

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-43551-RS
ADDRESS: 2237 NORTH 20TH STREET

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

M.K. Tucker ^{by} CWH
M. TUCKER
DOE PROJECT ENGINEER

DATE

July 22, 1985

REA43551-GJ:REA-GE004

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 EXECUTIVE SUMMARY	1
1.1 Introduction	1
1.2 Evaluation and Recommendation	1
2.0 PROPERTY DESCRIPTION	2
2.1 General Description	2
2.2 Existing Facilities and Structures	2
3.0 RADIOLOGIC SURVEY	4
3.1 Introduction	4
3.2 Gamma Exposure-Rate Surveys	4
3.2.1 Exterior Findings	4
3.2.2 Interior Findings	4
3.3 Boreholes, Soil Samples, and Other Measurements	4
3.4 Radon/Radon Daughter Concentration	5
3.5 Extent of Contamination	5
4.0 RECOMMENDED REMEDIAL ACTION	6
4.1 Decontamination and Restoration	6
4.2 Evaluation of Recommended Remedial Action	6
5.0 REFERENCES	7
6.0 APPENDIX	8

1.0 EXECUTIVE SUMMARY

1.1 Introduction

The location, DOE ID No. GJ-43551-RS, is a single-family residence located at 2237 North 20th Street, 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, 19 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is \$3,378. Remedial action on this property will take approximately 15 days to complete.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 2237 North 20th Street, Grand Junction, Colorado

Zoning: Residential (RSF-8)

Lot Size: Approximately 7,440 sf (0.172 acre)

Legal Description: Lot 20, Sungold Park Subdivision, Section 12, 1S, 1W, City of Grand Junction, County of Mesa, State of Colorado

Point of Reference: This property is located approximately 2-1/2 miles north 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:	Single-family residence
East:	20th Street
West:	19th Street

2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-story residence with basement
Size:	Approximately 960 sf each level
Construction Date:	1955
Construction:	Wood-frame
Foundation:	Concrete
Footing Depth:	Approximately 72" to bottom of footing from grade
Basement:	Full under residence
Crawl Space:	None
Condition:	Good

Other Structures:

Type:	Garage
Size:	Approximately 480 sf
Construction:	Wood-frame, built 1960
Foundation:	Thickened edge of concrete slab
Condition:	Good

General Remarks:

Typical small residential site in fair condition. 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-43551-RS on April 25, 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.

This property was put on the inclusion list because of spillover contamination. There is no historical information from CDH or ORNL in the folio. The spillover data indicate contamination is located in the backyard and associated with a concrete patio between the garage and 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: 14 to 16 uR/h
Highest Outside Gamma Reading (HOG): 74 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: 13 to 16 uR/h
Highest Inside Gamma Reading (HIG): 19 uR/h

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

3.3 Boreholes, Soil Samples, and Other Measurements

Areas which displayed elevated gamma levels were further investigated; these areas are shown in Appendix Figures 3.3a, 3.3b, 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) Northwest of the primary structure, between the fence and the patio, a narrow strip of soil has contamination extending to depth of 18 inches, based on data gathered from Area B (approximately 25 sf).
- (AREA B) The soil under the 4-inch-thick concrete patio is contaminated to a total depth of 18 inches (approximately 264 sf).
- (AREA C) A portion of lawn, adjacent to the south side of the patio and the west side of the primary structure, is contaminated to a depth of 6 inches (approximately 75 sf).
- (AREA D) The concrete that anchors the swing set, west of the primary structure, is contaminated. The total estimated depth of contamination is 21 inches, based on owner knowledge (approximately 18 sf).

(AREAS REQUIRING FURTHER INVESTIGATION DURING REMEDIAL ACTION)

- The bedroom adjacent to Area B should be scanned after the tailings are removed from the exterior to assure that the elevated gamma readings recorded in this room are shine.

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-43551-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 \$3,378.

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 and Sample Locations (Ground Floor)
Figure 3.4	Exterior Sample Locations
Figure 3.5	Estimated Extent of Contamination

Official Survey Report

Memo of Understanding

Team Leader Notes

Deconvolution Graphs (Apparent Radium-226 Concentration)

Radium Concentrations at Exterior Locations

DOE ID #GJ-43551-RS

2237 North 20th Street

Page 1 of 7

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
8	166221	03	TC	2.9		*	Next to swing DC = 0 inches
		06	TC	3.4		*	
		09	TC	3.6		*	
		12	TC	3.9		*	
		15	TC	4.0		*	
		18	TC	4.1		*	
		21	TC	4.0		*	
		24	TC	4.0		*	
		27	TC	3.9		*	
		30	TC	3.8		*	
		33	TC	3.7		*	
		36	TC	3.5		*	
		39	TC	3.4		*	
9	166227	06	DS	7.8		*	Swing set Top of concrete
10	166228	03	TC	3.3		*	Next to swing DC = 0 inches
		06	TC	3.7		*	
		09	TC	3.9		*	
		12	TC	4.1		*	
		15	TC	4.3		*	
		18	TC	4.4		*	
		21	TC	4.3		*	
		24	TC	4.3		*	
		27	TC	4.2		*	
		30	TC	4.0		*	
		33	TC	3.9		*	
		36	TC	3.6		*	
11	190266	00	DS	6.9		*	Along fence line
		06	DS	10.3		*	
		12	DS	6.0		*	
12	192252	00	DS	<1.0		*	Near patio
		06	DS	1.1		*	
13	200260	00	GS		18.6	*	Core Soil Back patio
		00-04	SS			4.5	
		04-10	SS			97.5	
		03	TC	34.0		*	
		06	BH	30.9	112.5	*	
		09	TC	20.7		*	
		12	BH	14.4	49.0	*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-43551-RS

2237 North 20th Street

Page 2 of 7

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
13	200260	15	TC	11.9		*	DC = 18 inches Based on the deconvolution graph
		18	TC	10.4		*	
		21	TC	9.6		*	
		24	BH	9.3	22.3	*	
		27	TC	9.2		*	
		30	TC	8.6		*	
		33	TC	7.9		*	
		36	BH	7.3	17.7	*	
		39	TC	6.8		*	
		42	TC	6.2		*	
		45	TC	5.7		*	
		48	BH	5.3	10.4	*	
		51	TC	5.1		*	
		54	TC	4.8		*	
		57	TC	4.5		*	
		60	TC	4.4		*	
		63	TC	4.3		*	
		66	TC	4.1		*	
		69	TC	3.9		*	
14	202254	00	DS	2.1		*	Next to patio
		06	DS	2.6		*	
		12	DS	2.0		*	
		15	DS	2.0		*	
15	208229	03	TC	3.1		*	West side of primary structure DC = 0 inches
		06	TC	3.2		*	
		09	TC	3.2		*	
		12	TC	3.2		*	
		15	TC	3.2		*	
		18	TC	3.3		*	
		21	TC	3.3		*	
		24	TC	3.3		*	
		27	TC	3.2		*	
		30	TC	3.3		*	
		33	TC	3.2		*	
		36	TC	3.3		*	
		39	TC	3.3		*	
		42	TC	3.3		*	
		45	TC	3.2		*	
		48	TC	3.2		*	
		51	TC	3.2		*	
		54	TC	3.2		*	
		57	TC	3.2		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-43551-RS

2237 North 20th Street

Page 3 of 7

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
15	208229	60	TC	3.2		*	
		63	TC	3.2		*	
		66	TC	3.1		*	
		69	TC	3.1		*	
		72	TC	3.1		*	
		75	TC	3.0		*	
		78	TC	3.2		*	
		81	TC	3.2		*	
		84	TC	3.4		*	
		87	TC	3.5		*	
		90	TC	3.5		*	
		93	TC	3.6		*	
16	208230	00	DS	<1.0		*	West side of primary structure
		06	DS	<1.0		*	
17	208234	00	DS	<1.0		*	West side of primary structure
		06	DS	<1.0		*	
18	208248	00	DS	<1.0		*	Backyard
		06	DS	<1.0		*	
19	208252	00	DS	2.1		*	Backyard
		06	DS	2.3		*	
		12	DS	1.2		*	
20	209242	03	TC	3.0		*	Sewer line DC = 0 inches
		06	TC	3.2		*	
		09	TC	3.3		*	
		12	TC	3.4		*	
		15	TC	3.4		*	
		18	TC	3.4		*	
		21	TC	3.4		*	
		24	TC	3.5		*	
		27	TC	3.4		*	
		30	TC	3.5		*	
		33	TC	3.5		*	
		36	TC	3.5		*	
		39	TC	3.4		*	
		42	TC	3.5		*	
		45	TC	3.5		*	
		48	TC	3.4		*	
		51	TC	3.4		*	
		54	TC	3.4		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-43551-RS

2237 North 20th Street

Page 4 of 7

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
20	209242	57	TC	3.4		*	
		60	TC	3.4		*	
		63	TC	3.4		*	
		66	TC	3.4		*	
		69	TC	3.4		*	
21	210233	03	DS	1.4		*	Buried electrical line
22	213263	03	TC	4.0		*	Northwest corner of primary structure DC = 0 inches
		06	TC	4.0		*	
		09	TC	3.9		*	
		12	TC	3.9		*	
		15	TC	3.8		*	
		18	TC	3.8		*	
		21	TC	3.7		*	
		24	TC	3.7		*	
		27	TC	3.6		*	
		30	TC	3.6		*	
		33	TC	3.7		*	
		36	TC	3.6		*	
23	215260	03	TC	3.3		*	North side of primary structure DC = 0 inches
		06	TC	3.4		*	
		09	TC	3.5		*	
		12	TC	3.5		*	
		15	TC	3.5		*	
		18	TC	3.6		*	
		21	TC	3.6		*	
		24	TC	3.6		*	
		27	TC	3.6		*	
		30	TC	3.6		*	
		33	TC	3.7		*	
		36	TC	3.7		*	
		39	TC	3.7		*	
		42	TC	3.7		*	
		45	TC	3.7		*	
		48	TC	3.6		*	
		51	TC	3.6		*	
		54	TC	3.6		*	
		57	TC	3.6		*	
		60	TC	3.5		*	
		63	TC	3.6		*	
		66	TC	3.4		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-43551-RS

2237 North 20th Street

Page 5 of 7

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
23	215260	69	TC	3.4		*	
		72	TC	3.3		*	
		75	TC	3.2		*	
		78	TC	3.2		*	
		81	TC	3.2		*	
24	218261	00	DS	<1.0		*	North side of
		06	DS	<1.0		*	primary structure
25	222260	21	DS	<1.0		*	Exposed gas line
26	230220	03	TC	3.0		*	Southeast corner of primary structure DC = 0 inches
		06	TC	3.2		*	
		09	TC	3.2		*	
		12	TC	3.3		*	
		15	TC	3.3		*	
		18	TC	3.3		*	
		21	TC	3.3		*	
		24	TC	3.4		*	
		27	TC	3.4		*	
		30	TC	3.4		*	
		33	TC	3.4		*	
		36	TC	3.4		*	
		39	TC	3.4		*	
		42	TC	3.3		*	
		45	TC	3.4		*	
		48	TC	3.4		*	
		51	TC	3.4		*	
		54	TC	3.4		*	
		57	TC	3.4		*	
		60	TC	3.4		*	
		63	TC	3.5		*	
		66	TC	3.3		*	
		69	TC	3.3		*	
		72	TC	3.4		*	
		75	TC	3.4		*	
		78	TC	3.3		*	
		81	TC	3.3		*	
27	235238	03	TC	3.0		*	Water line
		06	TC	3.4		*	DC = 0 inches
		09	TC	3.4		*	
		12	TC	3.5		*	
		15	TC	3.6		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-43551-RS

2237 North 20th Street

Page 6 of 7

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
27	235238	18	TC	3.7		*	
		21	TC	3.6		*	
		24	TC	3.6		*	
		27	TC	3.7		*	
		30	TC	3.6		*	
		33	TC	3.6		*	
		36	TC	3.7		*	
		39	TC	3.7		*	
		42	TC	3.7		*	
		45	TC	3.7		*	
		48	TC	3.7		*	
		51	TC	3.7		*	
		54	TC	3.7		*	
28	235255	03	TC	3.3		*	East side of primary structure DC = 0 inches
		06	TC	3.5		*	
		09	TC	3.5		*	
		12	TC	3.5		*	
		15	TC	3.4		*	
		18	TC	3.5		*	
		21	TC	3.5		*	
		24	TC	3.3		*	
		27	TC	3.5		*	
		30	TC	3.4		*	
		33	TC	3.5		*	
		36	TC	3.5		*	
		39	TC	3.4		*	
		42	TC	3.5		*	
		45	TC	3.4		*	
		48	TC	3.4		*	
		51	TC	3.4		*	
		54	TC	3.5		*	
		57	TC	3.5		*	
		60	TC	3.5		*	
		63	TC	3.6		*	
		66	TC	3.6		*	
		69	TC	3.6		*	
		72	TC	3.6		*	
29	238209	00	DS	<1.0		*	South side of primary structure
		06	DS	<1.0		*	
30	238259	00	DS	<1.0		*	Northeast corner of primary structure
		03	TC	3.3		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-43551-RS

2237 North 20th Street

Page 7 of 7

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
30	238259	06	TC	3.5		*	DC = 0 inches
		09	TC	3.6		*	
		12	TC	3.6		*	
		15	TC	3.5		*	
		18	TC	3.4		*	
		21	TC	3.4		*	
		24	TC	3.4		*	
		27	TC	3.4		*	
		30	TC	3.5		*	
		33	TC	3.5		*	
		36	TC	3.5		*	
31	255235	00	DS	<1.0		*	Background DC = 0 inches
		00	GS		2.5	*	
		00-06	SS			2.3	
		03	TC	2.9		*	
		06	TC	3.3		*	
		09	TC	3.4		*	
		12	TC	3.5		*	
		15	TC	3.5		*	
		18	TC	3.6		*	
		21	TC	3.6		*	
		24	TC	3.6		*	
		27	TC	3.7		*	
		30	TC	4.0		*	
		33	TC	4.0		*	

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 = 04-25-85
 Team Leader = TRU

Radium Concentrations at Interior Locations

DOE ID #GJ-43551-RS

2237 North 20th Street

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	DS	<1.0		*	In basement
2		00	DS	<1.0		*	In basement
3		00	DS	<1.0		*	In basement
4		00	DS	<1.0		*	In basement
5		00	DS	<1.0		*	In basement
6		00	DS	<1.0		*	In basement
7		00	DS	2.8		*	Northwest corner of bedroom

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 = 04-25-85
 Team Leader = TRU

Location *	Number of Readings Taken at Waist Level	Range at Waist Level (uR/h)	Mean at Waist Level (uR/h)	Number of Readings Taken at Surface	Range at Surface (uR/h)	Mean Surface (uR/h)
ROOM A	08	16-17	17	08	16-18	17
ROOM B	05	16-18	17	05	16-18	17
ROOM C	07	16-18	16	07	16-18	17
ROOM D	03	15-16	15	03	16-16	16
ROOM E	06	16-18	17	06	16-18	17
GROUND FLOOR	*	*	*	*	13-19	*
GARAGE	*	*	*	*	14-16	*

=====

* The spillover data indicate the absence of interior contamination at this property. This information was investigated by performing a walking gamma scan on the ground floor of the primary structure and in the garage. These areas and the ranges of gamma measurements are shown in Appendix Figure 3.3b. Exposure rates and room locations for the basement are shown in Appendix Figure 3.3a.

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-43551-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>
EXTERIOR									
	Concrete								
B	11 x 24	=	264	x	0.3	=	79		
D	(2) 3 x 3	=	18	x	1.8	=	32		
	Volume of Concrete						= 111	=	111/27 = 4
	Contaminated Fill								
A	1 x 25	=	25	x	1.5	=	38		
B	11 x 24	=	264	x	1.2	=	317		
C	5 x 15	=	75	x	0.5	=	38		
	Volume of Fill						= 393	=	393/27 = 15
	TOTAL VOLUME - EXTERIOR								= 19

See Appendix Figure 3.5 For Areas

=====

Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-43551-RS

Page 1 of 1

EXTERIOR

Remove identified residual radioactive material (manual)		
16 cy @ \$44/cy	\$	704
Remove and replace 4" thick concrete patio slab		
264 sf @ \$3/sf		792
Replace roadbase		
13 cy @ \$11.50/cy		150
Replace topsoil		
3 cy @ \$9.50/cy		29
Replace sod		
100 sf @ \$0.35/sf		35
Sawcut concrete		
4 lf @ \$1.50/lf		6
Remove and replace concrete step		
Lump sum		28
Remove and replace wood swing frame		
Lump sum		100
Replace concrete base for swing frame		
1 cy @ \$150.00/cy		150
	TOTAL EXTERIOR	\$ 1,994
	ACCESS CONTROL	200
	SUBTOTAL	\$ 2,194
	CONTINGENCY @ 10%	219
	SUBTOTAL	\$ 2,413
	CONTRACTOR OVERHEAD & PROFIT @ 40%	965
	GRAND TOTAL	\$ 3,378

=====

FHW071885
REA43551:REA-GE004:LMR

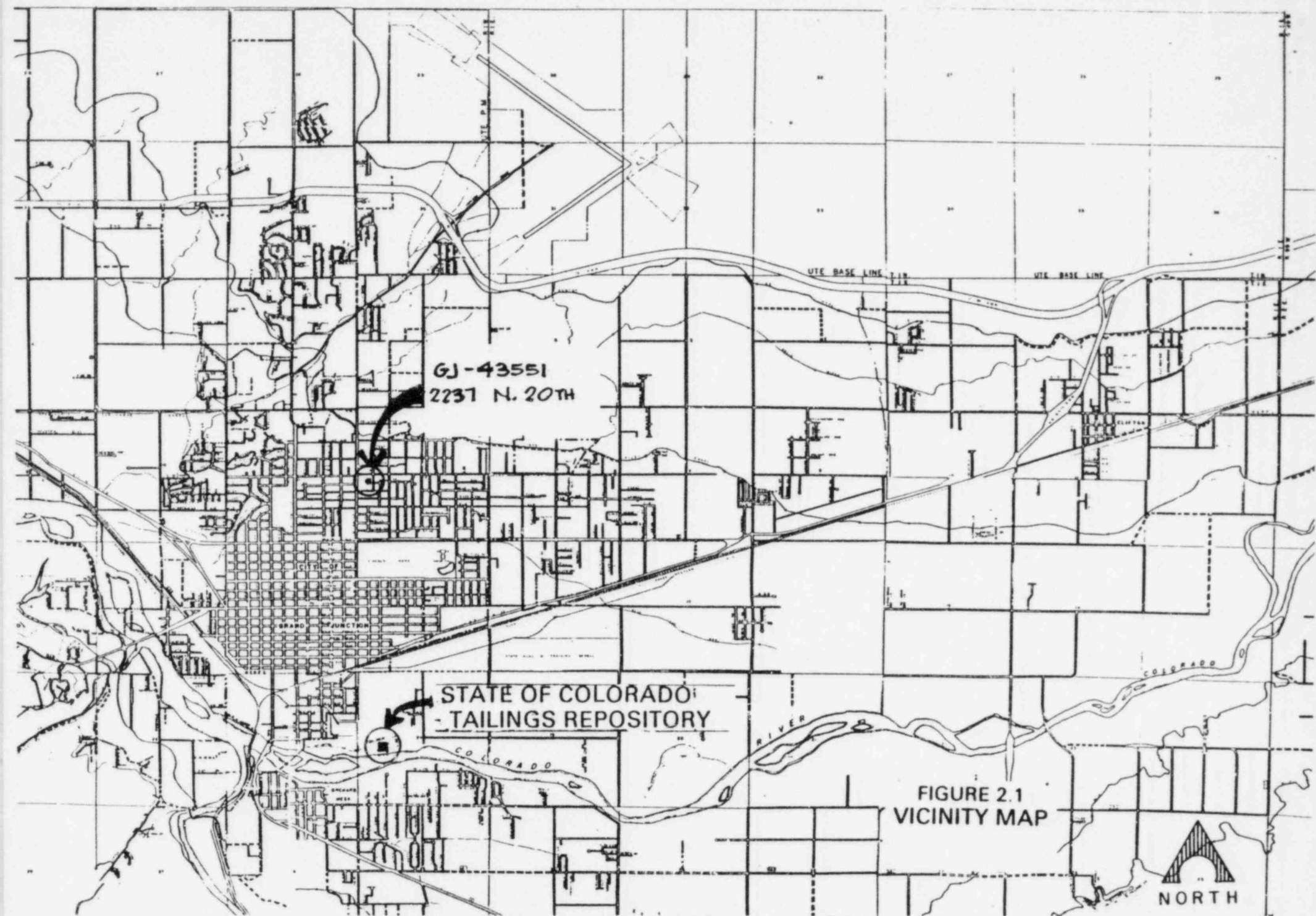
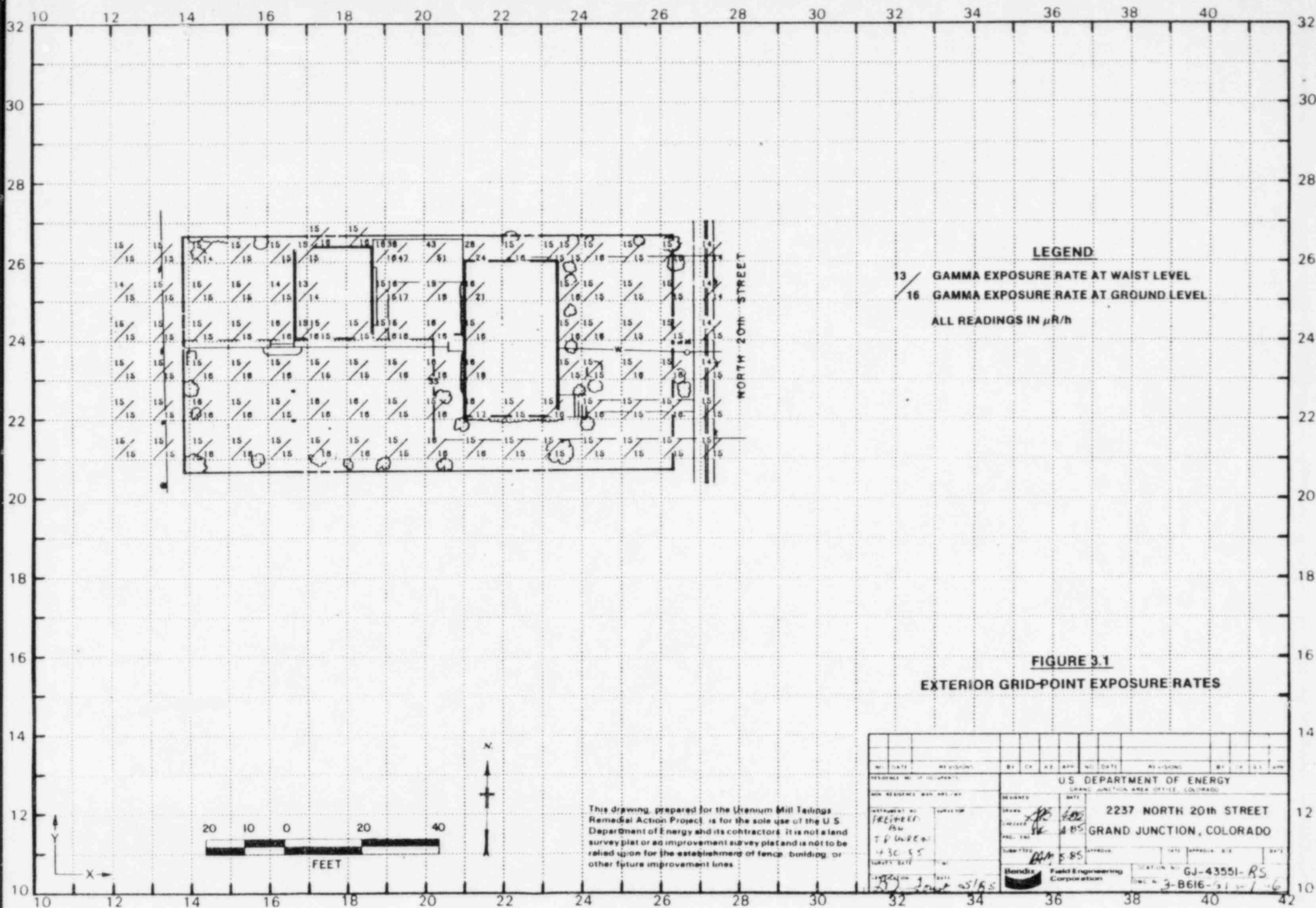
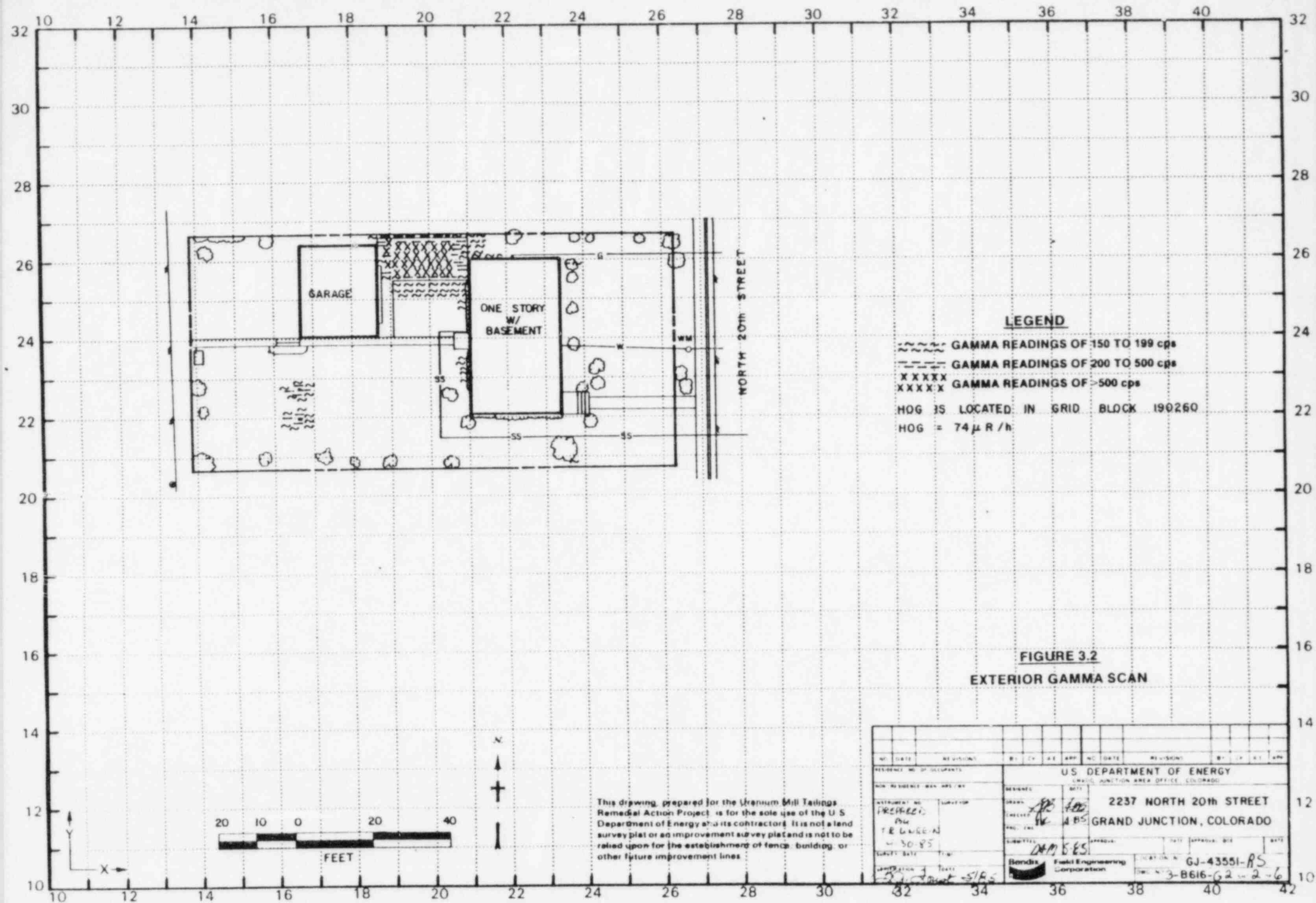


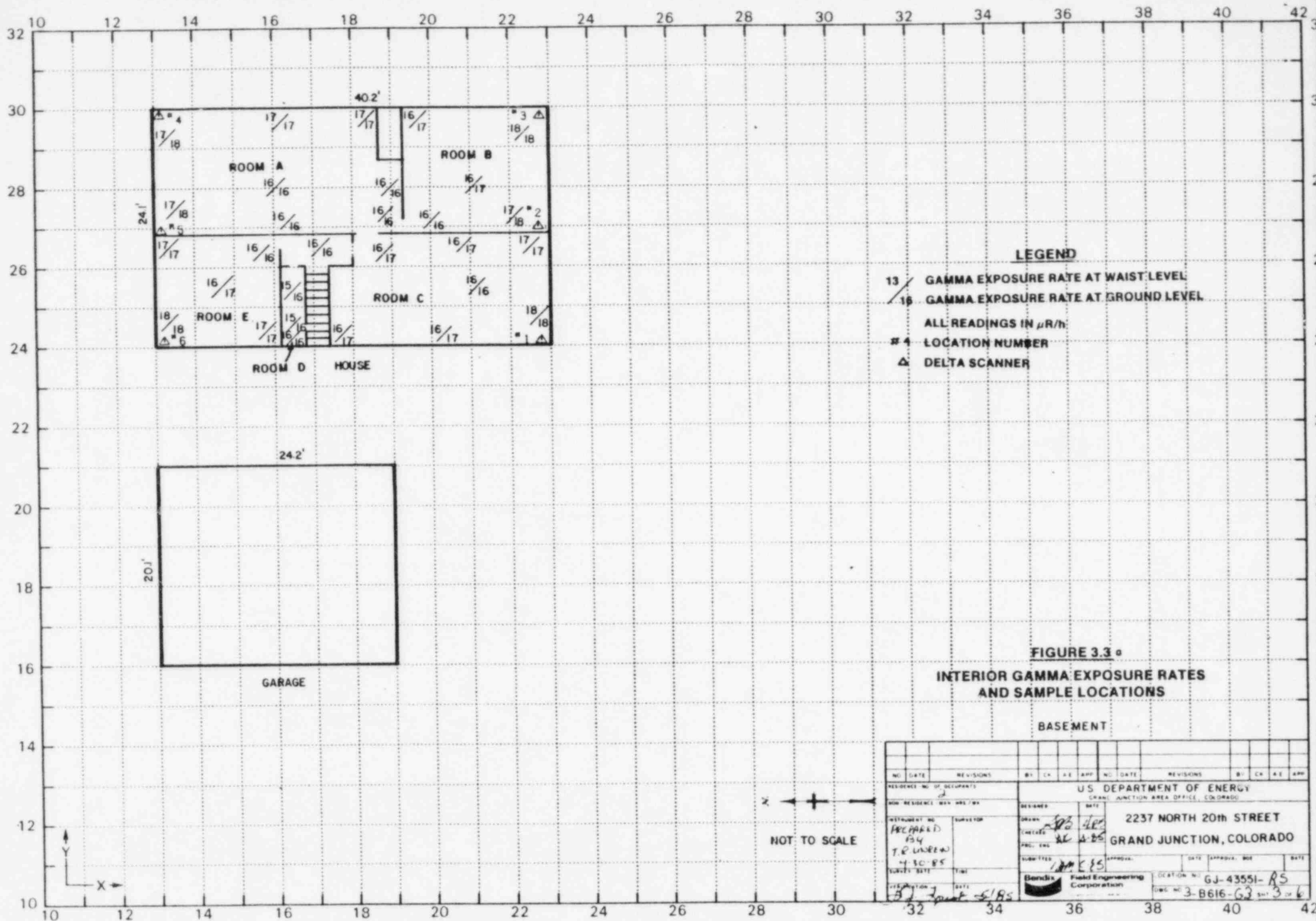
FIGURE 2.1
VICINITY MAP

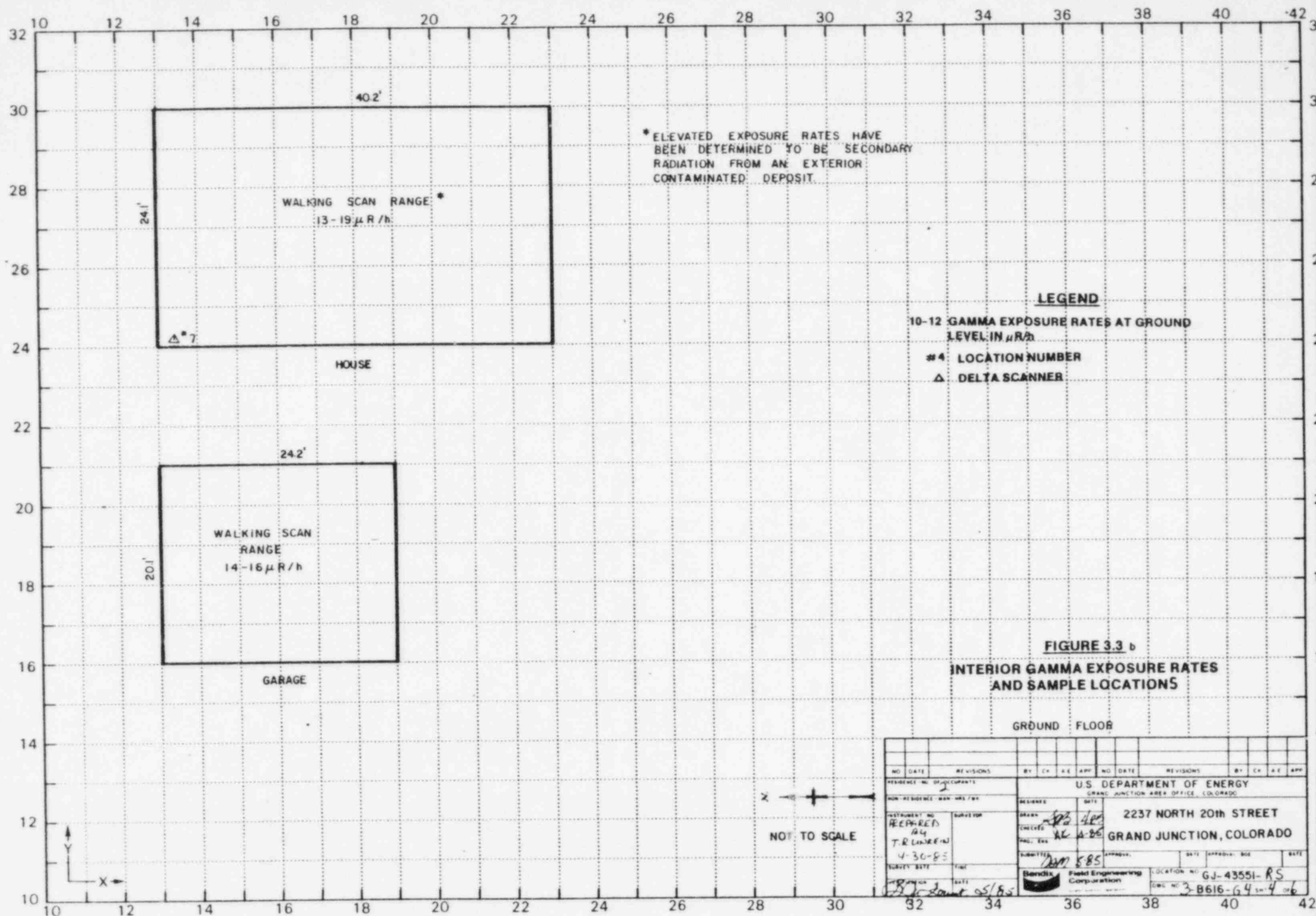




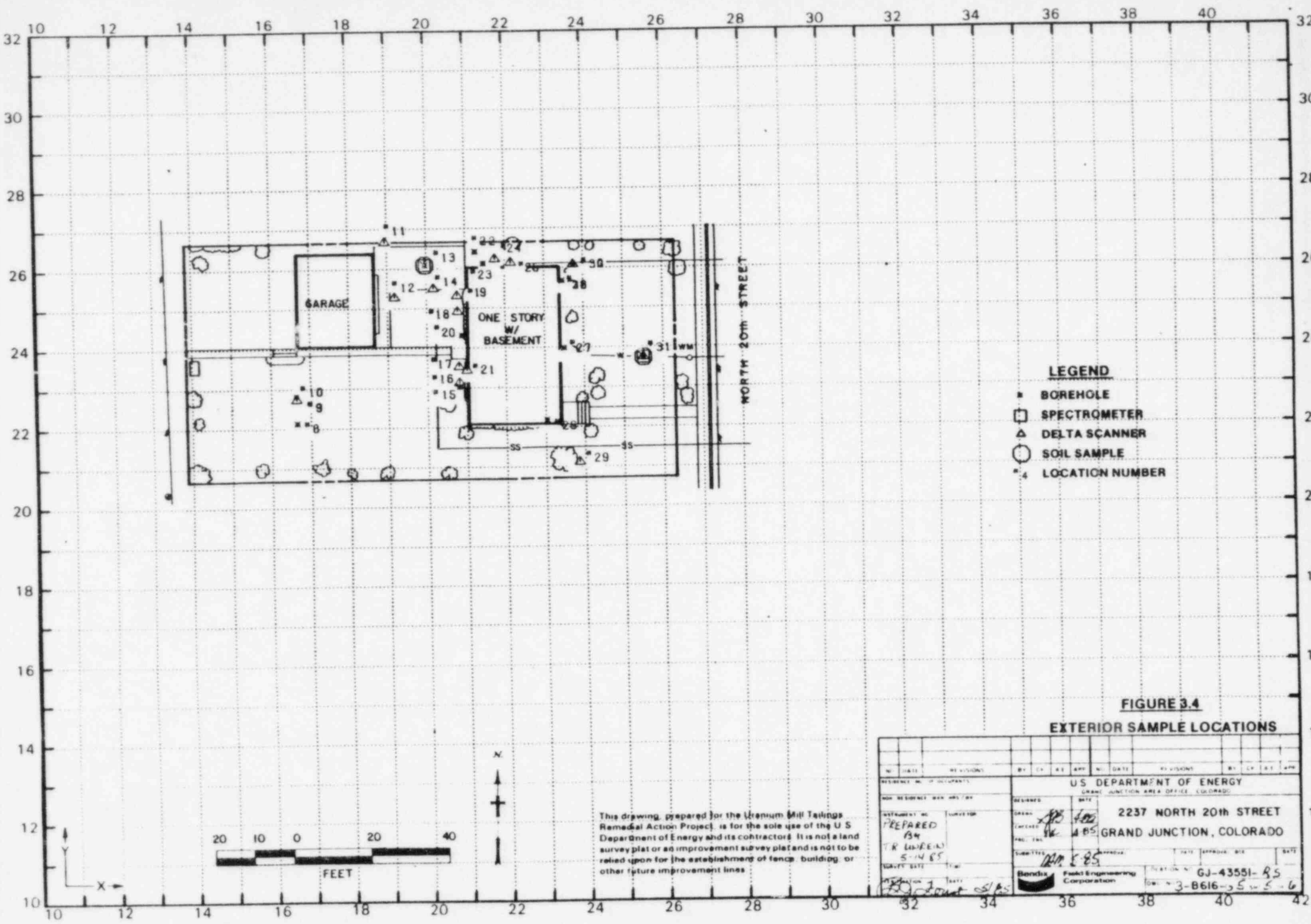
This drawing, prepared for the Uranium Mill Tailings Remedial Action Project, is for the sole use of the U. S. Department of Energy and its contractors. It is not a land survey plat or an improvement survey plat and is not to be relied upon for the establishment of fence, building, or other future improvement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

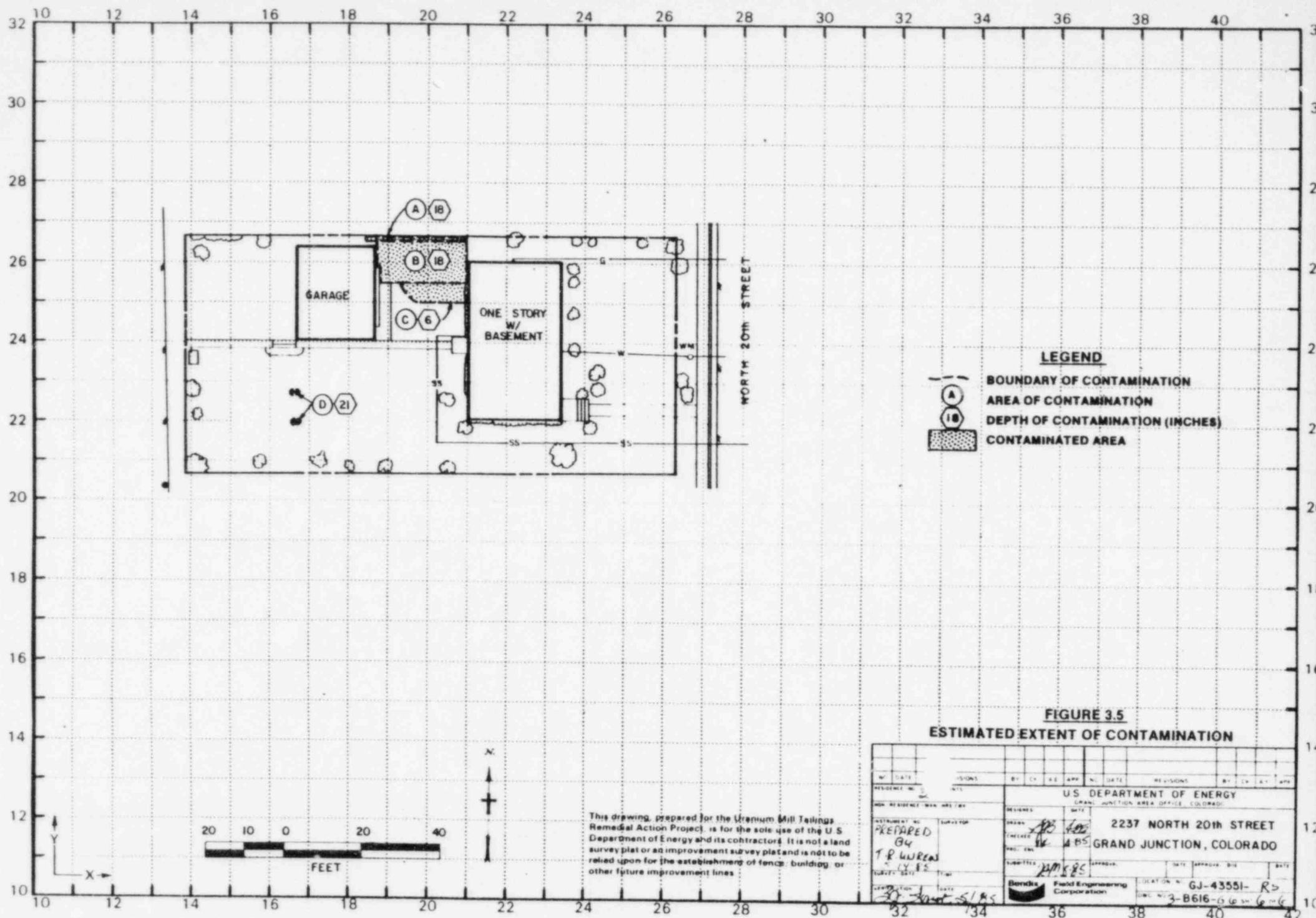
NO. DATE		REVISION		BY		CHK		APP		NO. DATE		REVISION		BY		CHK		APP											
RESIDENCE NO. OF OCCUPANTS										US DEPARTMENT OF ENERGY GRAND JUNCTION AREA OFFICE, COLORADO																			
NON-RESIDENTIAL MAN AND WY										DESIGNED DRAWN CHECKED ENG. ING. SUBMITTAL Bonds										2237 NORTH 20th STREET GRAND JUNCTION, COLORADO FIELD Engineering Corporation GJ-43551-AS 3-B616-62-2-6									
INSTRUMENT NO. PROJECT NO. TR. LINE & N. W. 30-85										LOCATION DATE APPROVAL DATE APPROVAL DATE										2237 NORTH 20th STREET GRAND JUNCTION, COLORADO FIELD Engineering Corporation GJ-43551-AS 3-B616-62-2-6									





NO	DATE	REVISIONS	BY	CHK	APP	NO	DATE	REVISIONS	BY	CHK	APP
RESIDENCE NO. OF OCCUPANTS NON-RESIDENCE (MAN HRS / WK) INSTRUMENT NO. REPAIRS T.R. LINKER 4-30-85 SURVEY SITE DATE 5/85											
U.S. DEPARTMENT OF ENERGY GRAND JUNCTION AREA OFFICE, COLORADO 2237 NORTH 20th STREET GRAND JUNCTION, COLORADO LOCATION NO. GJ-43551-RS DOW NO. 3-B616-64-4 of 6											





3/85

DOE ID NO. GJ 43551- RS

Date May 9, 1985

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

Official Survey Report

Property Address 2237 North 20th Street

Property Owner Bert and Alice Allred

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

Report Prepared By Tom Unrein

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 = 19 uR/h
HOG = 74 uR/h

May 14, 1985

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

ATTN: Coleen Campbell

SUBJECT: GJ-43551-RS

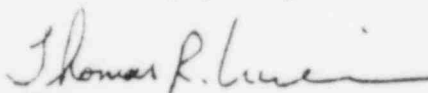
Dear Coleen:

The following is in response to your questions and comments during the Technical Review concerning Department of Energy (DOE) Identification (ID) number GJ-43551-RS.

1. Yes, it is a spillover from GJ-34247-RS (2249 North 20th Street).
2. The tailings were used around the patio area.
3. This will be added to the areas of further investigation.

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

Very truly yours,



Thomas R. Unrein
RSD Survey Team Leader

TRU:pr

MEMORANDUM

ALLIED Bendix
Aerospace

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

DATE: April 30, 1985

TO: Files

FROM: Thomas R. Unrein

SUBJECT: Team Leader Notes - GJ-43551-RS

Address: 2237 North 20th Street

Owner: Bert and Alice Allred

Team Members

T.R. Unrein (Team Leader)
H. Mattison
N. Wallace
M. Gilfillan
T. Flores

R. Herman
V. Young
D. Bell
R. Wilkins

Instruments

Crutch Scintillometer - C-1127, C-3502, C-3510, C-1182, C-1196
Delta Scintillometer - C-3942
Total Count - C-3959, C-3957
Surface Spectrometer - C-3413
Downhole Spectrometer - C-3361

Date: April 25, 1985

Team members arrived at the property at 8:45 A.M. and proceeded to grid the property (while it was raining). We then waited 45 minutes for the rain to stop before finishing the survey.

The data shows contamination around the patio area and the swing set.

Team Leader Notes
Thomas R. Unrein
GJ-43551-RS
April 30, 1985
Page 2

We had a 160 cps reading in one of the bedrooms, but I believe this is secondary radiation (shine) from the patio. This bedroom is adjacent to the patio. The owner informed me that he has owned the house since it was built and the only time tailings were used was for the concrete patio. He also stated that there was a small amount of tailings leftover which he used to anchor his swing set and to fill in a few places in the yard.

We worked through lunch and finished around 2:00 P.M.

All team members were frisked and returned back to the office.

Revisit

Instruments

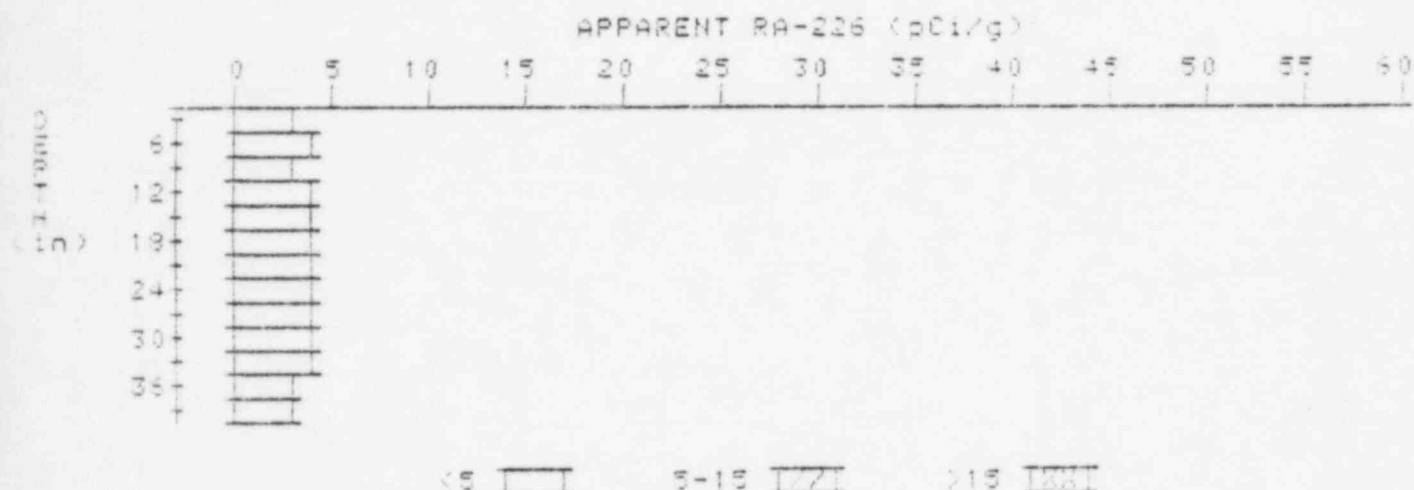
Delta Scintillometer - C-3942

Date: April 30, 1985

I sent T. Flores back out to the property to do a few more deltas.

APPARENT RADIUM-226 CONCENTRATION 8 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-43551-RS
HOLE NUMBER: 8
LOCATION: 166221



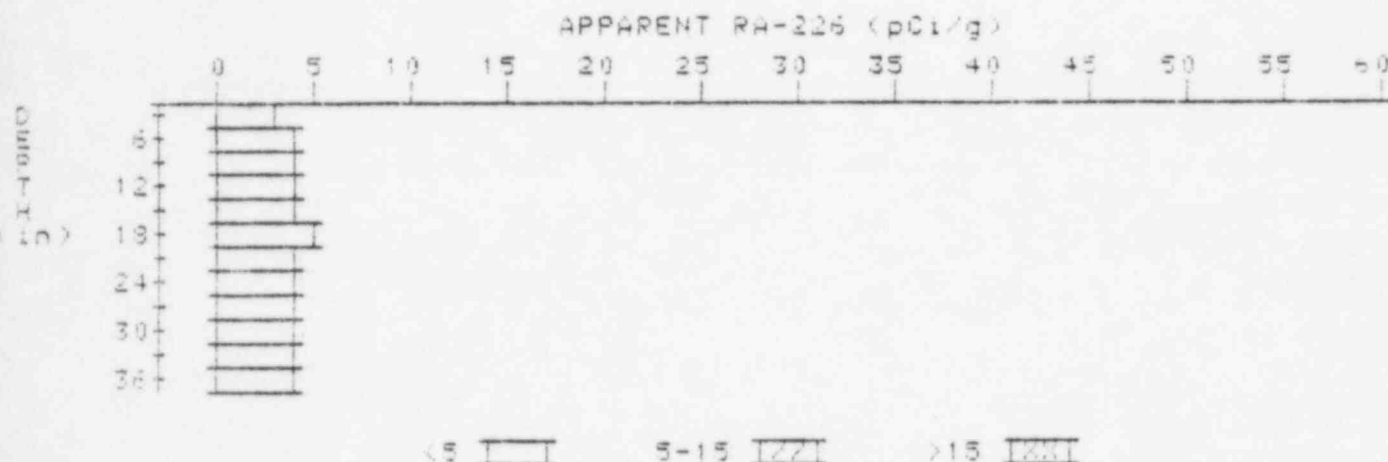
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.9	2.9
6	3.4	3.9
9	3.6	3.4
12	3.9	4.3
15	4.0	4.0
18	4.1	4.3
21	4.0	3.6
24	4.0	4.2
27	3.9	3.9
30	3.9	3.6
33	3.7	3.9
36	3.8	3.6
39	3.4	3.4

APPARENT RADIUM-226 CONCENTRATION 10 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-43551-R3

HOLE NUMBER: 10

LOCATION: 166228



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.3	3.3
6	3.7	4.1
9	3.9	3.9
12	4.1	4.1
15	4.3	4.5
18	4.4	4.8
21	4.3	4.1
24	4.3	4.3
27	4.2	4.4
30	4.0	3.8
33	3.9	4.3
36	3.6	3.8

Horizontal bar chart showing the distribution of apparent RA-226 (pCi/g) for various radon progeny concentrations. The x-axis represents APPARENT RA-226 (pCi/g) from 0 to 60. The y-axis represents radon progeny concentration from 0 to 60. The chart shows that for low radon progeny concentrations (0-10), the apparent RA-226 is mostly below 15 pCi/g. As radon progeny concentration increases, the apparent RA-226 values also increase, with some concentrations (e.g., 12, 18, 24, 30, 36, 42, 48) showing values exceeding 15 pCi/g. A legend at the bottom indicates three ranges: <5 (white), 5-15 (diagonal lines), and >15 (cross-hatched).

Radon Progeny Concentration	Apparent RA-226 Range (pCi/g)	Pattern
0	0 - 10	White
6	0 - 10	White
12	0 - 15	Diagonal lines
18	0 - 15	Diagonal lines
24	0 - 15	Diagonal lines
30	0 - 15	Diagonal lines
36	0 - 15	Diagonal lines
42	0 - 15	Diagonal lines
48	0 - 15	Diagonal lines
54	0 - 15	White
60	0 - 15	White

Depth (m)	Apparent Residual-226 (pCi/g)	Apparent Residual-226 (pCi/g)
	Unconvolved	Deconvolved
4.4	34.0	34.0
4.9	30.9	43.8
5.4	20.7	13.6
5.9	14.4	7.6
6.4	11.9	10.1
6.9	10.4	9.4
7.4	9.9	9.4
7.9	9.9	9.4
8.4	9.9	9.4
8.9	9.9	9.4
9.4	9.9	9.4
9.9	9.9	9.4
10.4	9.9	9.4
10.9	9.9	9.4
11.4	9.9	9.4
11.9	9.9	9.4
12.4	9.9	9.4
12.9	9.9	9.4
13.4	9.9	9.4
13.9	9.9	9.4
14.4	9.9	9.4
14.9	9.9	9.4
15.4	9.9	9.4
15.9	9.9	9.4
16.4	9.9	9.4
16.9	9.9	9.4
17.4	9.9	9.4
17.9	9.9	9.4
18.4	9.9	9.4
18.9	9.9	9.4
19.4	9.9	9.4
19.9	9.9	9.4
20.4	9.9	9.4
20.9	9.9	9.4
21.4	9.9	9.4
21.9	9.9	9.4
22.4	9.9	9.4
22.9	9.9	9.4
23.4	9.9	9.4
23.9	9.9	9.4
24.4	9.9	9.4
24.9	9.9	9.4
25.4	9.9	9.4
25.9	9.9	9.4
26.4	9.9	9.4
26.9	9.9	9.4
27.4	9.9	9.4
27.9	9.9	9.4
28.4	9.9	9.4
28.9	9.9	9.4
29.4	9.9	9.4
29.9	9.9	9.4
30.4	9.9	9.4
30.9	9.9	9.4
31.4	9.9	9.4
31.9	9.9	9.4
32.4	9.9	9.4
32.9	9.9	9.4
33.4	9.9	9.4
33.9	9.9	9.4
34.4	9.9	9.4
34.9	9.9	9.4
35.4	9.9	9.4
35.9	9.9	9.4
36.4	9.9	9.4
36.9	9.9	9.4
37.4	9.9	9.4
37.9	9.9	9.4
38.4	9.9	9.4
38.9	9.9	9.4
39.4	9.9	9.4
39.9	9.9	9.4
40.4	9.9	9.4
40.9	9.9	9.4
41.4	9.9	9.4
41.9	9.9	9.4
42.4	9.9	9.4
42.9	9.9	9.4
43.4	9.9	9.4
43.9	9.9	9.4
44.4	9.9	9.4
44.9	9.9	9.4
45.4	9.9	9.4
45.9	9.9	9.4
46.4	9.9	9.4
46.9	9.9	9.4
47.4	9.9	9.4
47.9	9.9	9.4
48.4	9.9	9.4
48.9	9.9	9.4
49.4	9.9	9.4
49.9	9.9	9.4
50.4	9.9	9.4
50.9	9.9	9.4
51.4	9.9	9.4
51.9	9.9	9.4
52.4	9.9	9.4
52.9	9.9	9.4
53.4	9.9	9.4
53.9	9.9	9.4
54.4	9.9	9.4
54.9	9.9	9.4
55.4	9.9	9.4
55.9	9.9	9.4
56.4	9.9	9.4
56.9	9.9	9.4
57.4	9.9	9.4
57.9	9.9	9.4
58.4	9.9	9.4
58.9	9.9	9.4
59.4	9.9	9.4
59.9	9.9	9.4
60.4	9.9	9.4
60.9	9.9	9.4
61.4	9.9	9.4
61.9	9.9	9.4
62.4	9.9	9.4
62.9	9.9	9.4
63.4	9.9	9.4
63.9	9.9	9.4
64.4	9.9	9.4
64.9	9.9	9.4
65.4	9.9	9.4
65.9	9.9	9.4
66.4	9.9	9.4
66.9	9.9	9.4
67.4	9.9	9.4
67.9	9.9	9.4
68.4	9.9	9.4
68.9	9.9	9.4
69.4	9.9	9.4
69.9	9.9	9.4
70.4	9.9	9.4
70.9	9.9	9.4
71.4	9.9	9.4
71.9	9.9	9.4
72.4	9.9	9.4
72.9	9.9	9.4
73.4	9.9	9.4
73.9	9.9	9.4
74.4	9.9	9.4
74.9	9.9	9.4
75.4	9.9	9.4
75.9	9.9	9.4
76.4	9.9	9.4
76.9	9.9	9.4
77.4	9.9	9.4
77.9	9.9	9.4
78.4	9.9	9.4
78.9	9.9	9.4
79.4	9.9	9.4
79.9	9.9	9.4
80.4	9.9	9.4
80.9	9.9	9.4
81.4	9.9	9.4
81.9	9.9	9.4
82.4	9.9	9.4
82.9	9.9	9.4
83.4	9.9	9.4
83.9	9.9	9.4
84.4	9.9	9.4
84.9	9.9	9.4
85.4	9.9	9.4
85.9	9.9	9.4
86.4	9.9	9.4
86.9	9.9	9.4
87.4	9.9	9.4
87.9	9.9	9.4
88.4	9.9	9.4
88.9	9.9	9.4
89.4	9.9	9.4
89.9	9.9	9.4
90.4	9.9	9.4
90.9	9.9	9.4
91.4	9.9	9.4
91.9	9.9	9.4
92.4	9.9	9.4
92.9	9.9	9.4
93.4	9.9	9.4
93.9	9.9	9.4
94.4	9.9	9.4
94.9	9.9	9.4
95.4	9.9	9.4
95.9	9.9	9.4
96.4	9.9	9.4
96.9	9.9	9.4
97.4	9.9	9.4
97.9	9.9	9.4
98.4	9.9	9.4
98.9	9.9	9.4
99.4	9.9	9.4
99.9	9.9	9.4
100.4	9.9	9.4
100.9	9.9	9.4
101.4	9.9	9.4
101.9	9.9	9.4
102.4	9.9	9.4
102.9	9.9	9.4
103.4	9.9	9.4
103.9	9.9	9.4
104.4	9.9	9.4
104.9	9.9	9.4
105.4	9.9	9.4
105.9	9.9	9.4
106.4	9.9	9.4
106.9	9.9	9.4
107.4	9.9	9.4
107.9	9.9	9.4
108.4	9.9	9.4
108.9	9.9	9.4
109.4	9.9	9.4
109.9	9.9	9.4
110.4	9.9	9.4
110.9	9.9	9.4
111.4	9.9	9.4
111.9	9.9	9.4
112.4	9.9	9.4
112.9	9.9	9.4
113.4	9.9	9.4
113.9	9.9	9.4
114.4	9.9	9.4
114.9	9.9	9.4
115.4	9.9	9.4
115.9	9.9	9.4
116.4	9.9	9.4
116.9	9.9	9.4
117.4	9.9	9.4
117.9	9.9	9.4
118.4	9.9	9.4
118.9	9.9	9.4
119.4	9.9	9.4
119.9	9.9	9.4
120.4	9.9	9.4
120.9	9.9	9.4
121.4	9.9	9.4
121.9	9.9	9.4
122.4	9.9	9.4
122.9	9.9	9.4
123.4	9.9	9.4
123.9	9.9	9.4
124.4	9.9	9.4
124.9	9.9	9.4
125.4	9.9	9.4
125.9	9.9	9.4
126.4	9.9	9.4
126.9	9.9	9.4
127.4	9.9	9.4
127.9	9.9	9.4
128.4	9.9	9.4
128.9	9.9	9.4
129.4	9.9	9.4
129.9	9.9	9.4
130.4	9.9	9.4
130.9	9.9	9.4
131.4	9.9	9.4
131.9	9.9	9.4
132.4	9.9	9.4
132.9	9.9	9.4
133.4	9.9	9.4
133.9	9.9	9.4
134.4	9.9	9.4
134.9	9.9	9.4
135.4	9.9	9.4
135.9	9.9	9.4
136.4	9.9	9.4
136.9	9.9	9.4
137.4	9.9	9.4
137.9	9.9	9.4
138.4	9.9	9.4
138.9	9.9	9.4
139.4	9.9	9.4
139.9	9.9	9.4
140.4	9.9	9.4
140.9	9.9	9.4
141.4	9.9	9.4
141.9	9.9	9.4
142.4	9.9	9.4
142.9	9.9	9.4
143.4	9.9	9.4
143.9	9.9	9.4
144.4	9.9	9.4
144.9	9.9	9.4
145.4	9.9	9.4
145.9	9.9	9.4
146.4	9.9	9.4
146.9	9.9	9.4
147.4	9.9	9.4
147.9	9.9	9.4
148.4	9.9	9.4
148.9	9.9	9.4
149.4	9.9	9.4
149.9	9.9	9.4
150.4	9.9	9.4
150.9	9.9	9.4
151.4	9.9	9.4
151.9	9.9	9.4
152.4	9.9	9.4
152.9	9.9	9.4
153.4	9.9	9.4
153.9	9.9	9.4
154.4	9.9	9.4
154.9	9.9	9.4
155.4	9.9	9.4
155.9	9.9	9.4
156.4	9.9	9.4
156.9	9.9	9.4
157.4	9.9	9.4
157.9	9.9	9.4
158.4	9.9	9.4
158.9	9.9	9.4
159.4	9.9	9.4
159.9	9.9	9.4
160.4	9.9	9.4
160.9	9.9	9.4
161.4	9.9	9.4
161.9	9.9	9.4
162.4	9.9	9.4
162.9	9.9	9.4
163.4	9.9	9.4
163.9	9.9	9.4
164.4	9.9	9.4
164.9	9.9	9.4
165.4	9.9	9.4
165.9	9.9	9.4
166.4	9.9	9.4
166.9	9.9	9.4
167.4	9.9	9.4
167.9	9.9	9.4
168.4	9.9	9.4
168.9	9.9	9.4
169.4	9.9	9.4
169.9	9.9	9.4
170.4	9.9	9.4
170.9	9.9	9.4
171.4	9.9	9.4
171.9	9.9	9.4
172.4	9.9	9.4
172.9	9.9	9.4
173.4	9.9	9.4
173.9	9.9	9.4
174.4	9.9	9.4
174.9	9.9	9.4
175.4	9.9	9.4
175.9	9.9	9.4
176.4	9.9	9.4
176.9	9.9	9.4
177.4	9.9	9.4
177.9	9.9	9.4
178.4	9.9	9.4
178.9	9.9	9.4
179.4	9.9	9.4
179.9	9.9	9.4
180.4	9.9	9.4
180.9	9.9	9.4
181.4	9.9	9.4
181.9	9.9	9.4
182.4	9.9	9.4
182.9	9.9	9.4
183.4	9.9	9.4
183.9	9.9	9.4
184.4	9.9	9.4
184.9	9.9	9.4
185.4	9.9	9.4
185.9	9.9	9.4
186.4	9.9	9.4
186.9	9.9	9.4
187.4	9.9	9.4
187.9	9.9	9.4
188.4	9.9	9.4
188.9	9.9	9.4
189.4	9.9	9.4
189.9	9.9	9.4
190.4	9.9	9.4
190.9	9.9	9.4
191.4	9.9	9.4
191.9	9.9	9.4
192.4	9.9	9.4
192.9	9.9	9.4
193.4	9.9	9.4
193.9	9.9	9.4
194.4	9.9	9.4
194.9	9.9	9.4
195.4	9.9	9.4
195.9	9.9	9.4
196.4	9.9	9.4
196.9	9.9	9.4
197.4	9.9	9.4
197.9	9.9	9.4
198.4	9.9	9.4
198.9	9.9	9.4
199.4	9.9	9.4
199.9	9.9	9.4
200.4	9.9	9.4
200.9	9.9	9.4
201.4	9.9	9.4
201.9	9.9	9.4
202.4	9.9	9.4
202.9	9.9	9.4
203.4	9.9	9.4
203.9	9.9	9.4
204.4	9.9	9.4
204.9	9.9	9.4
205.4	9.9	9.4
205.9	9.9	9.4
206.4	9.9	9.4
206.9	9.9	9.4
207.4	9.9	9.4
207.9	9.9	9.4
208.4	9.9	9.4
208.9	9.9	9.4
209.4	9.9	9.4
209.9	9.9	9.4
210.4	9.9	9.4
210.9	9.9	9.4
211.4	9.9	9.4
211.9	9.9	9.4
212.4	9.9	

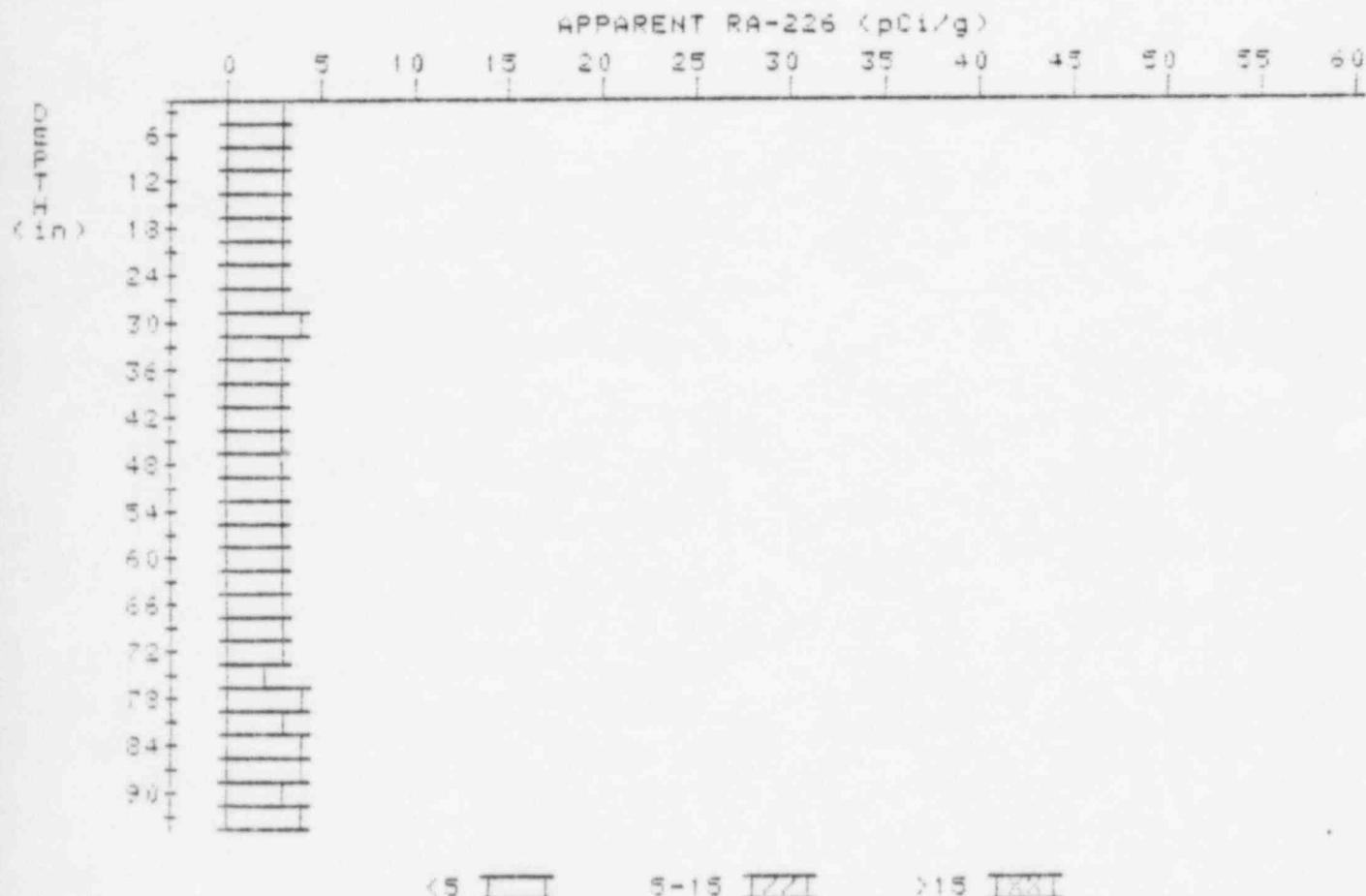
4.00
5.14
5.44
5.74
6.00
6.33
6.66
6.99

5.33
5.66
6.00
6.33
6.66
7.00
7.33
7.66

4.00
5.33
6.66
8.00
9.33
10.66
12.00
13.33

APPARENT RADIUM-226 CONCENTRATION 15 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-43551-RS
HOLE NUMBER: 15
LOCATION: 208229



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
0	5.1	5.1
2	5.2	5.4
4	5.3	5.5
6	5.4	5.6
8	5.5	5.7
10	5.6	5.8
12	5.7	5.9
14	5.8	6.0
16	5.9	6.1
18	6.0	6.2
20	6.1	6.3
22	6.2	6.4
24	6.3	6.5
26	6.4	6.6
28	6.5	6.7
30	6.6	6.8
32	6.7	6.9
34	6.8	7.0
36	6.9	7.1
38	7.0	7.2
40	7.1	7.3
42	7.2	7.4
44	7.3	7.5
46	7.4	7.6
48	7.5	7.7
50	7.6	7.8
52	7.7	7.9
54	7.8	8.0
56	7.9	8.1
58	8.0	8.2
60	8.1	8.3
62	8.2	8.4
64	8.3	8.5
66	8.4	8.6
68	8.5	8.7
70	8.6	8.8
72	8.7	8.9
74	8.8	9.0
76	8.9	9.1
78	9.0	9.2
80	9.1	9.3
82	9.2	9.4
84	9.3	9.5
86	9.4	9.6
88	9.5	9.7
90	9.6	9.8

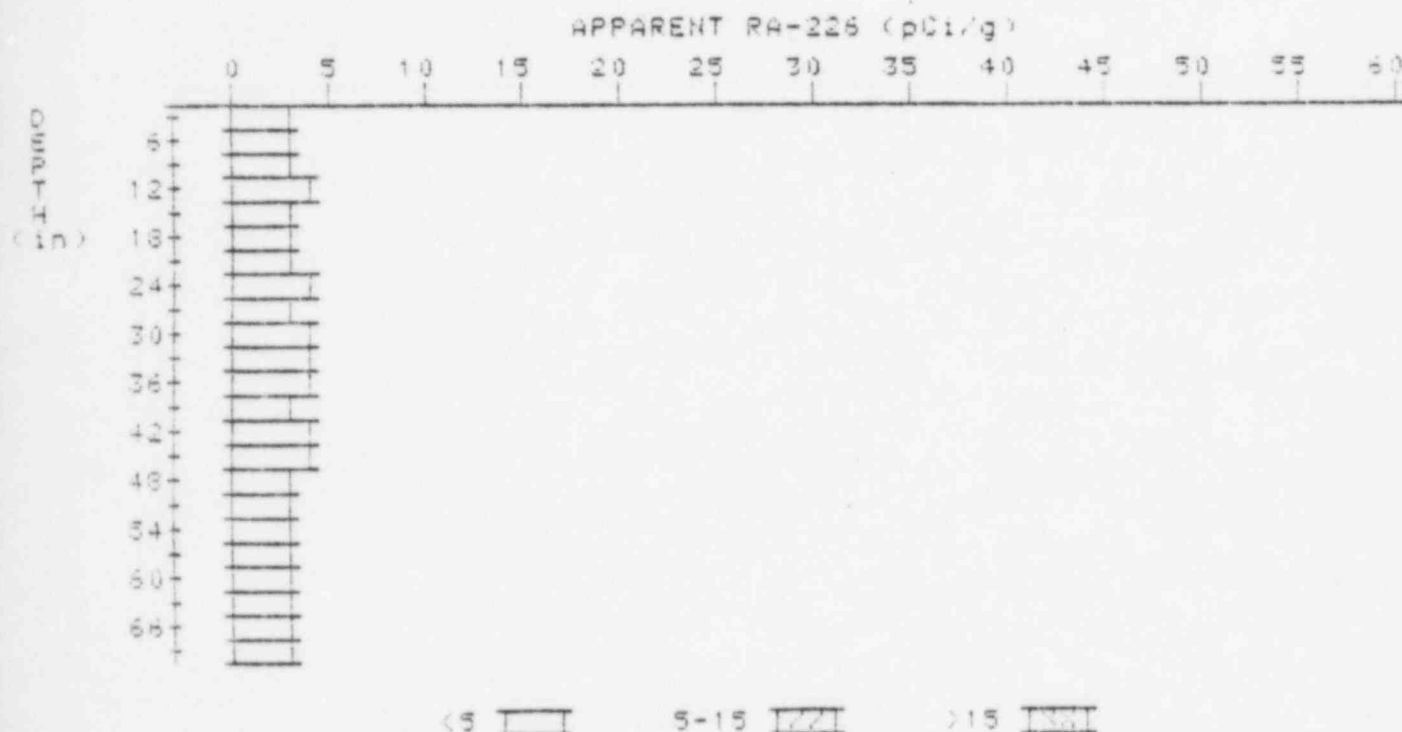
30
31
36
39
42
45
48
51
54
57
60
63
66
69
72
75
78
81
84
87
90
93

[illegible]

(continued)

APPARENT RADIUM-226 CONCENTRATION 20 DECONVOLUTION GRAPH

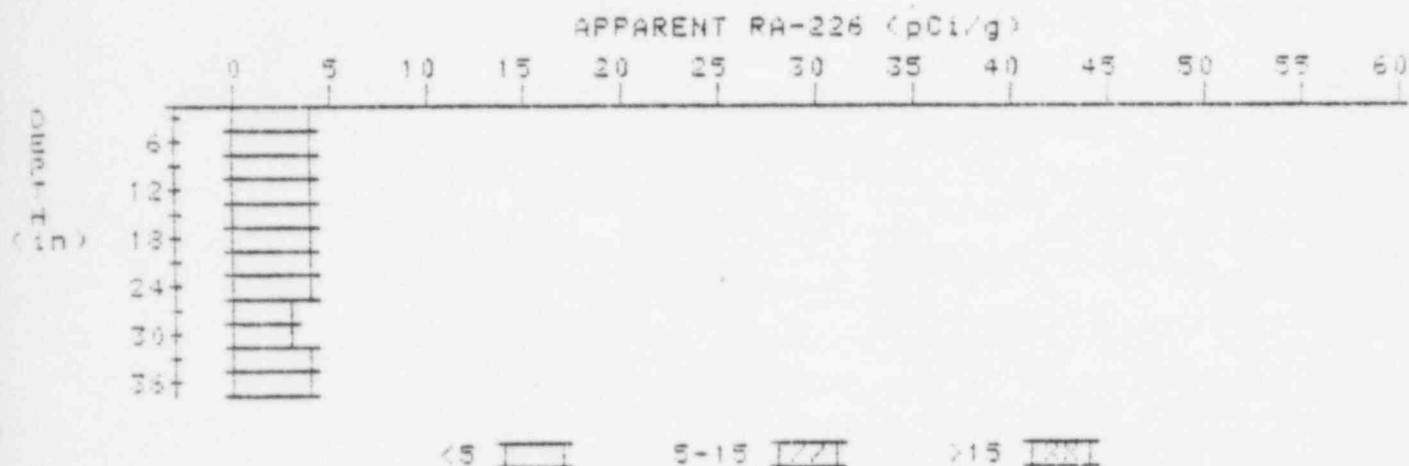
PROPERTY NUMBER: GJ-43551-RS
HOLE NUMBER: 20
LOCATION: 209242



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.0	3.0
6	3.3	3.4
9	3.3	3.3
12	3.4	3.5
15	3.4	3.4
18	3.4	3.4
21	3.4	3.4
24	3.4	3.4
27	3.4	3.4
30	3.4	3.4
33	3.4	3.4
36	3.4	3.4
39	3.4	3.4
42	3.4	3.4
45	3.4	3.4
48	3.4	3.4
51	3.4	3.4
54	3.4	3.4
57	3.4	3.4
60	3.4	3.4
63	3.4	3.4
66	3.4	3.4

APPARENT RADIUM-226 CONCENTRATION 22 DECONVOLUTION GRAPH

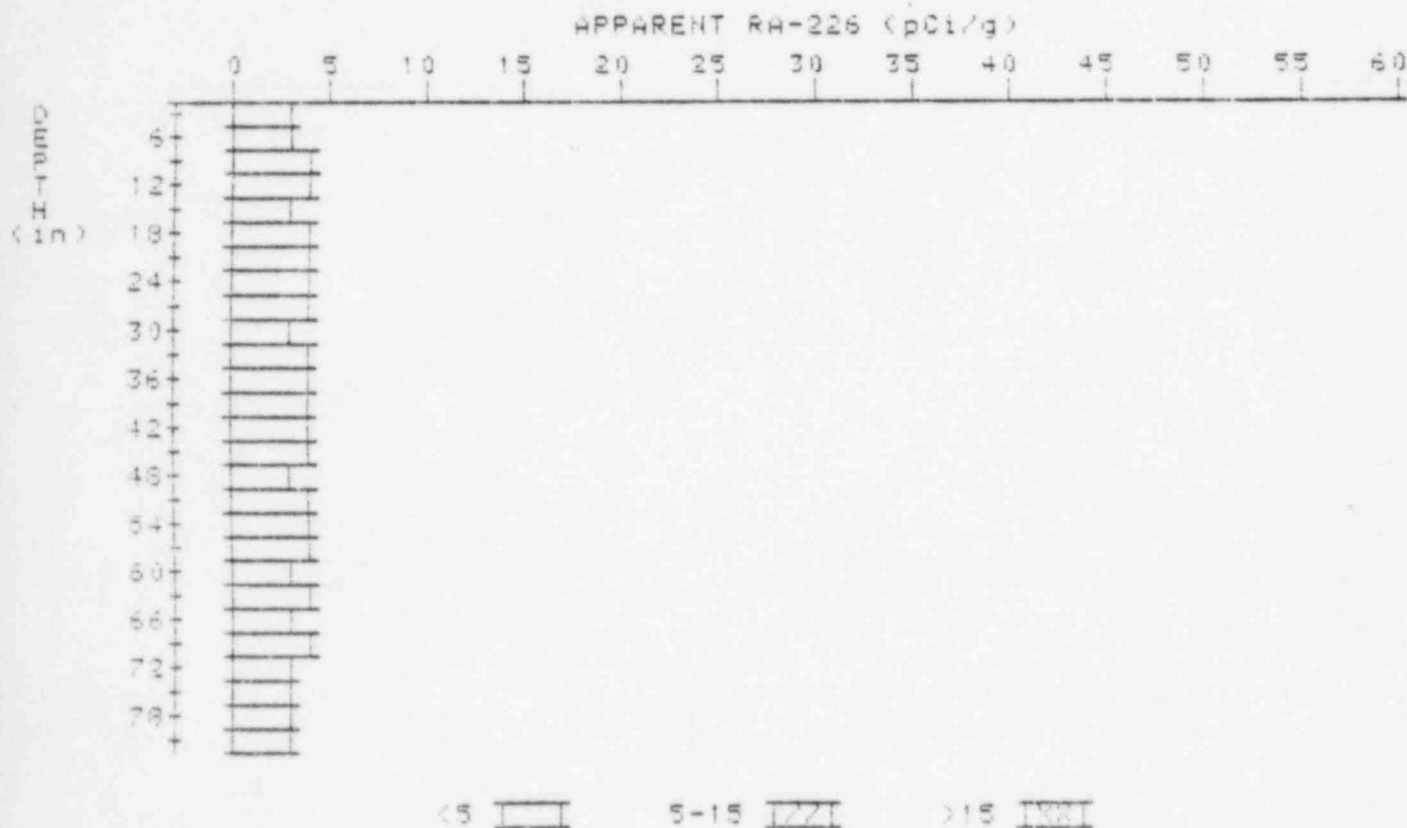
PROPERTY NUMBER: GJ-43551-R5
HOLE NUMBER: 22
LOCATION: 213263



Depth (in)	Apparent Radium-226 (pCi/g)	Apparent Radium-226 (pCi/g)
	Undeconvolved	Deconvolved
3	4.0	4.0
6	4.0	4.2
9	3.9	3.7
12	3.9	4.1
15	3.8	3.6
18	3.8	4.0
21	3.7	3.8
24	3.7	3.9
27	3.6	3.4
30	3.6	3.4
33	3.7	4.1
36	3.6	3.6

APPARENT RADIUM-226 CONCENTRATION 23 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-43551-RS
HOLE NUMBER: 23
LOCATION: 215260/



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
0	0.0	0.0
1	0.0	0.0
2	0.0	0.0
3	0.0	0.0
4	0.0	0.0
5	0.0	0.0
6	0.0	0.0
7	0.0	0.0
8	0.0	0.0
9	0.0	0.0
10	0.0	0.0
11	0.0	0.0
12	0.0	0.0
13	0.0	0.0
14	0.0	0.0
15	0.0	0.0
16	0.0	0.0
17	0.0	0.0
18	0.0	0.0
19	0.0	0.0
20	0.0	0.0
21	0.0	0.0
22	0.0	0.0
23	0.0	0.0
24	0.0	0.0
25	0.0	0.0
26	0.0	0.0
27	0.0	0.0
28	0.0	0.0
29	0.0	0.0
30	0.0	0.0
31	0.0	0.0
32	0.0	0.0
33	0.0	0.0
34	0.0	0.0
35	0.0	0.0
36	0.0	0.0
37	0.0	0.0
38	0.0	0.0
39	0.0	0.0
40	0.0	0.0
41	0.0	0.0
42	0.0	0.0
43	0.0	0.0
44	0.0	0.0
45	0.0	0.0
46	0.0	0.0
47	0.0	0.0
48	0.0	0.0
49	0.0	0.0
50	0.0	0.0
51	0.0	0.0
52	0.0	0.0
53	0.0	0.0
54	0.0	0.0
55	0.0	0.0
56	0.0	0.0
57	0.0	0.0
58	0.0	0.0
59	0.0	0.0
60	0.0	0.0
61	0.0	0.0
62	0.0	0.0
63	0.0	0.0
64	0.0	0.0
65	0.0	0.0
66	0.0	0.0
67	0.0	0.0
68	0.0	0.0
69	0.0	0.0
70	0.0	0.0
71	0.0	0.0
72	0.0	0.0
73	0.0	0.0
74	0.0	0.0
75	0.0	0.0
76	0.0	0.0
77	0.0	0.0
78	0.0	0.0

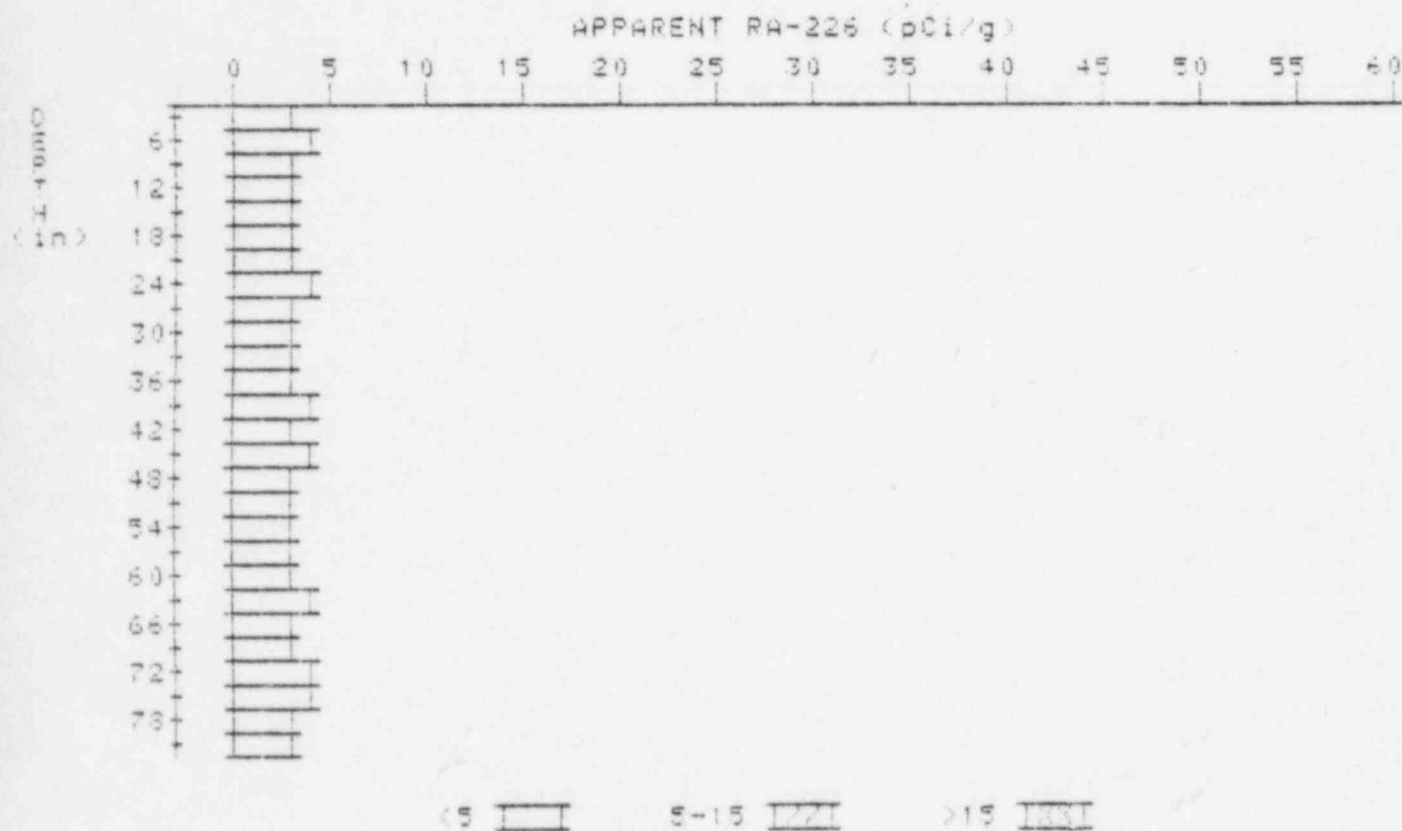
39
42
45
48
51
54
57
60
63
66
69
72
75
78
81

2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086 2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099 2100 2101 2102 2103 2104 2105 2106 2107 2108 2109 2110 2111 2112 2113 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123 2124 2125 2126 2127 2128 2129 2130 2131 2132 2133 2134 2135 2136 2137 2138 2139 2140 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151 2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164 2165 2166 2167 2168 2169 2170 2171 2172 2173 2174 2175 2176 2177 2178 2179 2180 2181 2182 2183 2184 2185 2186 2187 2188 2189 2190 2191 2192 2193 2194 2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216 2217 2218 2219 2220 2221 2222 2223 2224 2225 2226 2227 2228 2229 2230 2231 2232 2233 2234 2235 2236 2237 2238 2239 2240 2241 2242 2243 2244 2245 2246 2247 2248 2249 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2269 2270 2271 2272 2273 2274 2275 2276 2277 2278 2279 2280 2281 2282 2283 2284 2285 2286 2287 2288 2289 2290 2291 2292 2293 2294 2295 2296 2297 2298 2299 2300 2301 2302 2303 2304 2305 2306 2307 2308 2309 2310 2311 2312 2313 2314 2315 2316 2317 2318 2319 2320 2321 2322 2323 2324 2325 2326 2327 2328 2329 2330 2331 2332 2333 2334 2335 2336 2337 2338 2339 2340 2341 2342 2343 2344 2345 2346 2347 2348 2349 2350 2351 2352 2353 2354 2355 2356 2357 2358 2359 2360 2361 2362 2363 2364 2365 2366 2367 2368 2369 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386 2387 2388 2389 2390 2391 2392 2393 2394 2395 2396 2397 2398 2399 2400 2401 2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420 2421 2422 2423 2424 2425 2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480 2481 2482 2483 2484 2485 2486 2487 2488 2489 2490 2491 2492 2493 2494 2495 2496 2497 2498 2499 2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515 2516 2517 2518 2519 2520 2521 2522 2523 2524 2525 2526 2527 2528 2529 2530 2531 2532 2533 2534 2535 2536 2537 2538 2539 2540 2541 2542 2543 2544 2545 2546 2547 2548 2549 2550 2551 2552 2553 2554 2555 2556 2557 2558 2559 2560 2561 2562 2563 2564 2565 2566 2567 2568 2569 2570 2571 2572 2573 2574 2575 2576 2577 2578 2579 2580 2581 2582 2583 2584 2585 2586 2587 2588 2589 2590 2591 2592 2593 2594 2595 2596 2597 2598 2599 2600 2601 2602 2603 2604 2605 2606 2607 2608 2609 2610 2611 2612 2613 2614 2615 2616 2617 2618 2619 2620 2621 2622 2623 2624 2625 2626 2627 2628 2629 2630 2631 2632 2633 2634 2635 2636 2637 2638 2639 2640 2641 2642 2643 2644 2645 2646 2647 2648 2649 2650 2651 2652 2653 2654 2655 2656 2657 2658 2659 2660 2661 2662 2663 2664 2665 2666 2667 2668 2669 2670 2671 2672 2673 2674 2675 2676 2677 2678 2679 2680 2681 2682 2683 2684 2685 2686 2687 2688 2689 2690 2691 2692 2693 2694 2695 2696 2697 2698 2699 2700 2701 2702 2703 2704 2705 2706 2707 2708 2709 2710 2711 2712 2713 2714 2715 2716 2717 2718 2719 2720 2721 2722 2723 2724 2725 2726 2727 2728 2729 2730 2731 2732 2733 2734 2735 2736 2737 2738 2739 2740 2741 2742 2743 2744 2745 2746 2747 2748 2749 2750 2751 2752 2753 2754 2755 2756 2757 2758 2759 2760 2761 2762 2763 2764 2765 2766 2767 2768 2769 2770 2771 2772 2773 2774 2775 2776 2777 2778 2779 2780 2781 2782 2783 2784 2785 2786 2787 2788 2789 2790 2791 2792 2793 2794 2795 2796 2797 2798 2799 2800 2801 2802 2803 2804 2805 2806 2807 2808 2809 2810 2811 2812 2813 2814 2815 2816 2817 2818

[illegible]

APPARENT RADIUM-226 CONCENTRATION 26 DECONVOLUTION GRAPH

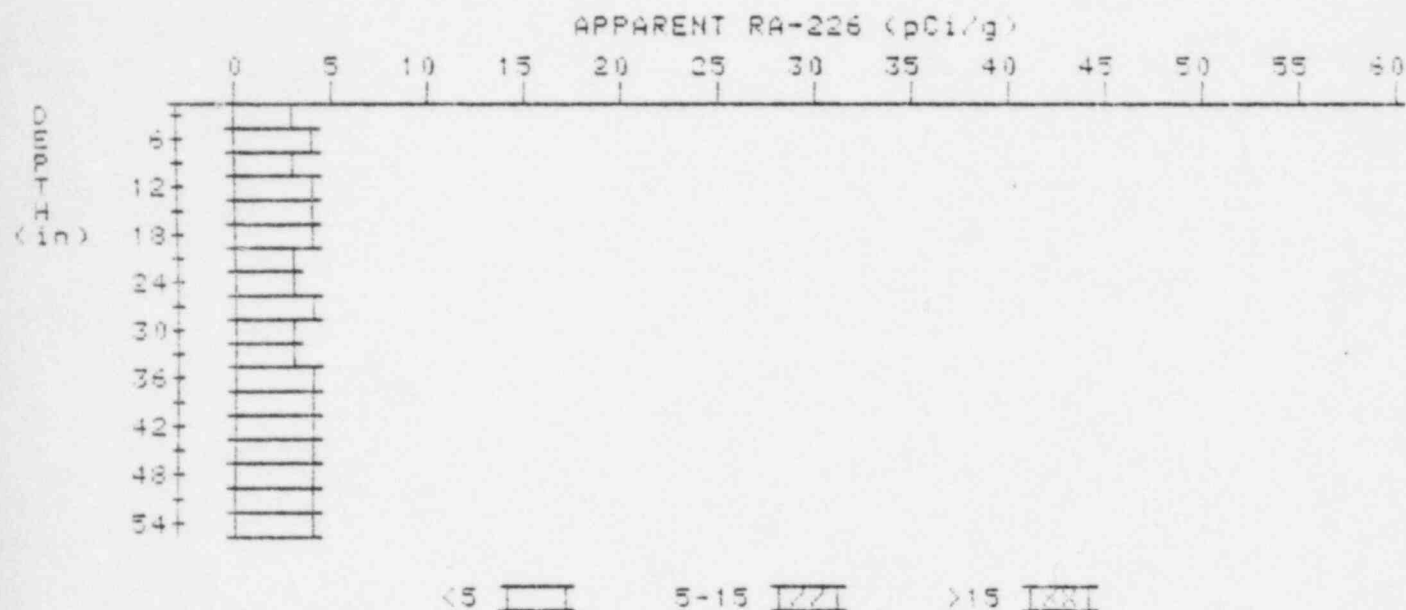
PROPERTY NUMBER: GJ-43551-RS
HOLE NUMBER: 26
LOCATION: 230220



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
0.0	3.0	3.0
0.2	3.2	3.6
0.4	3.2	3.0
0.6	3.3	3.3
0.8	3.3	3.3
1.0	3.3	3.3
1.2	3.3	3.3
1.4	3.4	3.3
1.6	3.4	3.3
1.8	3.4	3.3
2.0	3.4	3.3
2.2	3.4	3.3
2.4	3.4	3.3
2.6	3.4	3.3
2.8	3.4	3.3
3.0	3.4	3.3
3.2	3.4	3.3
3.4	3.4	3.3
3.6	3.4	3.3
3.8	3.4	3.3
4.0	3.4	3.3
4.2	3.4	3.3
4.4	3.4	3.3
4.6	3.4	3.3
4.8	3.4	3.3
5.0	3.4	3.3
5.2	3.4	3.3
5.4	3.4	3.3
5.6	3.4	3.3
5.8	3.4	3.3
6.0	3.4	3.3

APPARENT RADIUM-226 CONCENTRATION 27 DECONVOLUTION GRAPH

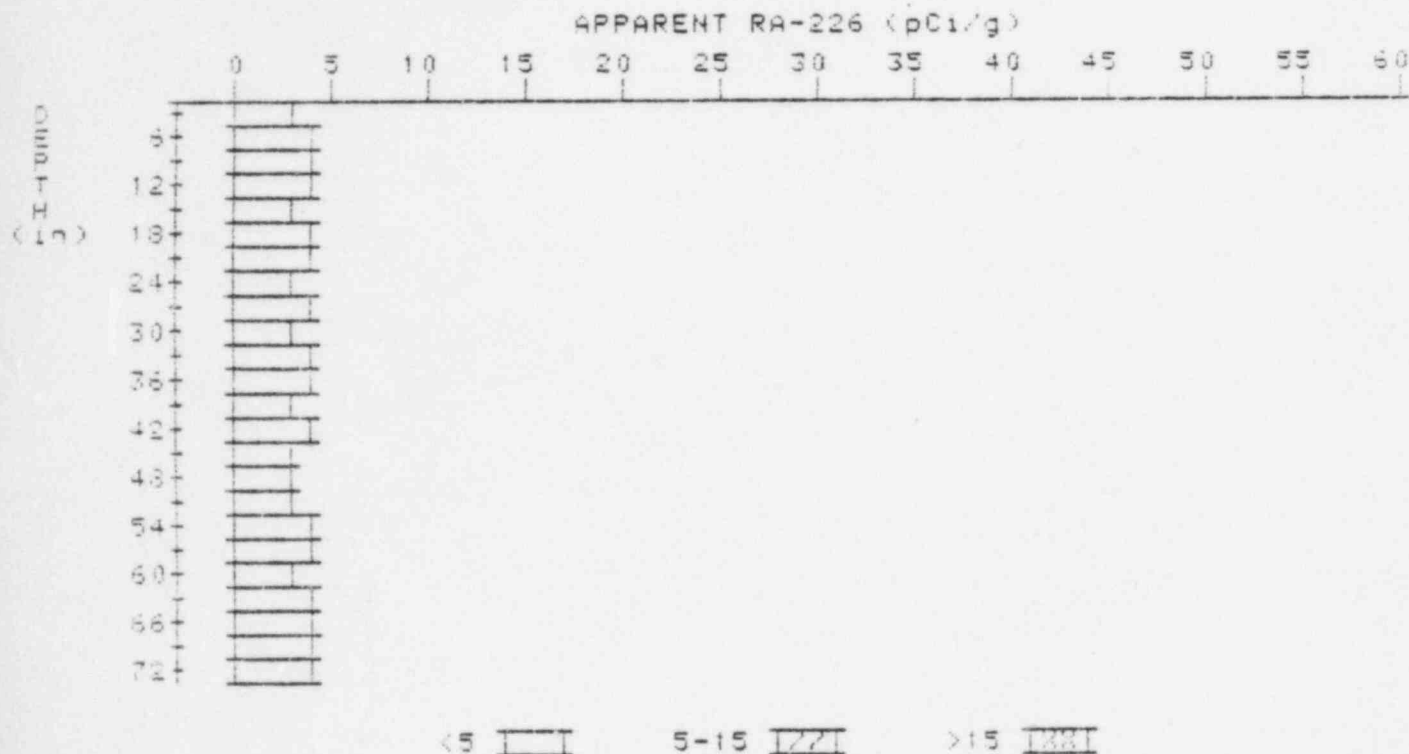
PROPERTY NUMBER: GJ-43551-R3
HOLE NUMBER: 27
LOCATION: 235238



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

APPARENT RADIUM-226 CONCENTRATION 28 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-43351-RS
HOLE NUMBER: 28
LOCATION: 233255



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
0	3.3	3.3
6	3.3	3.3
12	3.3	3.3
18	3.3	3.3
24	3.3	3.3
30	3.3	3.3
36	3.3	3.3
42	3.3	3.3
48	3.3	3.3
54	3.3	3.3
60	3.3	3.3
66	3.3	3.3
72	3.3	3.3

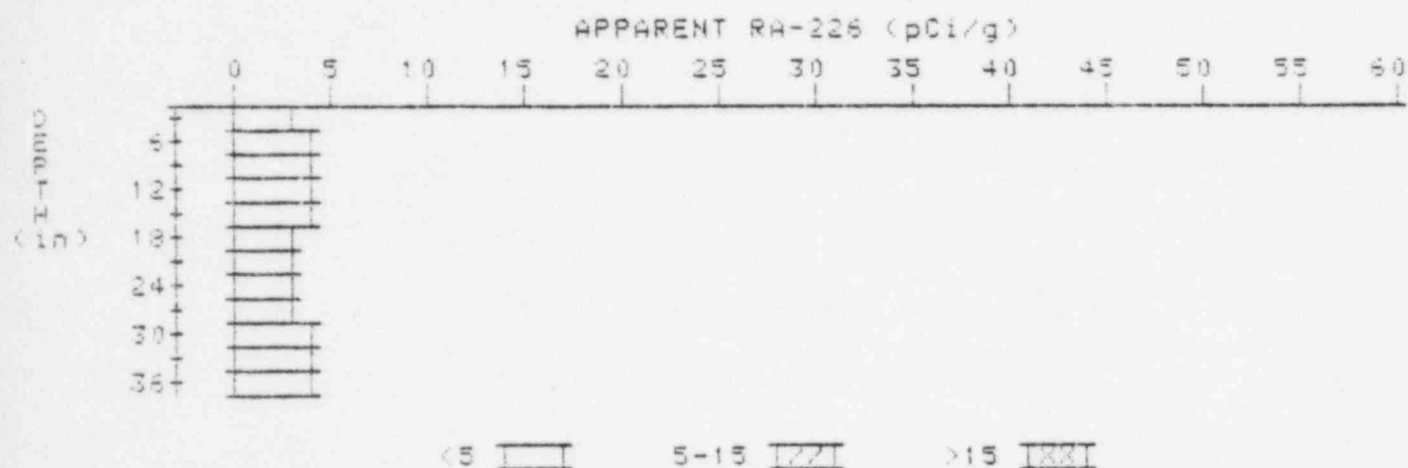
4 0
1 0
4 0
7 0
0 0
0 0
0 0
0 0
2 0

0 0
0 0
0 0
0 0
0 0
0 0
0 0
0 0
0 0

0 0
0 0
0 0
0 0
0 0
0 0
0 0
0 0
0 0

APPARENT RADIUM-226 CONCENTRATION 30 DECONVOLUTION GRAPH

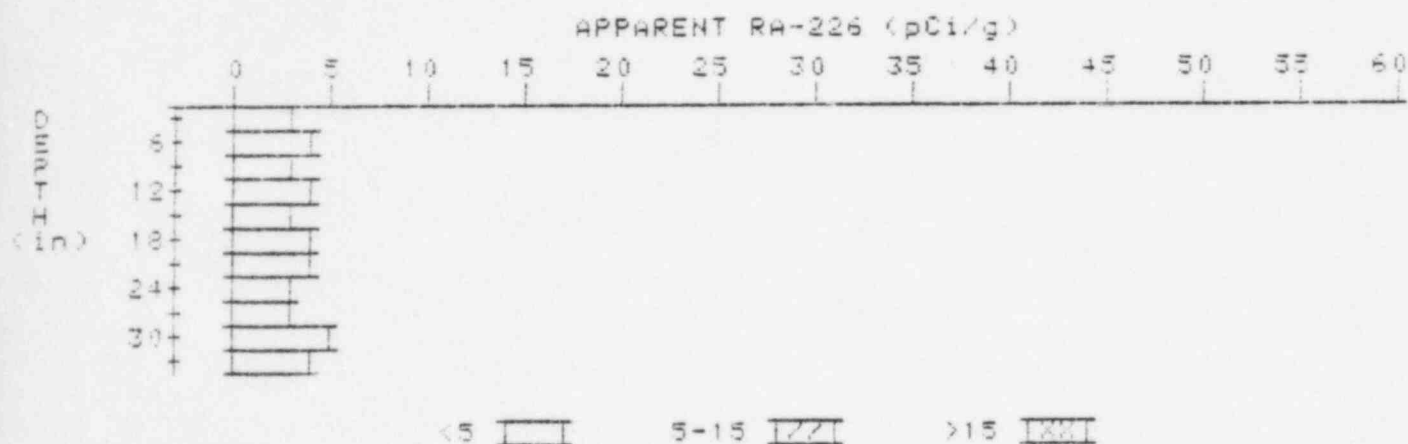
PROPERTY NUMBER: GJ-43551-RS
HOLE NUMBER: 30
LOCATION: 238259



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

APPARENT RADIUM-226 CONCENTRATION 31 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-43331-RS
HOLE NUMBER: 31
LOCATION: 255235



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.9	2.9
6	3.3	3.3
9	3.4	3.4
12	3.5	3.7
15	3.5	3.3
18	3.6	3.6
21	3.6	3.6
24	3.6	3.4
27	3.7	3.3
30	4.0	4.3
33	4.0	4.0