RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-11418-RS
ADDRESS: 507 29 ROAD

JULY 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

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DATE July 25, 1985

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TABLE OF CONTENTS

Section		Page
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-11418-RS, is a single-family residence located at 507 29 Road, Grand Junction, Colorado.

The purpose of this assessment is to evaluate the extent of uranium millsite contamination at this property and present a recommendation based on this assessment.

1.2 Evaluation and Recommendation

It is recommended that no remedial action be performed on this property (as discussed in Section 4.0) and that a Property Completion Report be prepared for use in the DOE certification process. The identified residual radioactive material found on this property is tailings; the estimated volume is: exterior, 0.4 cu. yd.; interior, 0 cu. yd.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 507 29 Road, Grand Junction, Colorado

Zoning: Residential (R-2)

Lot Size: Approximately 6,995 sf (0.2 acres)

Legal Description: Lot 9, Roscoe Giffin Subdivision, Section 7, 1S 1E, City of Grand Junction, 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:	Single-family residence
East:	29 Road
West:	Alley

2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-story residence
Size:	Approximately 880 sf
Construction Date:	1947
Construction:	Wood-frame
Foundation:	8" concrete block stemwall on spread footing
Footing Depth:	Approximately 12" to bottom of footing from grade
Basement:	None
Crawl Space:	Yes; under entire living area
Condition:	Fair to good

Other Structures:

Type:	Garage
Size:	Approximately 288 sf
Construction:	Prefabricated metal
Foundation:	Concrete slab-on-grade
Condition:	Good

Type:	Garage
Size:	Approximately 294 sf
Construction:	Wood-frame
Foundation:	Concrete slab-on-grade
Condition:	Good

General Remarks:

The front yard is landscaped. 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-11418-RS on April 9, 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 contamination located in the flower bed, west of the garage, and in the east and southeast portions of the property.

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: 15 to 16 uR/h
Highest Outside Gamma Reading (HOG): 46 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: 15 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, 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 3.3a 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 that contain identified residual radioactive materials are:

(AREA A) A small deposit west of Garage 2 is contaminated to a depth of 6 inches (approximately 6 sf).

(AREA B) Southeast of the primary structure, there is contamination to a depth of 6 inches (approximately 4 sf).

(AREA C) A deposit southeast of the primary structure is contaminated to a depth of 12 inches (approximately 4 sf).

(AREA D) Southeast of the primary structure, a small deposit is contaminated to a depth of 6 inches (approximately 4 sf).

(AREA E) East of the east property line, in the street right-of-way, contamination extends to a depth of 30 inches (approximately 128 sf; this area is excluded).

(AREA F) A deposit east of the east property line, in the street right-of-way, is contaminated to a depth of 15 inches (approximately 60 sf; this area is excluded).

(AREA G) West of 29 Road, in the street right-of-way, contamination extends to a depth of 66 inches (approximately 532 sf; this area is excluded).

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

We do not recommend decontamination and restoration of this property. It is recommended that no remedial action be performed and that a brief Property Completion Report be prepared for use in the DOE certification process.

4.2 Evaluation of Recommended Remedial Action

The recommendation that no remedial action be performed within the legal property boundaries is made because the levels of radioactivity on this property fall below the EPA Standards (40 CFR 192). The standard states that concentration of Radium-226 in soil averaged over any area of 100 square meters shall not exceed the background level by more than:

(1) 5 pCi/g above background, averaged over the first 15 cm of soil below the surface; and
(2) 15 pCi/g above background, averaged over 15-cm-thick layers of soil more than 15 cm below the surface.

Appendix Table 4.1 presents the area and volume calculations of contamination present on the property. The average radium concentration for this property is 2.16 pCi/g, which falls below the allowable EPA standard including background of 7 pCi/g for this area. Appendix Table 4.2 presents the calculations for concentrations of Radium-226 in soil for this location.

Areas E, F, and G are located beyond the legal property boundaries in the street right-of-way. These areas are associated with a 6-inch diameter water line that is bedded in tailings.

If the Department of Energy determines that the water line deposits should be removed, it is recommended that Areas E, F, and G be removed as part of DOE ID No. GJ-97002-OT remedial action project. This project would be performed in cooperation with the City of Grand Junction if water line improvements are made in this area. This DOE ID No. GJ-97002-OT remedial action project would be the most efficient and cost effective method of tailings removal. It allows for identification of tailing involvement on other adjacent properties along this utility and their removal under a single subcontract utilizing a utility subcontractor.

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	Calculations for Concentration of Radium-226 in Soil

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 and Crawl Space
Figure 3.3b	Interior Gamma Exposure Rates - Ground Floor
Figure 3.3c	Interior Gamma Exposure Rates
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)

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
5	167220	00	DS	3.9		*	Behind Garage 2
		06	DS	1.9		*	DC = 6 inches
6	180240	00	DS	<1.0		*	West yard
		00-06	SS			3.0	Background
		03	TC	3.0		*	
		06	TC	3.4		*	DC = 0 inches
		09	TC	3.6		*	
		12	TC	3.9		*	
		15	TC	3.8		*	
		18	TC	3.8		*	
		21	TC	4.0		*	
		24	TC	4.0		*	
		27	TC	4.0		*	
		30	TC	4.1		*	
		33	TC	4.2		*	
		36	TC	4.1		*	
7	204244	00	DS	<1.0		*	West side of the
		03	TC	3.5		*	primary structure
		06	TC	3.8		*	
		09	TC	4.0		*	DC = 0 inches
		12	TC	4.0		*	
		15	TC	4.1		*	
		18	TC	4.1		*	
		21	TC	4.1		*	
		24	TC	3.9		*	
		27	TC	3.9		*	
		30	TC	3.8		*	
8	205226	00	DS	1.0		*	Sewer line
		03	TC	2.7		*	
		06	TC	3.2		*	DC = 0 inches
		09	TC	3.5		*	
		12	TC	3.9		*	
		15	TC	4.1		*	
		18	TC	4.0		*	
		21	TC	4.0		*	
		24	TC	4.1		*	
		27	TC	3.9		*	
		30	TC	3.9		*	
		33	TC	3.8		*	
		36	TC	3.8		*	
		39	TC	3.9		*	

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	205226	42	TC	3.9		*	
		45	TC	4.1		*	
		48	TC	4.1		*	
		51	TC	4.2		*	
		54	TC	4.2		*	
		57	TC	3.9		*	
		60	TC	4.0		*	
		63	TC	4.0		*	
		66	TC	3.9		*	
		69	TC	4.0		*	
9	220250	00	DS	2.5		*	North side of the
		06	DS	1.7		*	primary structure
		03	TC	3.0		*	
		06	TC	3.4		*	DC = 0 inches
		09	TC	3.7		*	
		12	TC	3.9		*	
		15	TC	4.0		*	
		18	TC	4.0		*	
		21	TC	4.0		*	
		24	TC	4.0		*	
		27	TC	3.9		*	
		30	TC	3.9		*	
		33	TC	3.8		*	
		36	TC	3.8		*	
10	237229	00	DS	1.3		*	Gas meter
		16	DS	<1.0		*	
11	241241	00	DS	1.6		*	Water line
		03	TC	4.0		*	
		06	TC	4.2		*	DC = 0 inches
		09	TC	4.3		*	
		12	TC	4.3		*	
		15	TC	4.4		*	
		18	TC	4.4		*	
		21	TC	4.3		*	
		24	TC	4.2		*	
		27	TC	4.1		*	
		30	TC	4.2		*	
		33	TC	4.3		*	
12	244224	00	DS	4.4		*	Southeast corner of
		06	DS	1.8		*	primary structure

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
13	244228	00	DS	4.9		*	DC = 6 inches
		06	DS	1.9		*	
14	248228	00	DS	3.8		*	East yard
		06	DS	2.5		*	DC = 12 inches
		12	DS	2.3		*	
		16	DS	2.3		*	
15	260235	00	DS	1.7		*	East yard
		03	TC	2.9		*	
		06	TC	3.5		*	
		09	TC	3.9		*	DC = 0 inches
		12	TC	4.1		*	
		15	TC	4.2		*	
		18	TC	4.4		*	
		21	TC	4.2		*	
		24	TC	4.1		*	
		27	TC	4.1		*	
		30	TC	4.1		*	
		33	TC	4.1		*	
		36	TC	4.1		*	
		39	TC	4.1		*	
16	284212	00	DS	4.5		*	Southeast yard
		06	DS	11.6		*	Could not go deeper
		12	DS	9.6		*	
17	286230	32	DS	1.7		*	Inside drain pipe
18	287244	03	TC	4.3		*	East of fence
		06	TC	5.1		*	
		09	TC	5.1		*	DC = 30 inches
		12	TC	6.3		*	Based on the
		15	TC	7.9		*	deconvolution graph
		18	TC	8.7		*	
		21	TC	8.1		*	
		24	TC	7.1		*	
		27	TC	6.1		*	
		30	TC	5.5		*	
		33	TC	5.1		*	
		36	TC	4.9		*	
		39	TC	4.6		*	
19	291235	00	DS	5.1		*	East of fence

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
19	291235	06	DS	2.6		*	
		12	DS	2.7		*	
		18	DS	2.3		*	
20	291255	00	DS	8.8		*	By mail box
		03	TC	6.7		*	
		06	TC	6.4		*	
		09	TC	5.7		*	DC = 15 inches
		12	TC	5.4		*	Based on the
		15	TC	4.9		*	deconvolution graph
		18	TC	4.8		*	
		21	TC	4.8		*	
		24	TC	4.7		*	
		27	TC	4.7		*	
		30	TC	4.6		*	
		33	TC	4.5		*	
		36	TC	4.5		*	
		39	TC	4.4		*	
		42	TC	4.2		*	
		45	TC	4.2		*	
		48	TC	4.1		*	
		51	TC	4.1		*	
		54	TC	4.1		*	
		57	TC	4.1		*	
21	293213	00	DS	20.0		*	Next to 29 Road
		03	TC	40.3		*	
		06	TC	62.7		*	
		09	TC	87.4		*	
		12	TC	118.1		*	
		15	TC	137.5		*	
		18	TC	148.2		*	
		21	TC	149.4		*	
		24	TC	144.0		*	
		27	TC	131.8		*	
		30	TC	113.1		*	
		33	TC	101.2		*	
		36	TC	100.7		*	
		39	TC	115.1		*	
		42	TC	136.4		*	
		45	TC	153.2		*	
		48	TC	160.0		*	
		51	TC	174.1		*	
		54	TC	182.3		*	

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
21	293213	57	TC	127.8		*	DC = 66 inches
		60	TC	103.3		*	Based on the
		63	TC	73.2		*	deconvolution graph
		66	TC	46.9		*	
		69	TC	31.6		*	
		72	TC	22.9		*	
		75	TC	18.5		*	
		78	TC	16.1		*	
		81	TC	14.5		*	
		84	TC	13.2		*	
		87	TC	12.1		*	
		90	TC	10.6		*	
		93	TC	9.0		*	
		96	TC	7.7		*	
		99	TC	6.9		*	
		102	TC	6.6		*	
		105	TC	6.2		*	
		108	TC	5.8		*	
		111	TC	5.5		*	
		114	TC	5.3		*	
		117	TC	4.7		*	
		120	TC	4.7		*	
		123	TC	4.5		*	
		126	TC	4.7		*	
		129	TC	4.7		*	
22	295225	03	TC	9.2		*	Next to 29 Road
		06	TC	8.7		*	
		09	TC	7.4		*	
		12	TC	6.9		*	DC = 66 inches
		15	TC	7.0		*	Based on all
		18	TC	7.3		*	available data
		21	TC	8.1		*	
		24	TC	9.1		*	
		27	TC	10.5		*	
		30	TC	13.3		*	
		33	TC	17.9		*	
		36	TC	25.8		*	
		39	TC	37.3		*	
		42	TC	44.3		*	
		45	TC	37.8		*	
		48	TC	25.8		*	
		51	TC	18.2		*	
		54	TC	12.9		*	

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
22	295225	57	TC	9.3		*	
		60	TC	8.0		*	
		63	TC	7.0		*	
		66	TC	6.2		*	
23	297244	03	TC	11.0		*	Next to 29 Road
		06	TC	15.9		*	
		09	TC	22.2		*	DC = 66 inches
		12	TC	28.9		*	Based on all
		15	TC	33.6		*	available data
		18	TC	32.8		*	
		21	TC	29.8		*	
		24	TC	26.2		*	
		27	TC	25.1		*	
		30	TC	27.6		*	
		33	TC	35.2		*	
		36	TC	43.7		*	
		39	TC	47.3		*	
		42	TC	50.0		*	
		45	TC	56.0		*	
		48	TC	61.0		*	
		51	TC	56.6		*	
		54	TC	43.8		*	
		57	TC	29.4		*	
		60	TC	18.5		*	
		63	TC	12.7		*	
		66	TC	9.5		*	
		69	TC	7.9		*	
		72	TC	6.5		*	
		75	TC	5.7		*	
		78	TC	5.3		*	
		81	TC	4.8		*	
		84	TC	4.5		*	
		87	TC	4.4		*	
		90	TC	4.3		*	
		93	TC	4.3		*	
		96	TC	4.4		*	
24	297254	00	DS	8.2		*	By mail box
		03	TC	12.1		*	
		06	TC	14.2		*	
		09	TC	13.8		*	
		12	TC	11.8		*	
		15	TC	11.2		*	

Radium Concentrations at Exterior Locations

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
24	297254	18	TC	12.7		*	DC = 66 inches
		21	TC	16.8		*	Based on all
		24	TC	21.1		*	available data
		27	TC	21.4		*	
		30	TC	20.1		*	
		33	TC	21.6		*	
		36	TC	27.6		*	
		39	TC	40.4		*	
		42	TC	60.3		*	
		45	TC	74.7		*	
		48	TC	77.7		*	
		51	TC	68.5		*	
		54	TC	49.8		*	
		57	TC	30.1		*	
		60	TC	18.8		*	
		63	TC	13.0		*	
		66	TC	10.3		*	
		69	TC	8.9		*	
		72	TC	7.9		*	
		75	TC	7.2		*	
		78	TC	5.9		*	
		81	TC	5.3		*	
		84	TC	4.9		*	
		87	TC	4.7		*	
		90	TC	5.0		*	

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 = 04-09-85
- Team Leader = MJH

Radium Concentrations at Interior Locations

DOE ID No. GJ-11418-RS 507 29 Road

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
1		00	DS	<1.0		*	Basement
		00-06	SS			3.1	Core
		06-12	SS			2.9	Soil under concrete
		03	TC	3.2		*	
		06	TC	3.5		*	DC = 0 inches
		09	TC	3.8		*	
		12	TC	3.8		*	
		15	TC	3.8		*	
		18	TC	3.8		*	
		21	TC	3.8		*	
		24	TC	3.8		*	
		27	TC	3.8		*	
		30	TC	3.9		*	
		33	TC	3.9		*	
2		00	DS	1.4		*	Basement
3		00	DS	<1.0		*	Basement
4		[30]	DS	<1.0		*	Basement

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 = 04-09-85
- Team Leader = MJH

Table 3.3
Summary of Interior Gamma Exposure Rates

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	07	17-18	17	07	17-19	18
ROOM B	03	17-18	17	03	17-18	18
GROUND FLOOR	*	*	*	*	15-16	*
GARAGE 1	*	*	*	*	15-15	*
GARAGE 2	*	*	*	*	15-16	*

* The CDH and ORNL data indicate the absence of interior contamination at this property. This information was investigated by performing a walking gamma scan. These areas and the ranges of gamma measurements are shown in Appendix Figures 3.3b and 3.3c. Exposure rates in Room A and B are shown in Appendix Figure 3.3a.

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-11418-RS

AREA	CALCULATIONS(ft)		SF		DEPTH(ft)		CF				CUBIC YARDS
EXTERIOR											
A	2 x 3	=	6	x	0.5	=	3				
B	2 x 2	=	4	x	0.5	=	2				
C	2 x 2	=	4	x	1.0	=	4				
D	2 x 2	=	4	x	0.5	=	2				
							11	=	11/27	=	0.4
	TOTAL VOLUME - EXTERIOR									=	0.4

Total square feet of Exterior Areas A, B, C, and D = 18 square feet
18 square feet = 1.65 square meters

Note: Calculations are based on areas found within the legal property boundaries.

See Appendix Figure 3.5 For Areas

Table 4.2
Calculations for Concentration of Radium-226 in Soil
DOE ID No. GJ-11418-RS

$$C_{avg} = \frac{C_c \times A_c + C_b\ (100m^2 - A_c)}{100m^2}$$

Where

C_{avg} = Concentration average (pCi/g)

C_c = Concentration of Contamination (pCi/g)

A_c = Area of Concentration (m^2)

C_b = Background Concentration (pCi/g)

$$C_{avg} = \frac{11.8 \times 1.65 + 2\ (100 - 1.65)}{100}$$

$C_{avg} = 2.16 < 7$

Therefore, concentration does not meet EPA Standards of 7 pCi/g

NOTE: Background Radium concentration for this area is 2 pCi/g

==========

RR072585
REA11418/REA-612/LMR

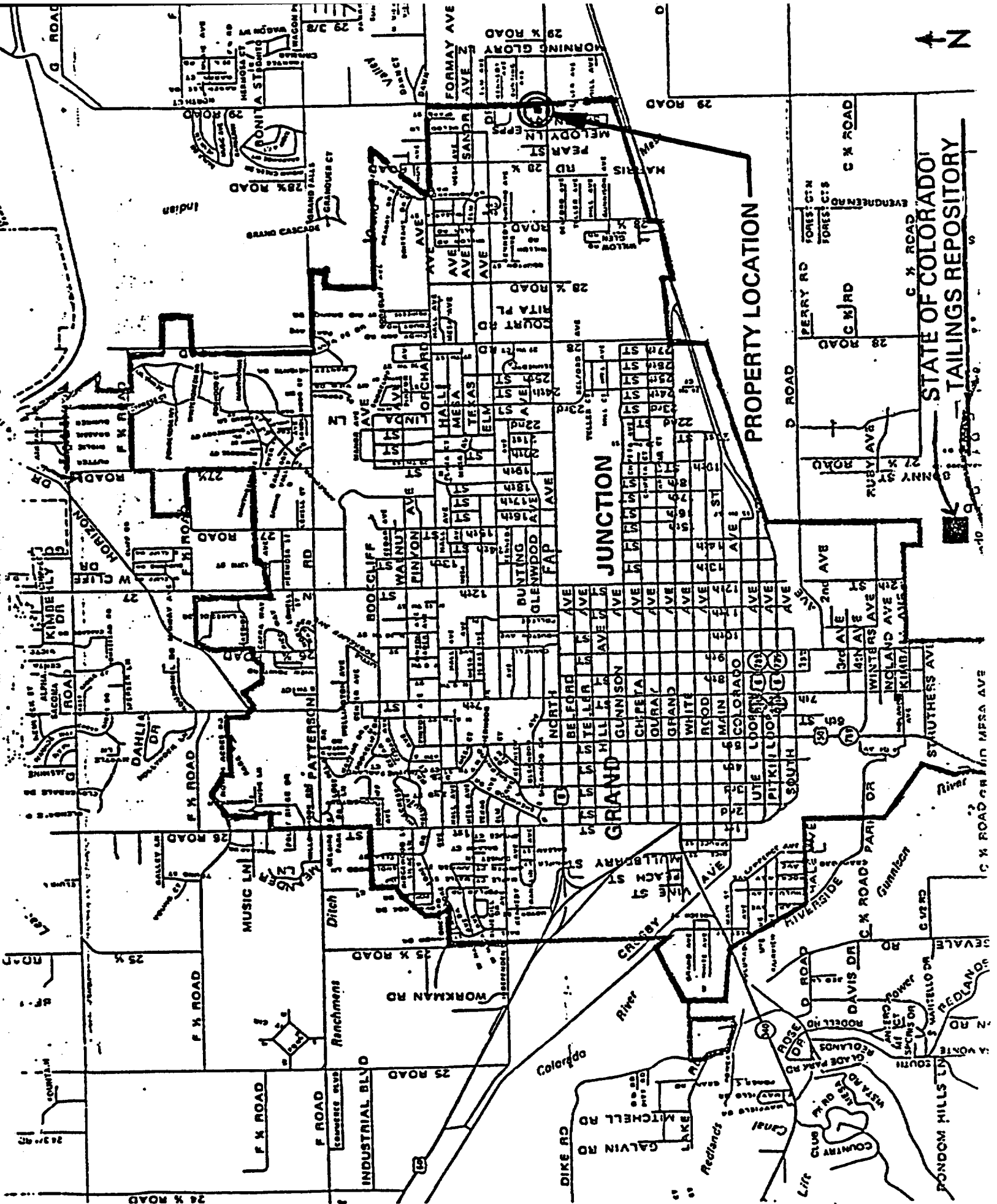
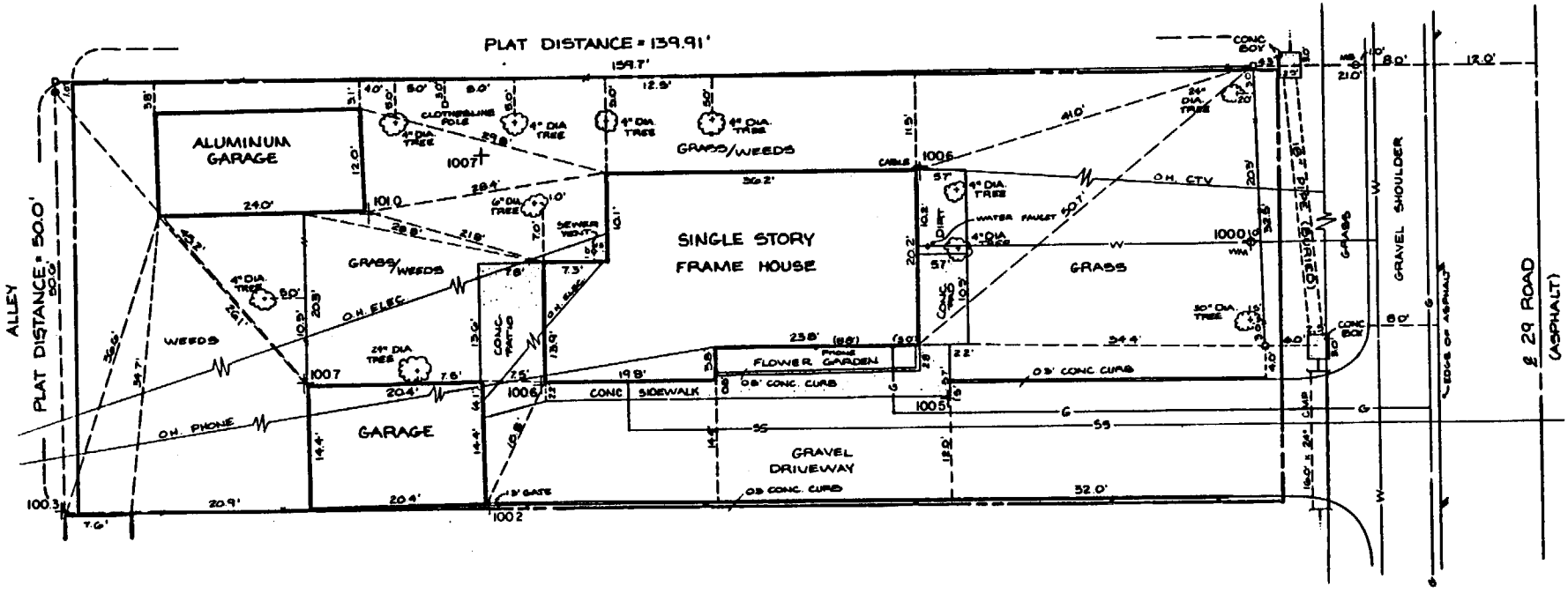


FIGURE 2.1
VICINITY MAP



LOT 9, ROSCOE GIFFIN SUBDIVISION,
SECTION 7, 1 SOUTH, 1 EAST.
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

FIGURE 2.2 SITE PLAN

SCALE IN FEET

0 5 10 20 30

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. GJ-11418-RS
AUDIT SS 507 29 ROAD GRAND JUNCTION, COLO.	ALLIED Bendix Aerospace Bendix Field Engineering Corporation Grand Junction Operations
SURV RSS/3-26-85 DRAFT KAS/3-28-85	CK CAF 3-28-85
DRAWING NO 3-C593-F1	SHEET 1 OF 1

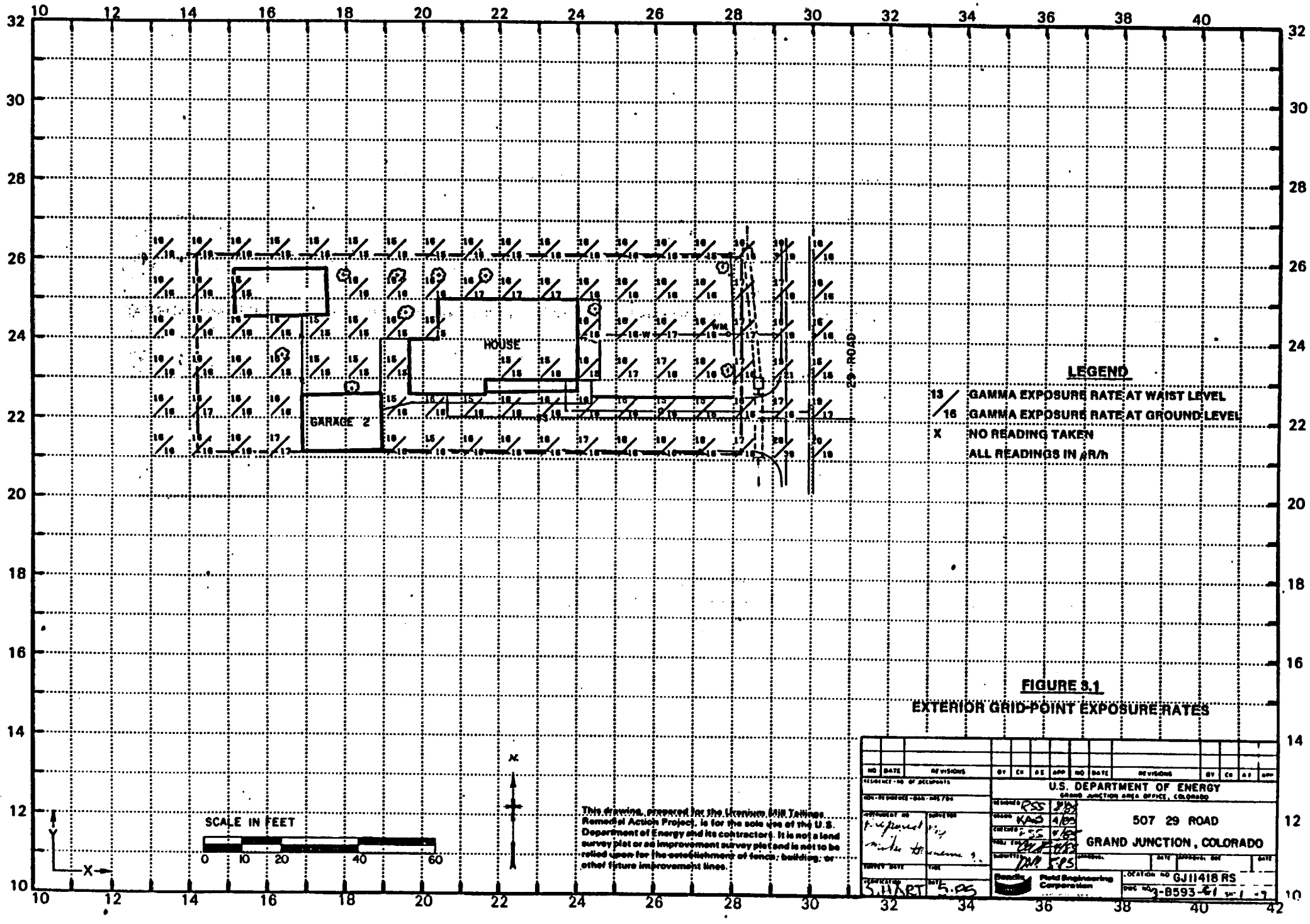


FIGURE 3.1

EXTERIOR GRID-POINT EXPOSURE RATES

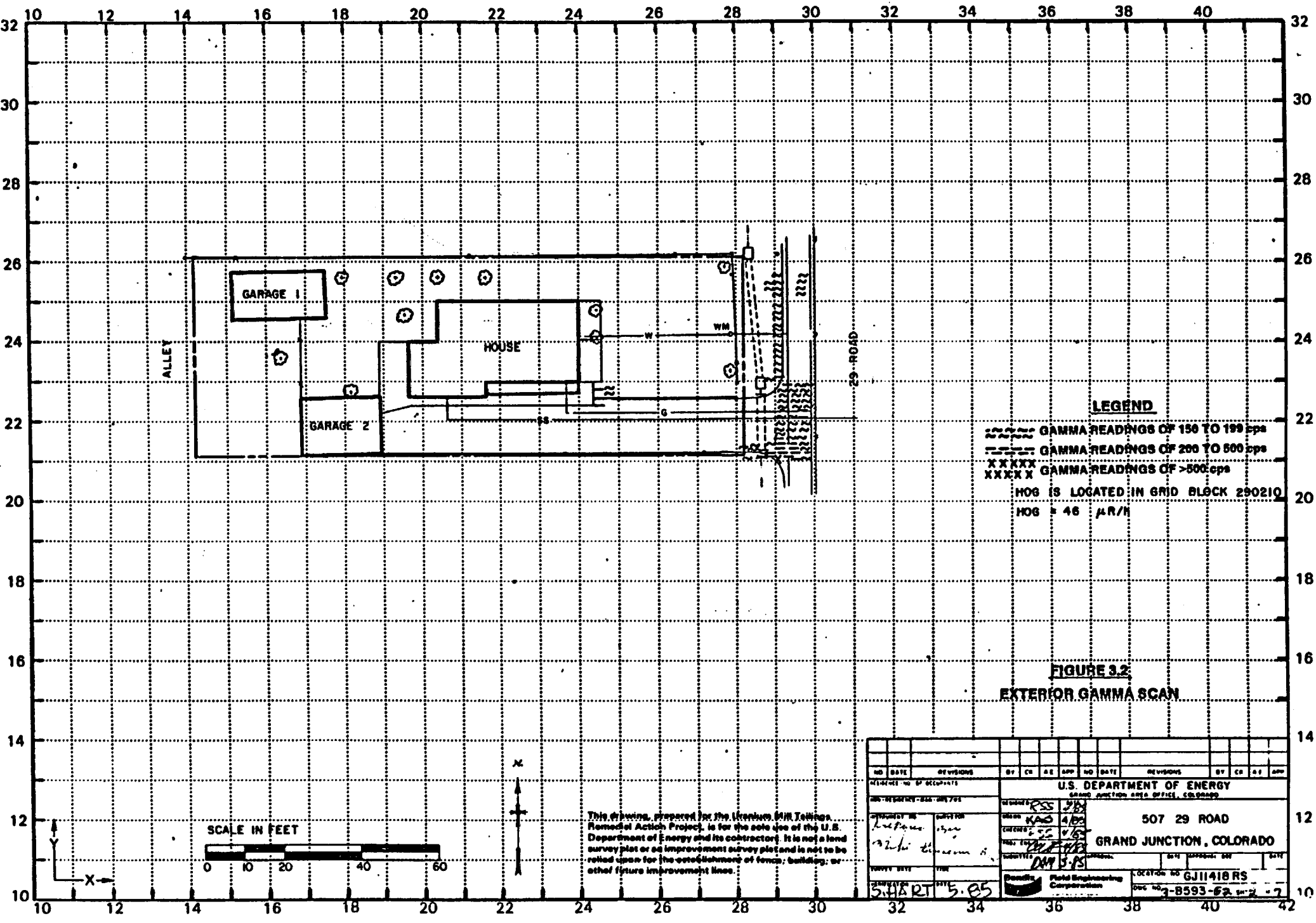


FIGURE 3.2
EXTERIOR GAMMA SCAN

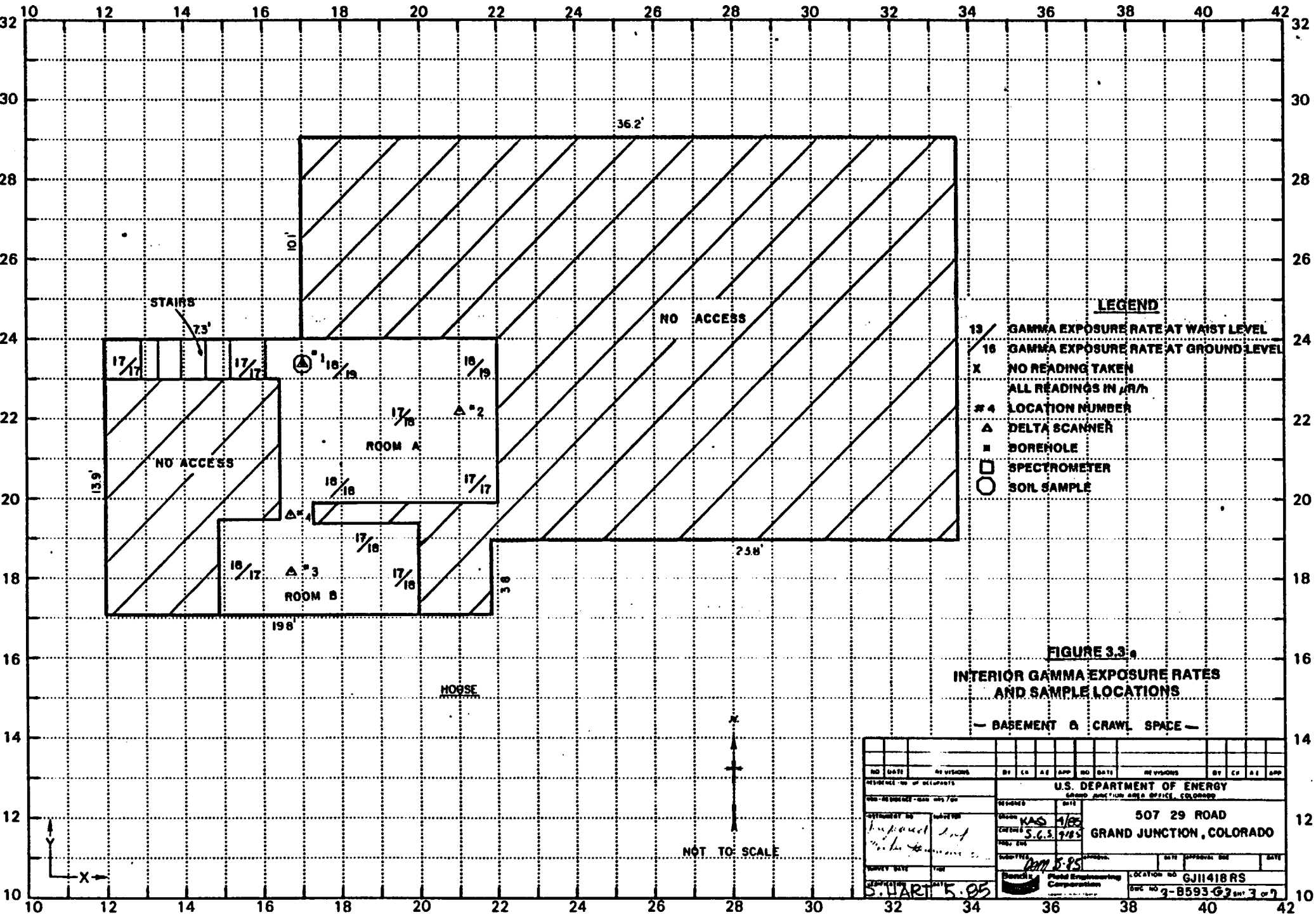


FIGURE 3.3a

INTERIOR GAMMA EXPOSURE RATES AND SAMPLE LOCATIONS

— BASEMENT & CRAWL SPACE —

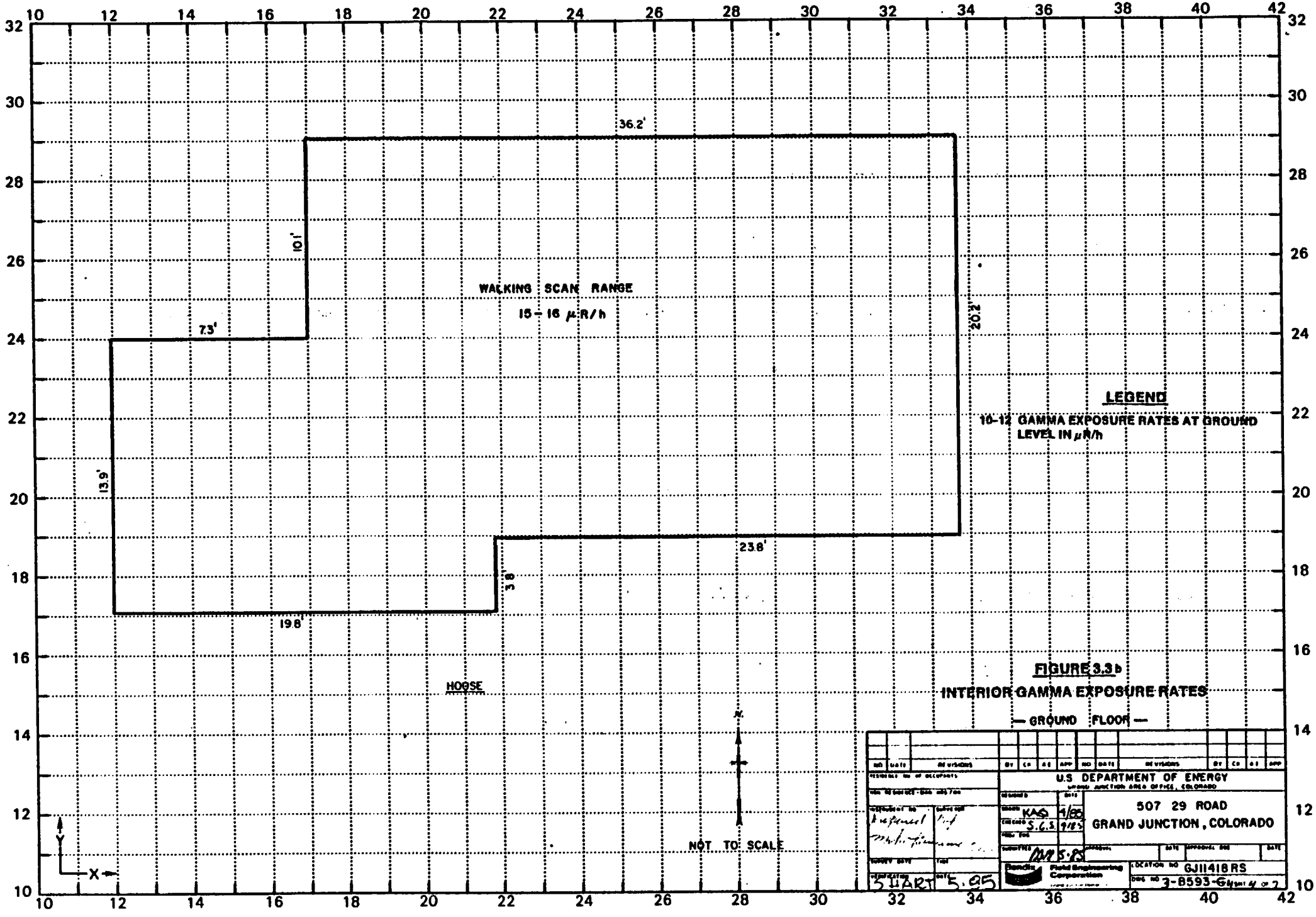


FIGURE 3.3 b

INTERIOR GAMMA EXPOSURE RATES

— GROUND FLOOR —

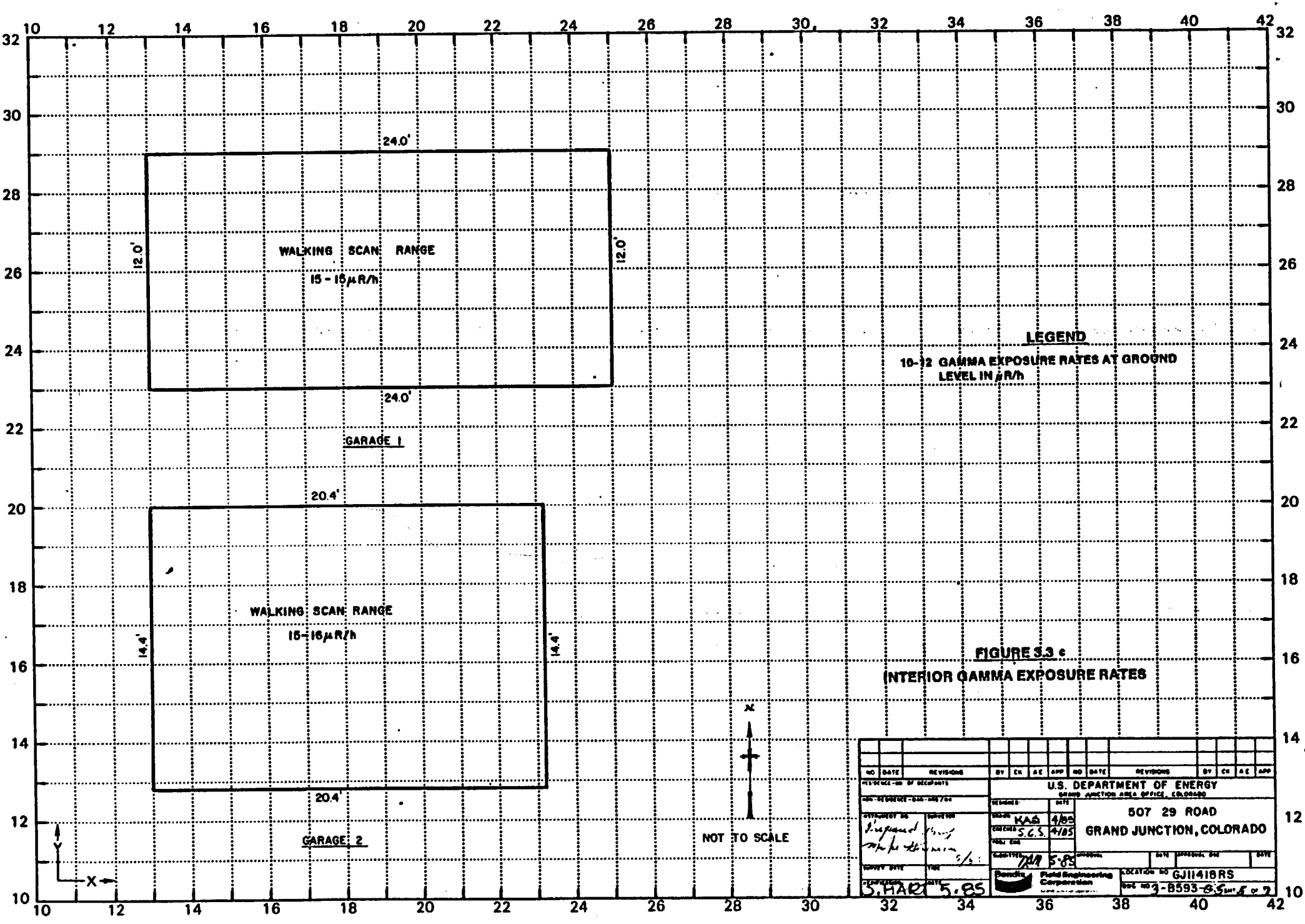


FIGURE 3.3 c

INTERIOR GAMMA EXPOSURE RATES

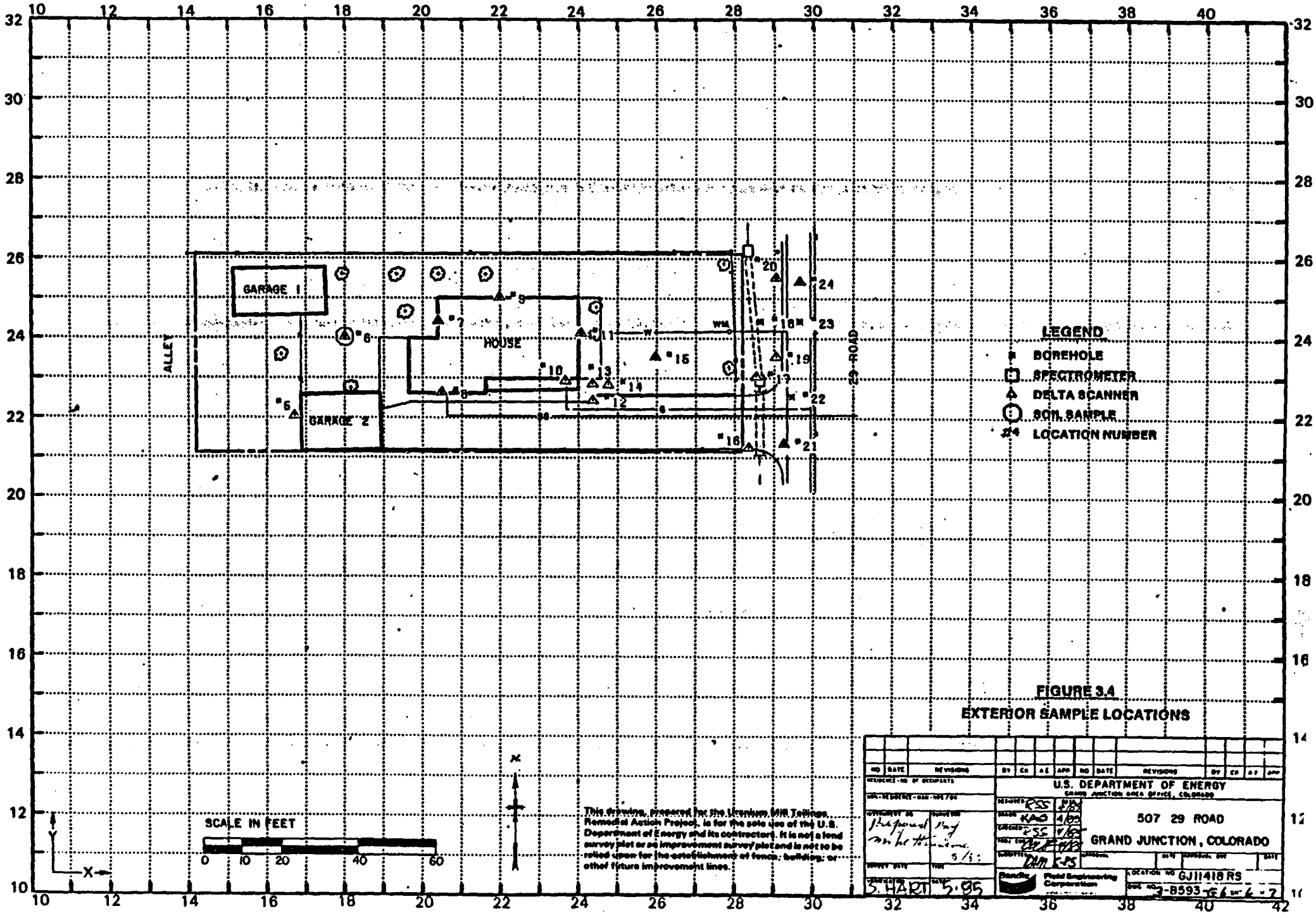


FIGURE 3.4
EXTERIOR SAMPLE LOCATIONS

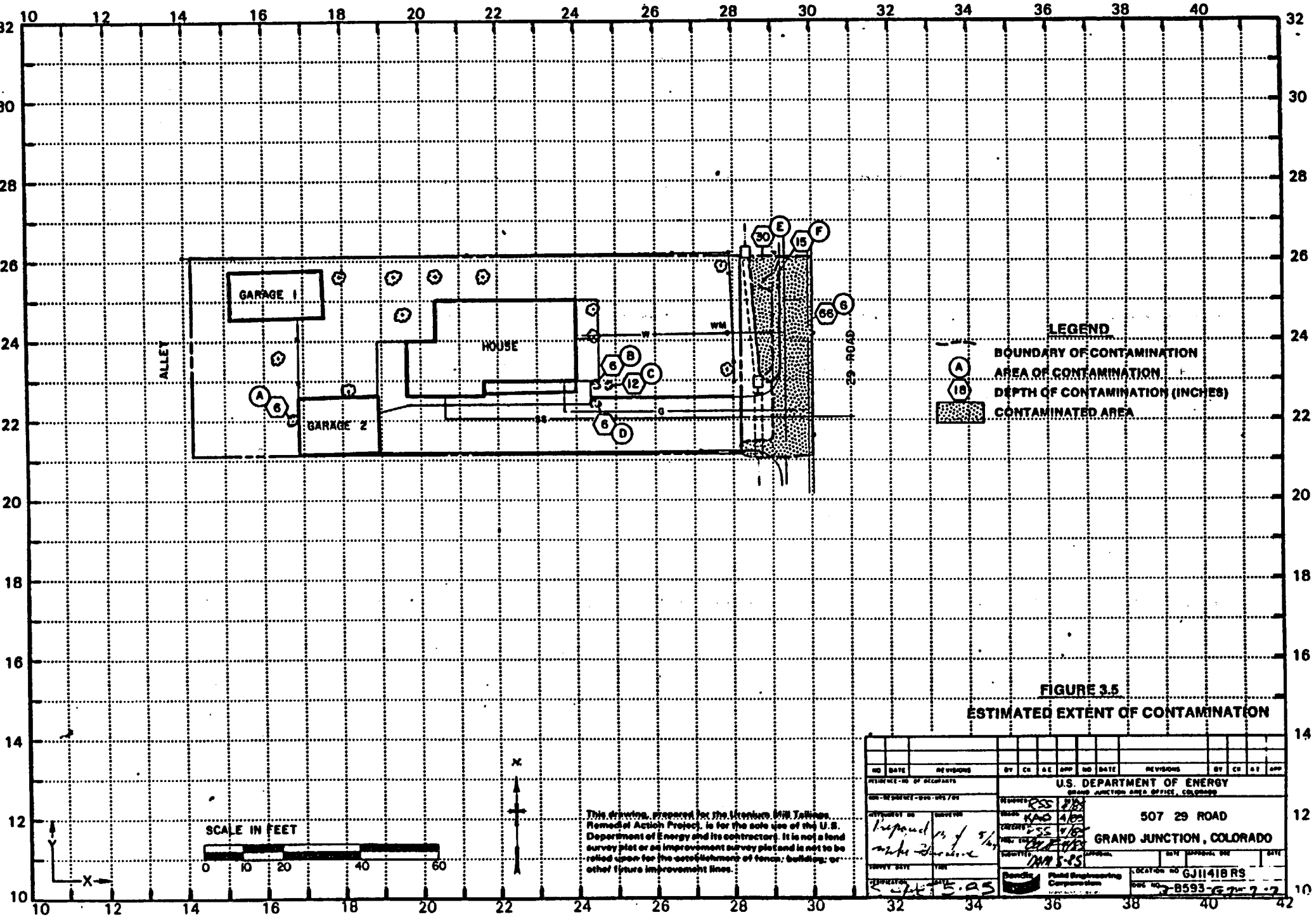


FIGURE 3.5
ESTIMATED EXTENT OF CONTAMINATION

3/85

DOE ID NO. GJ-11418-RS Date 05-08-85

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

Official Survey Report

Property Address 507 29 Road

Property Owner Ted and Susan Straughan

Address of Owner (if different from above) 2667 Catalina Drive

Report Prepared By Mike Heronema

I. PRESENCE/ABSENCE OF RESIDUAL RADIOACTIVE MATERIALS

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

1 XX 1 Residual ractioactive materials found at the following locations:

1 XX 1 In open areas.

1 1 Under or around exterior improvements.

1 XX 1 Under or around a typically nonoccupied structure.

1 1 Under or around a typically occupied structure.

II. RESULTS OF RADIOLOGIC ASSESSMENT

1 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 XX 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 = 46 uR/h

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

May 7, 1985

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

ATTN: Jon Luellen

Dear Jon:

The following is in response to your questions and comments during the Technical Review concerning Department of Energy (DOE) Identification (ID) number GJ-11418-RS.

1. The figure for Area 'A' has been changed to match the Location 167220.

2. The sewer line exits the house at approximately 24 inches; however, the location is 204242 and not 205226. Location 204242 was investigated with no apparent contamination.

3. The water line is approximately 43 inches at the meter; however, the line enters the crawl space at approximately 24 inches. This area was investigated with no apparent contamination.

4. Our Engineering Department will make the decision on this type of remedial action.

5. The 12- and 16-inch delta readings at Location 248228 will be considered contamination and not geometry. This area will be monitored during remedial action.

Thank you for your time and cooperation. If you should have additional questions or comments you may contact me at 242-8621, extension 433.

Sincerely,

Mike Heronema

Mike Heronema
RSD Survey Team

ME:pr

CDH. LETTER:11418.HERONEMA

MEMORANDUM

ALLIED Bendix Aerospace

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

DATE: April 12, 1985

TO: Files

FROM: Mike Heronema

SUBJECT: Team Leader Notes - GJ-11418-RS

Address: 507 29 Road

Owner(s): Lynn R. Raymond
Ted L. Straugham

Team Members

M. Heronema (Team Leader)
R. Schouten
L. Kula
M. Dexter
M. Gilfillan
J. Johnson
S. Larsen
C. Adams
B. Beltz
C. Holmes

Vacant property, no occupants.

Utilities were investigated with no apparent contamination.

Elevated gamma readings in the cellar were investigated. A decrease in cps was noted after the cellar was left open and allowed to vent for several hours. Approximately 10 cps per reading.

Date: April 9, 1985

NOTE: The sewer line exits the house at Location 204242 and not at Location 205226.

Revisit

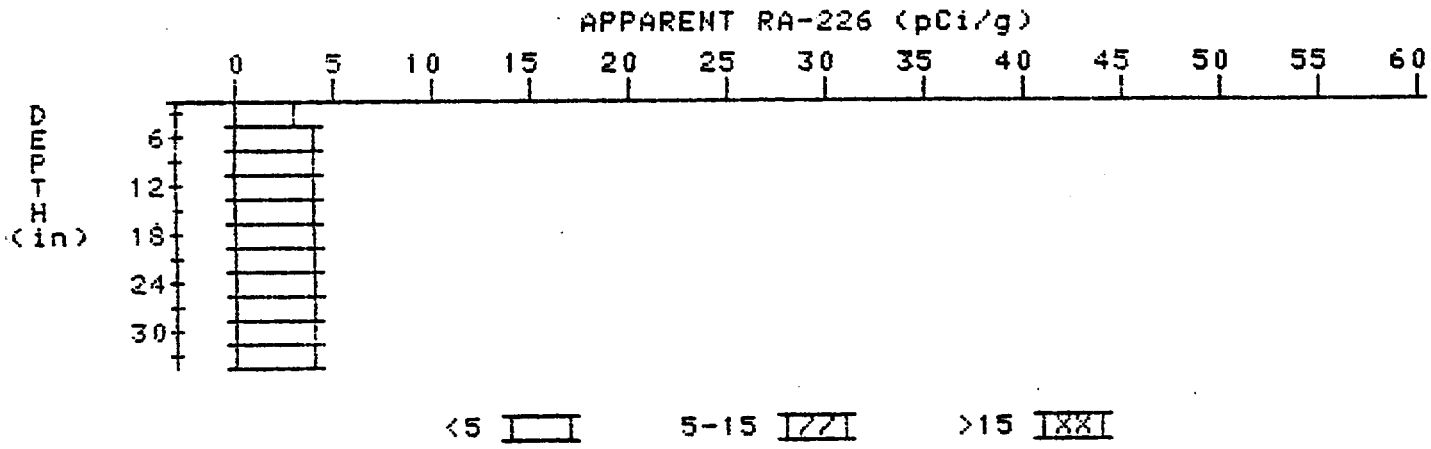
Date: April 12, 1985

Additional delta data was taken on elevated gamma readings that were overlooked on the original survey.

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11418-RS
HOLE NUMBER: 1
LOCATION:

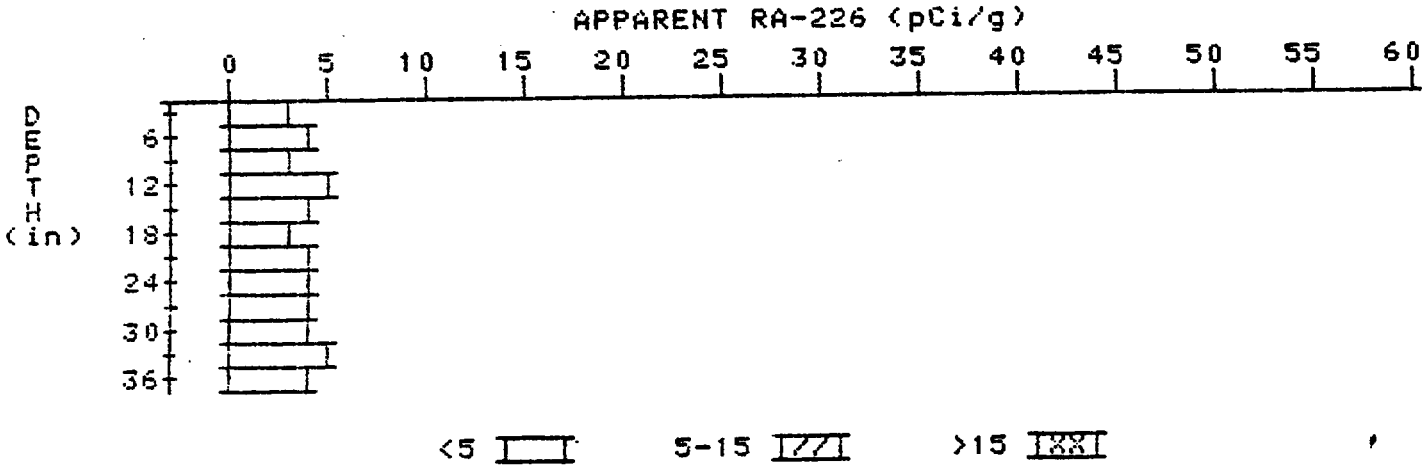


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.2	3.2
6	3.5	3.5
9	3.8	4.3
12	3.8	3.8
15	3.8	3.8
18	3.8	3.8
21	3.8	3.8
24	3.8	3.8
27	3.8	3.6
30	3.9	4.1
33	3.9	3.9

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11418-RS
HOLE NUMBER: 6
LOCATION: 180240



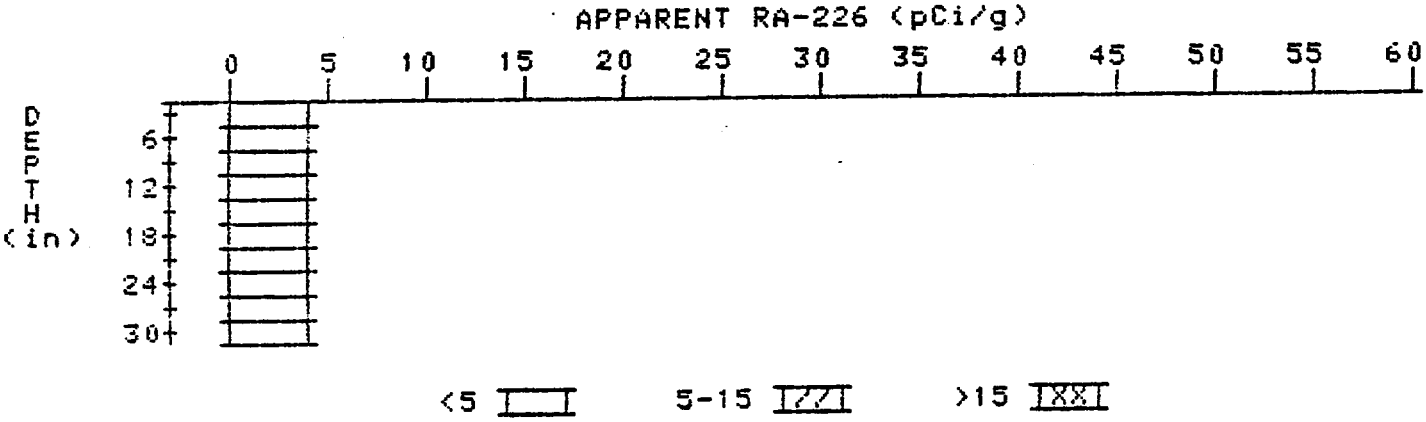
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.0	3.0
6	3.4	3.8
9	3.6	3.4
12	3.9	4.6
15	3.8	3.6
18	3.8	3.4
21	4.0	4.4
24	4.0	4.0
27	4.0	3.8
30	4.1	4.1
33	4.2	4.6
36	4.1	4.1

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

7

PROPERTY NUMBER: GJ-11418-RS
HOLE NUMBER: 7
LOCATION: 204244

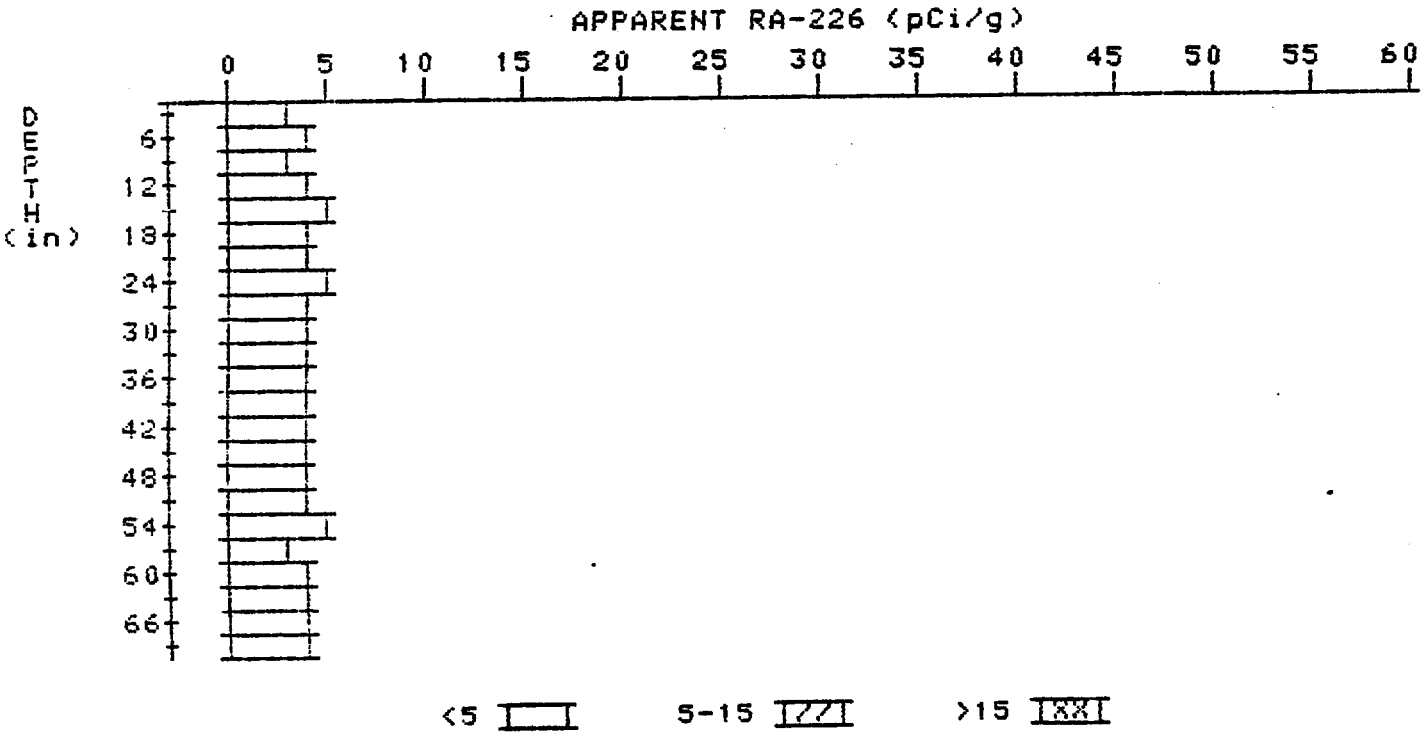


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.5	3.5
6	3.8	4.0
9	4.0	4.4
12	4.0	3.8
15	4.1	4.3
18	4.1	4.1
21	4.1	4.5
24	3.9	3.5
27	3.9	4.1
30	3.8	3.8

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11418-RS
HOLE NUMBER: 8'
LOCATION: 205226'



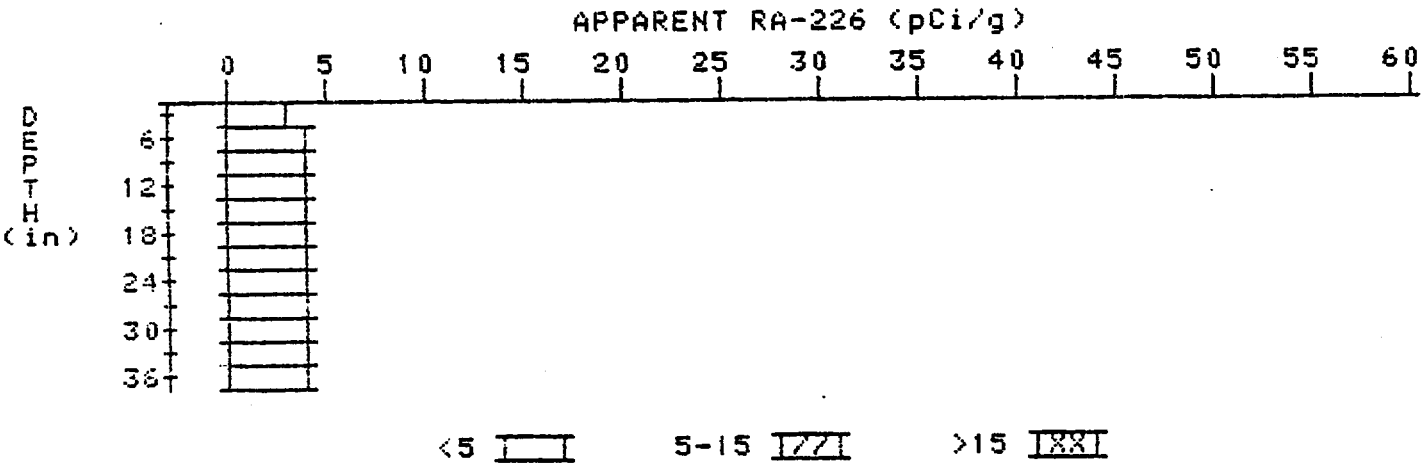
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.7	2.7
6	3.2	3.6
9	3.5	3.3
12	3.9	4.3
15	4.1	4.6
18	4.0	3.8
21	4.0	3.8
24	4.1	4.6
27	3.9	3.5
30	3.9	4.1
33	3.8	3.6
36	3.8	3.6
39	3.9	4.1
42	3.9	3.5
45	4.1	4.5

48	4.1	3.9
51	4.2	4.4
54	4.2	4.7
57	3.9	3.2
60	4.0	4.2
63	4.0	4.2
66	3.9	3.5
69	4.0	4.0

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11418-RS
HOLE NUMBER: 9'
LOCATION: 220250'

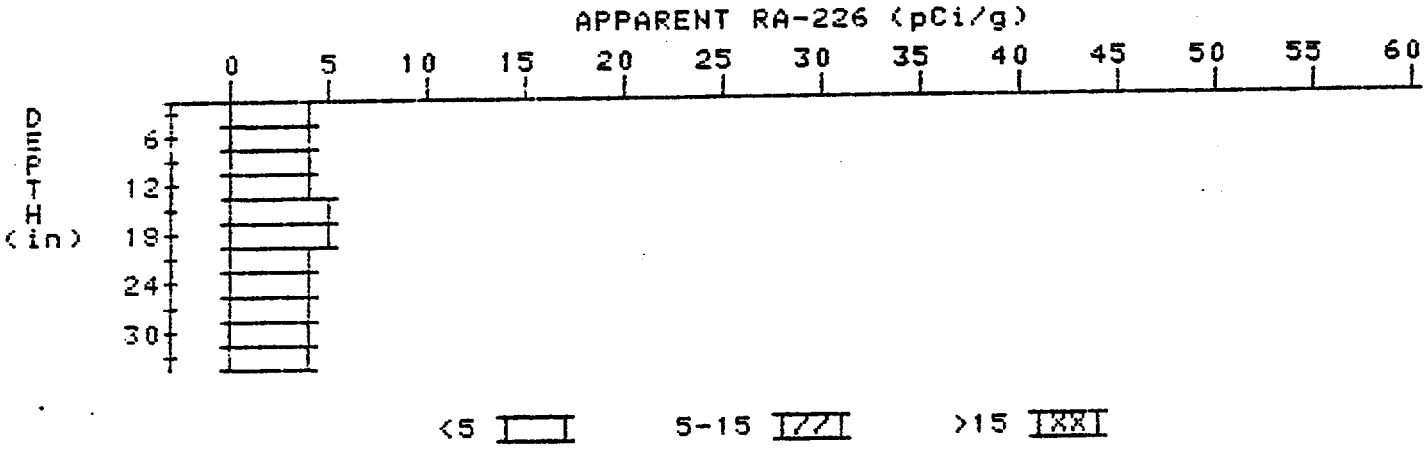


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.0	3.0
6	3.4	3.6
9	3.7	3.9
12	3.9	4.1
15	4.0	4.2
18	4.0	4.0
21	4.0	4.0
24	4.0	4.2
27	3.9	3.7
30	3.9	4.1
33	3.8	3.6
36	3.8	3.8

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11418-RS
HOLE NUMBER: 11/
LOCATION: 241241



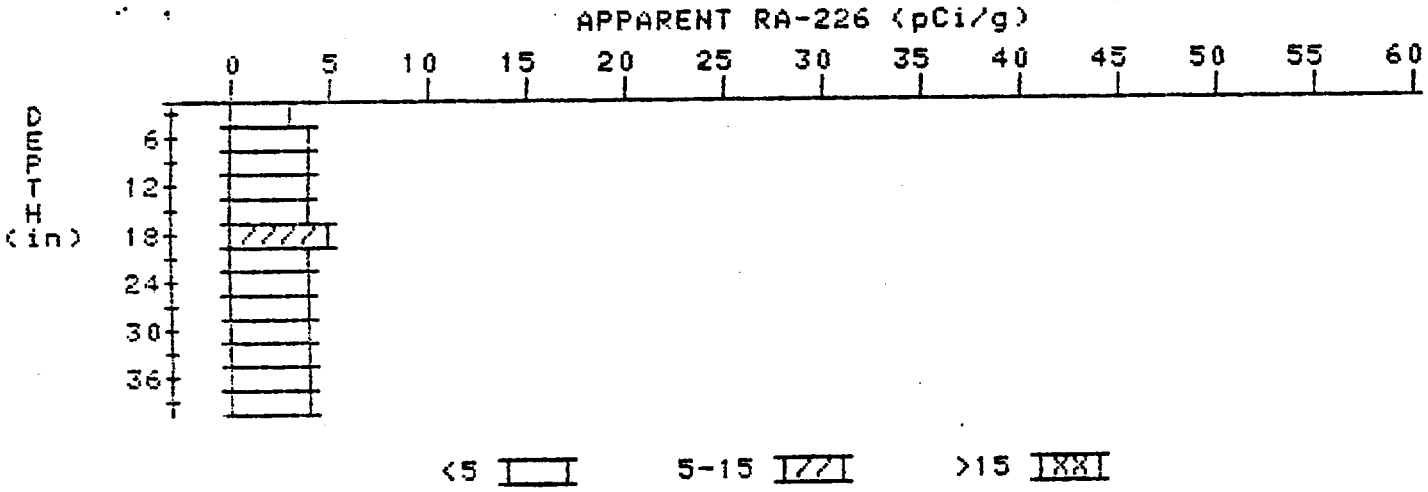
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.0	4.0
6	4.2	4.4
9	4.3	4.5
12	4.3	4.1
15	4.4	4.6
18	4.4	4.6
21	4.3	4.3
24	4.2	4.2
27	4.1	3.7
30	4.2	4.2
33	4.3	4.3

DECON V85.1(850117.1233)

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

15

PROPERTY NUMBER: GJ-11418-RS
HOLE NUMBER: 15
LOCATION: 260235



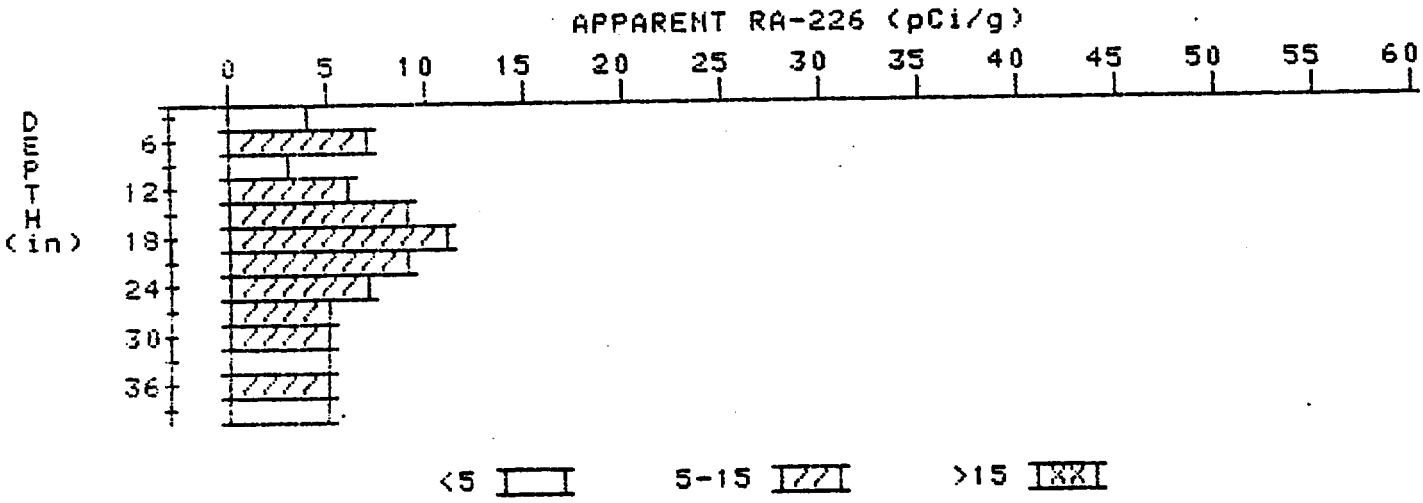
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.9	2.9
6	3.5	3.9
9	3.9	4.3
12	4.1	4.3
15	4.2	4.0
18	4.4	5.1
21	4.2	4.0
24	4.1	3.9
27	4.1	4.1
30	4.1	4.1
33	4.1	4.1
36	4.1	4.1
39	4.1	4.1

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

18

PROPERTY NUMBER: GJ-11418-RS
HOLE NUMBER: 18
LOCATION: 287244



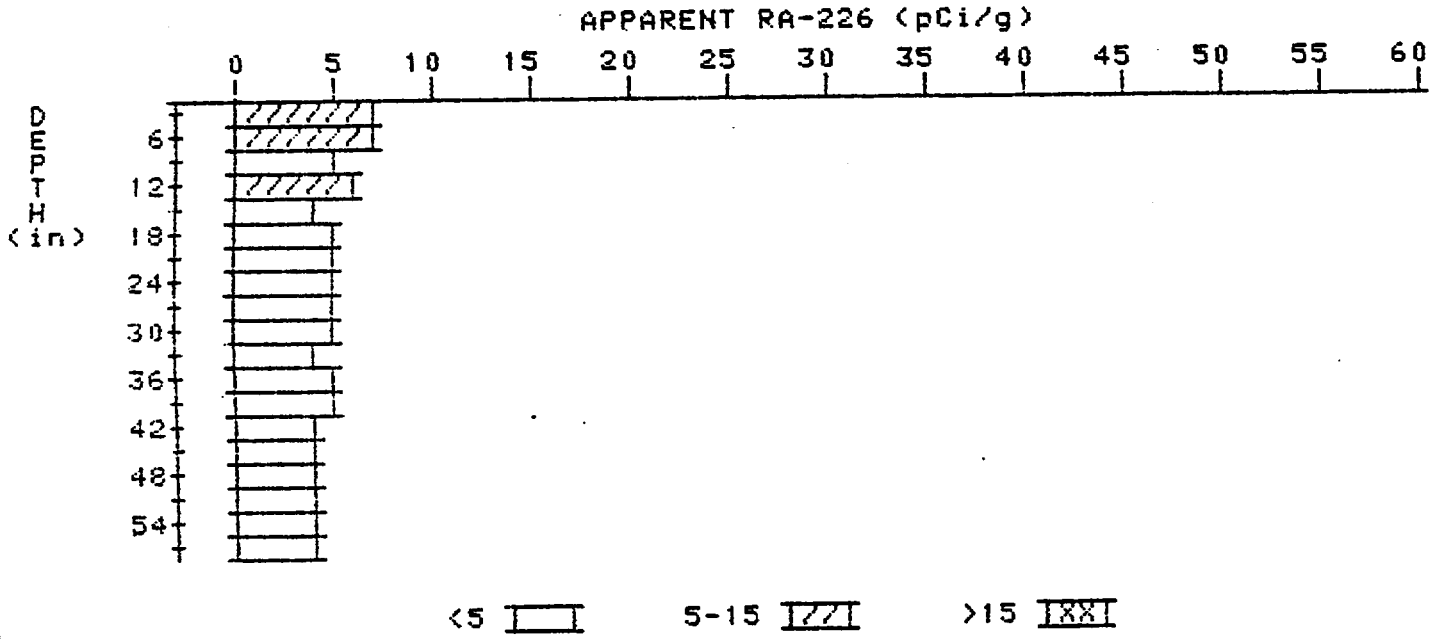
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.3	4.3
6	5.1	6.5
9	5.1	3.0
12	6.3	5.6
15	7.9	9.3
18	8.7	11.2
21	8.1	8.8
24	7.1	7.1
27	6.1	5.4
30	5.5	5.1
33	5.1	4.7
36	4.9	5.1
39	4.6	4.6

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

20

PROPERTY NUMBER: GJ-11418-RS
HOLE NUMBER: 20'
LOCATION: 291255'



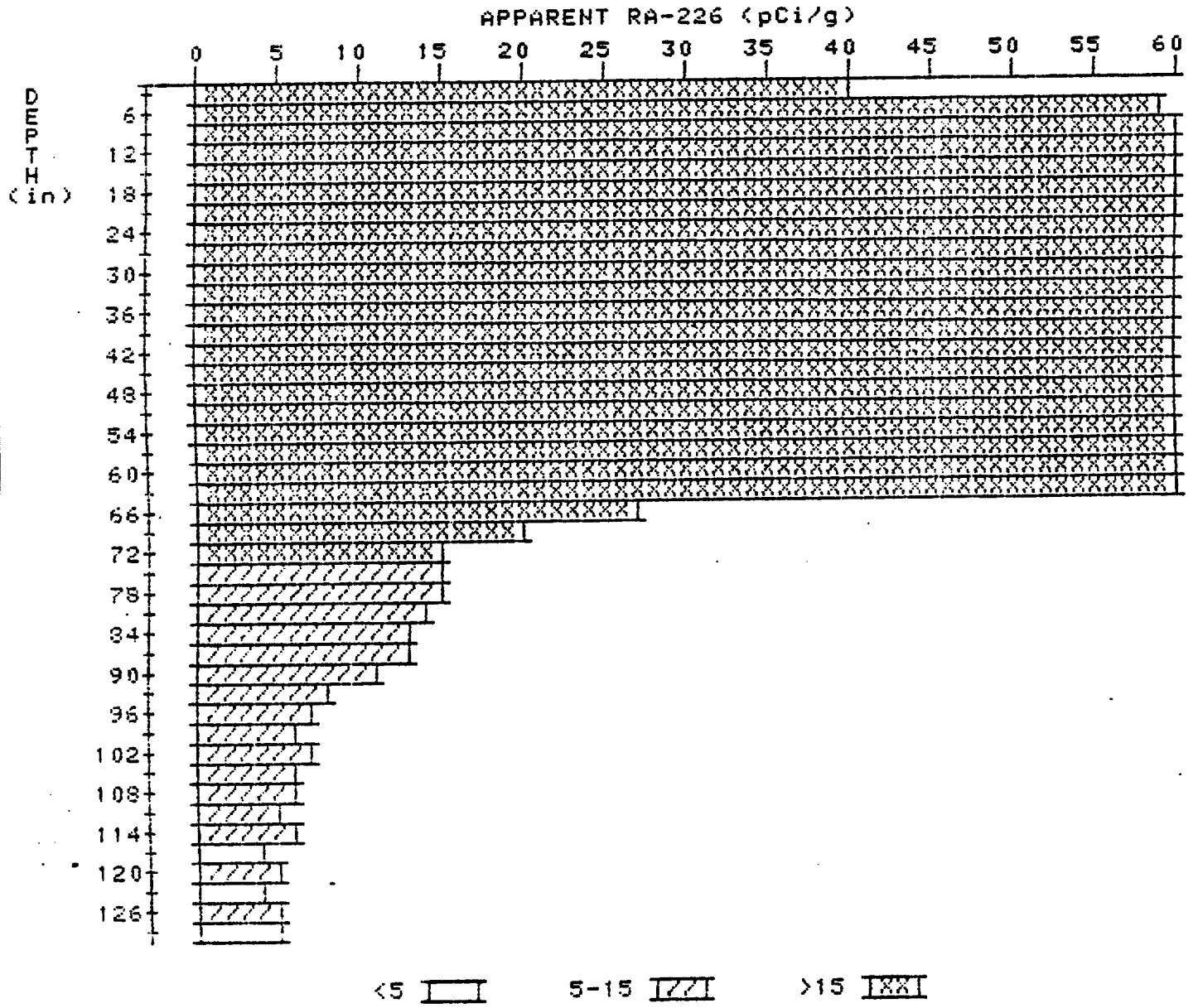
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	6.7	6.7
6	6.4	7.1
9	5.7	5.0
12	5.4	5.8
15	4.9	4.2
18	4.8	4.6
21	4.8	5.0
24	4.7	4.5
27	4.7	4.9
30	4.6	4.6
33	4.5	4.3
36	4.5	4.7
39	4.4	4.6
42	4.2	3.8
45	4.2	4.4
48	4.1	3.9
51	4.1	4.1
54	4.1	4.1

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

21

PROPERTY NUMBER: GJ-11418-RS
HOLE NUMBER: 21
LOCATION: 293213



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved

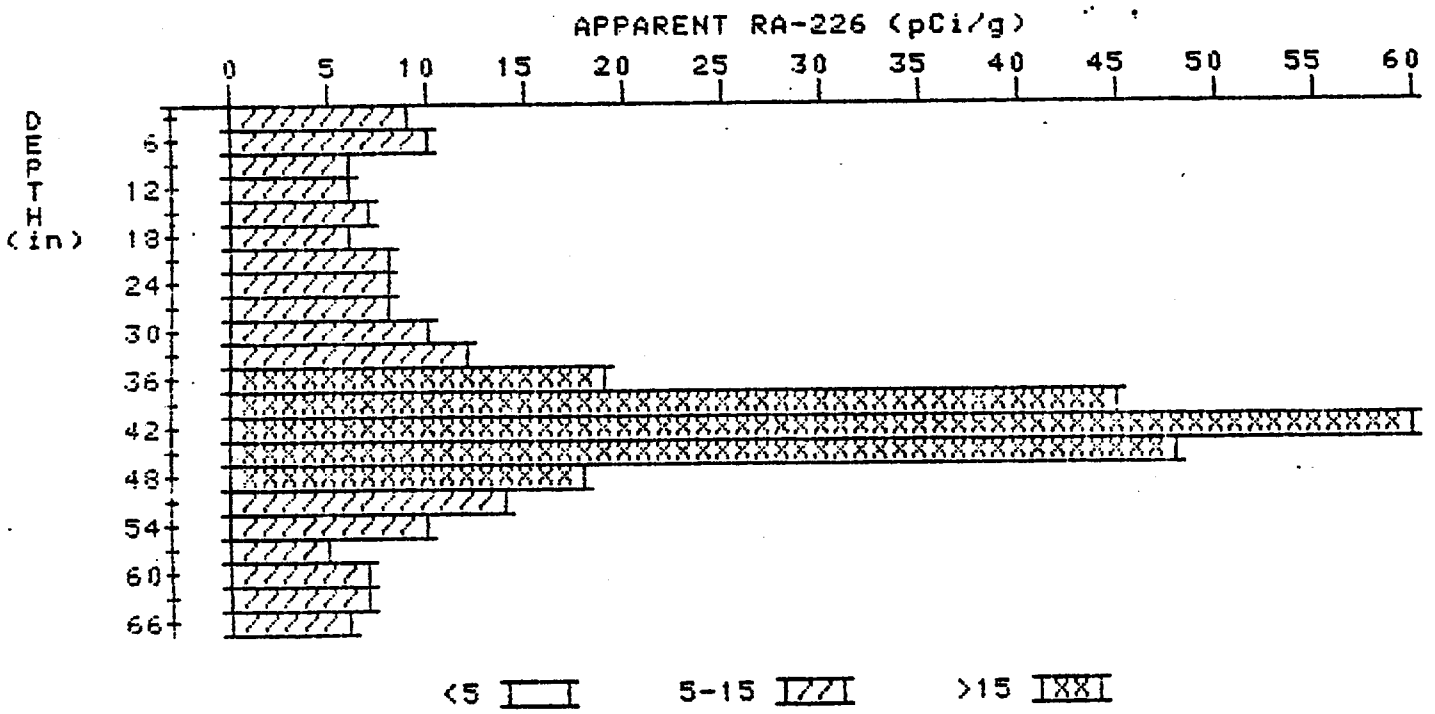
3	40.3	40.3
6	62.7	58.6
9	87.4	76.7
12	118.1	138.2
15	137.5	153.0
18	148.2	165.1
21	149.4	161.1
24	144.0	156.1
27	131.8	143.4
30	113.1	101.0
33	101.2	80.9
36	100.7	74.2
39	115.1	102.8
42	136.4	144.4
45	153.2	171.0
48	160.0	147.0
51	174.1	184.6
54	182.3	293.8
57	127.8	74.5
60	103.3	113.3
63	73.2	66.4
66	46.9	27.3
69	31.6	19.9
72	22.9	15.3
75	18.5	14.9
78	16.1	14.7
81	14.5	14.0
84	13.2	12.8
87	12.1	12.8
90	10.6	10.8
93	9.0	8.5
96	7.7	6.8
99	6.9	6.0
102	6.6	6.8
105	6.2	6.2
108	5.8	5.6
111	5.5	5.3
114	5.3	6.0
117	4.7	3.6
120	4.7	5.1
123	4.5	3.8
126	4.7	5.1
129	4.7	4.7

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

22

PROPERTY NUMBER: GJ-11418-RS
HOLE NUMBER: 22'
LOCATION: 295225'



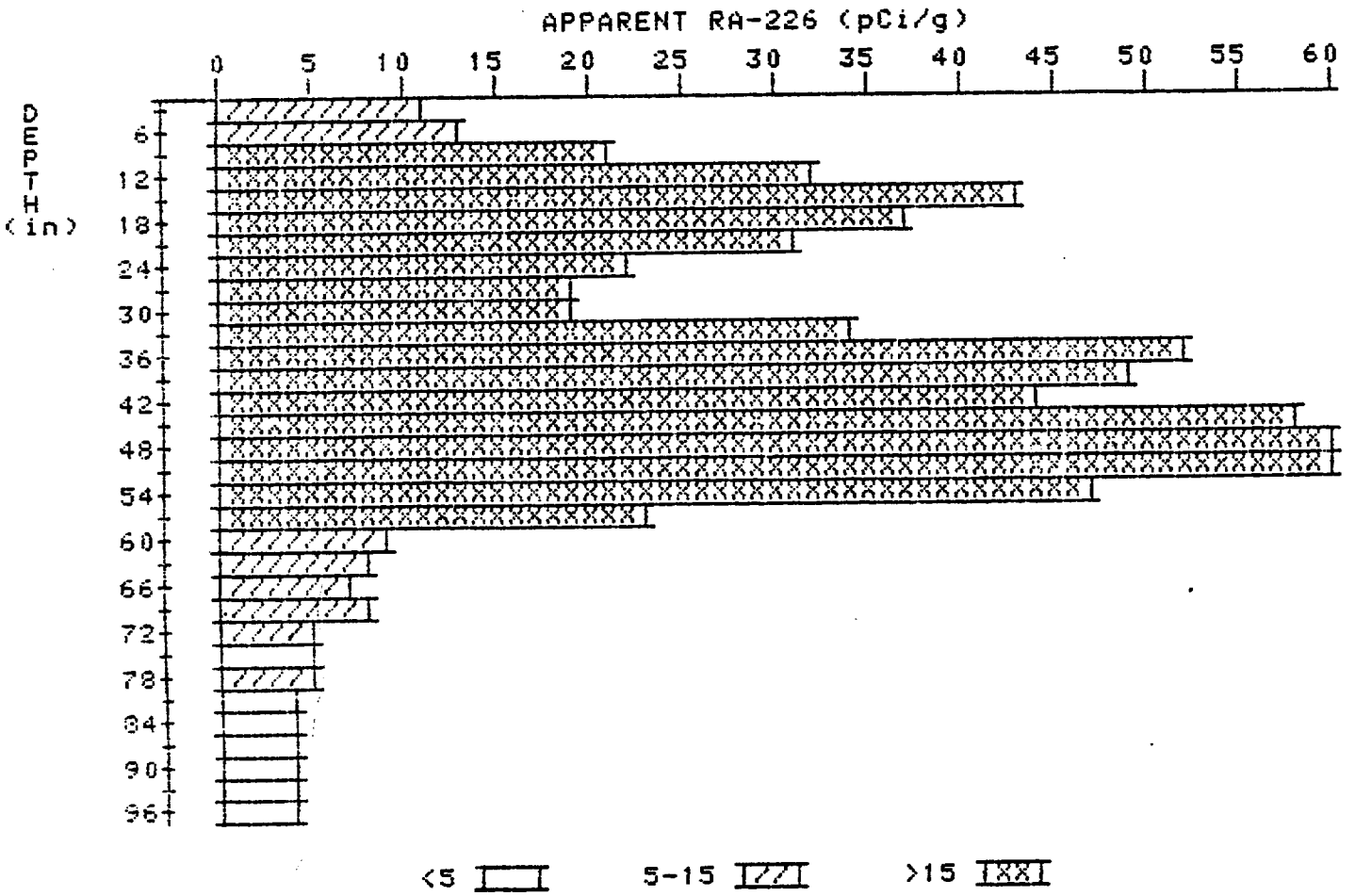
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	9.2	9.2
6	8.7	10.1
9	7.4	6.0
12	6.9	5.8
15	7.0	6.6
18	7.3	6.4
21	8.1	7.7
24	9.1	8.4
27	10.5	8.0
30	13.3	10.1
33	17.9	12.0
36	25.8	19.4
39	37.3	45.3
42	44.3	68.3
45	37.8	47.6
48	25.8	18.0

51	18.2	14.1
54	12.9	9.9
57	9.3	5.2
60	8.0	7.5
63	7.0	6.6
66	6.2	6.2

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11418-RS
HOLE NUMBER: 23'
LOCATION: 297244'



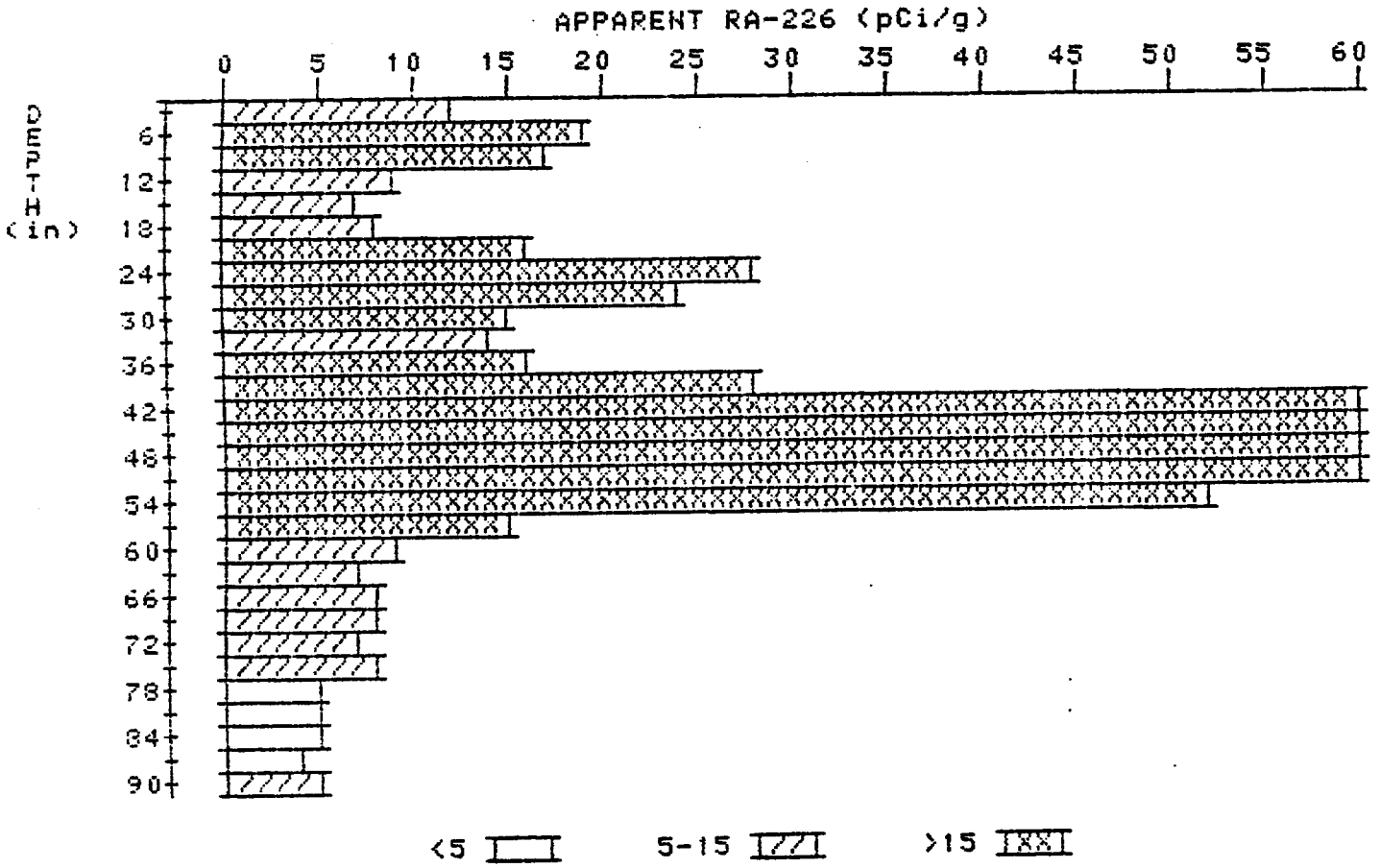
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	11.0	11.0
6	15.9	13.4
9	22.2	21.5
12	28.9	32.5
15	33.6	43.4
18	32.8	36.7
21	29.8	30.9
24	26.2	21.8
27	25.1	18.7

30	27.6	18.5
33	35.2	33.6
36	43.7	52.4
39	47.3	48.9
42	50.0	44.1
45	56.0	57.8
48	61.0	77.7
51	56.6	71.5
54	43.8	46.6
57	29.4	23.2
60	18.5	9.4
63	12.7	8.1
66	9.5	6.7
69	7.9	7.5
72	6.5	5.4
75	5.7	5.0
78	5.3	5.5
81	4.8	4.4
84	4.5	4.1
87	4.4	4.4
90	4.3	4.1
93	4.3	4.1
96	4.4	4.4

DECON V85.1(850117.1233)

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11418-RS
HOLE NUMBER: 24'
LOCATION: 297254'



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	12.1	12.1
6	14.2	18.6
9	13.8	16.6
12	11.8	9.3
15	11.2	7.5
18	12.7	8.1
21	16.8	16.4
24	21.1	28.2
27	21.4	24.2
30	20.1	15.1

33	21.6	13.6
36	27.6	15.5
39	40.4	27.8
42	60.3	70.1
45	74.7	95.0
48	77.7	99.4
51	68.5	85.4
54	49.8	51.6
57	30.1	15.2
60	18.8	9.0
63	13.0	7.5
66	10.3	8.0
69	8.9	8.2
72	7.9	7.4
75	7.2	8.3
78	5.9	4.7
81	5.3	4.9
84	4.9	4.5
87	4.7	3.8
90	5.0	5.0