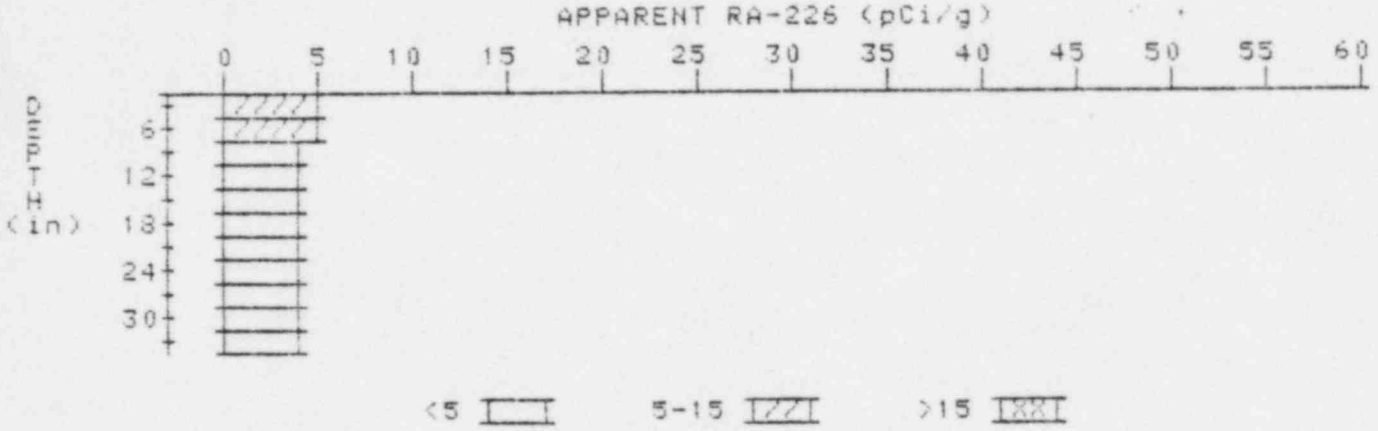


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.2	3.2
6	3.6	3.8
9	3.9	4.4
12	3.9	3.7
15	4.0	4.2
18	4.0	4.0
21	4.0	4.2
24	3.9	3.7
27	3.9	3.9
30	3.9	3.9

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION 19
DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-03635-RS
HOLE NUMBER: 19
LOCATION: 168222

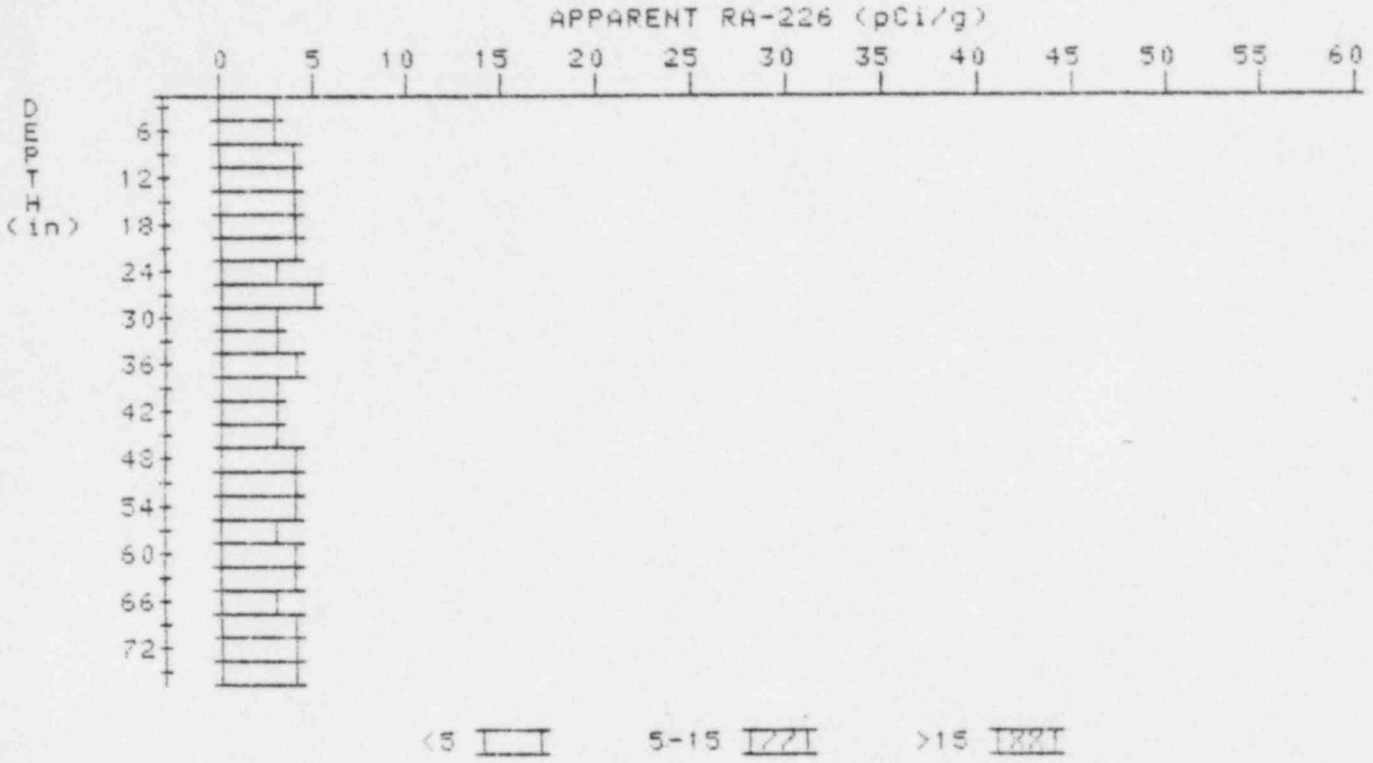


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.3	5.3
6	4.9	5.1
9	4.4	3.7
12	4.3	4.3
15	4.2	4.2
18	4.1	3.9
21	4.1	4.3
24	4.0	3.8
27	4.0	4.2
30	3.9	3.9
33	3.8	3.8

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 22

PROPERTY NUMBER: GJ-03635-RS
HOLE NUMBER: 22
LOCATION: 174251



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.4	3.4
6	3.3	2.8
9	3.5	3.7
12	3.6	3.8
15	3.6	3.6
18	3.6	3.6
21	3.6	3.6
24	3.6	3.2
27	3.8	4.5
30	3.6	3.4
33	3.5	3.3
36	3.5	3.7
39	3.4	3.2
42	3.4	3.4

45	3.4	3.2
48	3.5	3.7
51	3.5	3.5
54	3.5	3.5
57	3.5	3.3
60	3.6	3.6
63	3.7	3.9
66	3.7	3.3
69	3.9	4.3
72	3.9	3.9
75	3.9	3.9

DECON V85.1(850117.1233)

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-03635-RS
HOLE NUMBER: 24
LOCATION: 180245

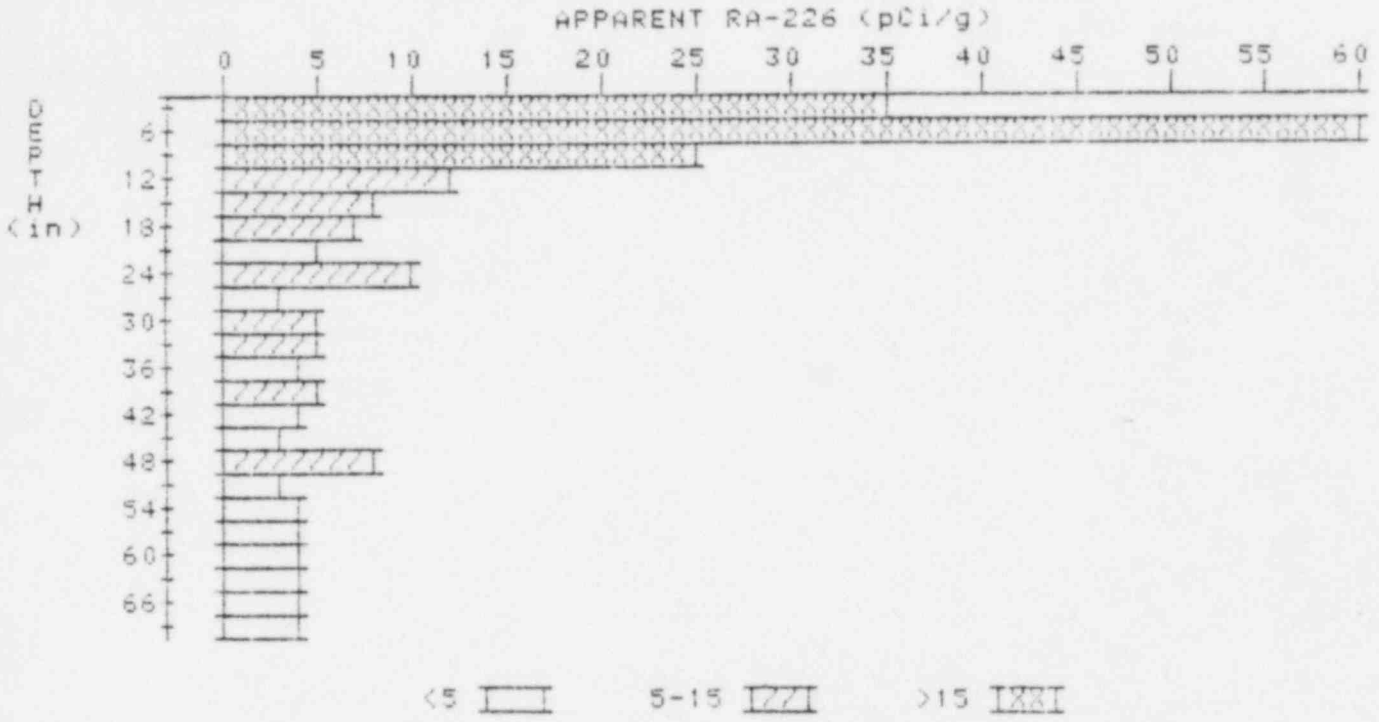
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.2	3.2
6	3.4	3.6
9	3.5	3.5
12	3.6	3.8
15	3.6	3.6
18	3.6	3.4
21	3.7	4.1
24	3.6	3.2
27	3.7	3.9
30	3.7	3.5
33	3.8	4.3
36	3.6	3.2
39	3.6	3.6
42	3.6	3.8
45	3.5	3.3
48	3.5	3.7
51	3.4	3.0
54	3.5	3.7

57	3.5	3.3
60	3.6	3.6

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION 26
DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-03635-RS
HOLE NUMBER: 26
LOCATION: 183284



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	35.0	35.0
6	44.1	34.6
9	30.4	25.2
12	19.6	11.8
15	13.2	7.9
18	9.8	7.3
21	7.8	4.8
24	7.5	10.0
27	5.8	3.5
30	5.4	5.2
33	5.1	5.1
36	4.8	4.3
39	4.8	5.2
42	4.6	4.4
45	4.5	2.9

48	5.3	3.3
51	4.4	3.0
54	4.3	4.3
57	4.2	4.0
60	4.2	4.4
63	4.1	3.7
66	4.2	4.4
69	4.2	4.2