

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-12294-RM
ADDRESS: 2848-1/2 ORCHARD 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
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APPROVED BY

MK Tucker ^{by} *CDA*
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DOE PROJECT ENGINEER

DATE

July 11, 1985

REA12294:REA-511

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	3
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	7
4.1 Decontamination and Restoration	7
4.2 Evaluation of Recommended Remedial Action	7
5.0 REFERENCES	8
6.0 APPENDIX	9

1.0 EXECUTIVE SUMMARY

1.1 Introduction

The location, DOE ID No. GJ-12294-RM, is two single-family residences located at 2848-1/2 Orchard 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, 19 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is \$1,334. Remedial action on this property will take approximately 5 days to complete.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 2848-1/2 Orchard Avenue, Grand Junction, Colorado

Zoning: Residential (R-2)

Lot Size: Approximately 16,016 sf (0.4 acres)

Legal Description: Tract Two; Book 1244, Page 45
 The south 181 Feet of East 10 Acres of the Southeast Quarter of the Northwest Quarter of Section Seven (7), Township One (1) South, Range One (1) East of the Ute Meridian; EXCEPT Beginning at the Southwest Corner of said East 10 Acres, thence North 181 feet, thence East 125 feet, thence South 181 feet, thence West 125 feet; AND EXCEPT Beginning at the Southeast Corner of said Southeast Quarter of the Northwest Quarter, thence North 181 feet, thence West 117 feet, thence South 181 feet, thence East to the point of beginning; AND EXCEPT the East 25 feet deed to Mesa County as described in document recorded in Book 716 on page 436. ALSO RIGHT OF WAY as described in Book 1027 at page 993. Together with all water, lateral, and ditch rights thereto belonging.

Tract One; Book 1244, Page 45
 Beginning 181 feet North and North 89°41' West 162.29 feet from Southeast Corner Northwest 1/4 Section 7, Township 1 South, Range 1 East, North 89°41', West 25.30 feet, North 10.0 feet, East 25.30 feet, South 10.0 feet to beginning, City of Grand Junction, County of Mesa, State of Colorado.

Point of Reference: This property is located approximately 3 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: Orchard Avenue
 East: Single-family residence
 West: Single-family residence

2.2 Existing Facilities and StructuresPrimary Structure:

Type: Single-story residence
 Size: Approximately 836 sf
 Construction Date: 1950
 Construction: Wood-frame
 Foundation: Not determined
 Footing Depth: Not determined
 Basement: None
 Crawl Space: Yes
 Condition: Good

Primary Structure:

Type: Single-story residence
 Size: Approximately 782 sf
 Construction Date: 1950
 Construction: Wood-frame
 Foundation: Not determined
 Footing Depth: Not determined
 Basement: None
 Crawl Space: None
 Condition: Good

General Remarks:

Structures, utilities, landscaping, and other special features of this property are included in Appendix Figure 2.2.

Historical Data:

These structures are not over 50 years old. Therefore, they do 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-12294-RM on June 6, 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 in the lawn and driveway west of the primary structure and in the yards south and east of the apartment.

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, team leader notes, deconvolution graphs, and Exterior Gamma Scan map 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): 29 uR/h

Exterior radium-concentration measurements are presented in Appendix Table 3.1. Grid-point survey results are shown in Appendix Figure 3.1.

3.2.2 Interior Findings

Background Readings: 15 to 17 uR/h
Highest Inside Gamma Reading (HIG): 17 uR/h

Interior gamma exposure-rate measurements are summarized in Appendix Table 3.2.

3.3 Boreholes, Soil Samples, and Other Measurements

Areas which displayed elevated gamma levels were further investigated; these areas are shown in Appendix Figure 3.2. Data from these investigations are included in Appendix Table 3.1.

3.4 Radon/Radon Daughter Concentration (RDC)

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

3.5 Extent of Contamination

Appendix Figure 3.3 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) Surface Material: 3/4-inch gravel
Direction From Primary Structure: southwest
Other Directions: none
Total Depth of Contamination: 6 inches
Other (height or thickness): none
Comments: Three small deposits are included.
Approximate Square Footage: 32
- (Area B) Surface Material: 3/4-inch gravel
Direction From Primary Structure: west
Other Directions: south and southwest of apartment
Total Depth of Contamination: 6 inches
Other (height or thickness): none
Comments: Two small deposits are included.
Approximate Square Footage: 76
- (Area C) Surface Material: 3/4-inch gravel
Direction From Primary Structure: west
Other Directions: south of apartment
Total Depth of Contamination: 9 inches
Other (height or thickness): none
Comments: Two deposits are included.
Approximate Square Footage: 156
- (Area D) Surface Material: 3/4-inch gravel
Direction From Primary Structure: west
Other Directions: south of apartment
Total Depth of Contamination: 6 inches
Other (height or thickness): none
Comments: none
Approximate Square Footage: 56
- (Area E) Surface Material: soil
Direction From Primary Structure: northwest
Other Directions: east of apartment
Total Depth of Contamination: 9 inches
Other (height or thickness): none
Comments: none
Approximate Square Footage: 150

- (Area F) Surface Material: soil
Direction From Primary Structure: northwest
Other Directions: east of apartment
Total Depth of Contamination: 15 inches
Other (height or thickness): none
Comments: This area includes the gas line.
Approximate Square Footage: 124
- (Area G) Surface Material: soil
Direction From Primary Structure: northeast
Other Directions: on the north property line
Total Depth of Contamination: 6 inches
Other (height or thickness): none
Comments: none
Approximate Square Footage: 16
- (Area H) Surface Material: lawn
Direction From Primary Structure: east
Other Directions: at the east property line
Total Depth of Contamination: 12 inches
Other (height or thickness): none
Comments: none
Approximate Square Footage: 16
- (Area I) Surface Material: lawn
Direction From Primary Structure: southwest
Other Directions: none
Total Depth of Contamination: 6 inches
Other (height or thickness): none
Comments: none
Approximate Square Footage: 9

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-12294-RM, includes removal of all areas identified as containing radioactive material (as discussed in Section 3.5 and shown in Appendix Figure 3.3) 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 \$1,334.

This remedial action will result in removal of the identified residual radioactive materials.

There is no owner preference with respect to remedial action and no legal or other complications are foreseen at this time.

5.0 REFERENCES

ARIX, A Professional Corporation, Procedures Manual for the Grand Junction Remedial Action Program, for Colorado Department of Health, Radiation Control Division, and the U.S. Department of Energy, 1983.

Bendix Field Engineering Corporation, Procedures Manual Radiologic Support Operations Grand Junction Vicinity Properties, (GJ-07), for U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, 1984.

Bendix Field Engineering Corporation, Engineering, Construction, and Land Support Manual Grand Junction Vicinity Properties Project, (GJ-08), for U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, 1984.

Bendix Field Engineering Corporation, Grand Junction Vicinity Properties Operating Manual, (GJ-16) for U.S. Department of Energy, Nuclear Energy Programs, Division of Remedial Action Projects, UMTRA, 1984.

Bendix Field Engineering Corporation, Vicinity Properties General Construction Specification, for U.S. Department of Energy, Nuclear Energy Programs, Division of Remedial Action Projects, UMTRA, 1984.

Bendix Field Engineering Corporation, Environmental Assessment of Preliminary Cleanup Activities at Offsite Properties Contaminated by Tailings from the Grand Junction Inactive Uranium Millsite, (GJ-04), for U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations, Albuquerque, New Mexico, 1983.

U.S. Department of Energy, Programmatic Memorandum of Agreement (DOE No. DE-GM04-84AL28460) between the U.S. Department of Energy, the Advisory Council on Historic Preservation, and the Colorado State Historic Preservation Officer, for UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, 1984.

U.S. Department of Energy, Vicinity Properties Management and Implementation Manual, for UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, 1984.

U.S. Environmental Protection Agency, Standards for Remedial Action at Inactive Uranium Processing Sites (40 CFR Part 192), Washington, D.C., 1983.

6.0 APPENDIX

This Appendix contains the following:

Appendix Tables:

Table 3.1	Radium Concentrations at Exterior Locations
Table 3.2	Summary of Interior Gamma Exposure Rates
Table 4.1	Area and Volume Calculations
Table 4.2	Estimated Cost of Decontamination and Restoration

Appendix Figures:

Figure 2.1	Vicinity Map
Figure 2.2	Site Plan
Figure 3.1	Exterior Grid-Point Exposure Rates
Figure 3.2	Sample Locations
Figure 3.3	Estimated Extent of Contamination

Official Survey Report

Team Leader Notes

Deconvolution Graphs (Apparent Radium-226 Concentration)

Exterior Gamma Scan Map

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-12294-RM

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					
A	4 x 3 =	12			
	4 x 2 =	8			
	4 x 3 =	12			
		<u>32</u>	x 0.5 =	16	
B	4 x 9 =	36			
	10 x 4 =	40			
		<u>76</u>	x 0.5 =	38	
C	13 x 12 =	156	x 0.8 =	125	
D	7 x 8 =	56	x 0.5 =	28	
E	10 x 15 =	150	x 0.8 =	120	
F	4 x 10 =	40			
	14 x 6 =	84			
		<u>124</u>	x 1.3 =	161	
G	4 x 4 =	16	x 0.5 =	8	
H	4 x 4 =	16	x 1.0 =	16	
I	3 x 3 =	9	x 0.5 =	5	
				<u>517</u>	= 517/27 = 19
TOTAL VOLUME - EXTERIOR					= 19

See Appendix Figure 3.3 For Areas

Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-12294-RM

Page 1 of 1

Remove identified residual radioactive material		
15 cy @ \$14.50/cy (machine-open)	\$	218
4 cy A \$44/cy (manual-open)		176
Replace areas with compacted roadbase		
2 cy @ \$11.50/cy		23
Replace areas with topsoil		
17 cy @ \$9.50/cy		162
Replace sod		
57 sf @ \$.50/cy		29
		<hr/>
	TOTAL EXTERIOR	\$ 608
	TOTAL INTERIOR	0
	ACCESS CONTROL	200
		<hr/>
	SUBTOTAL	\$ 808
	CONTINGENCY @ .10%	81
		<hr/>
	SUBTOTAL	\$ 889
	CONTRACTOR OVERHEAD & PROFIT @ 50%	445
		<hr/>
	GRAND TOTAL	\$ 1,334

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Radium Concentrations at Exterior Locations

DOE ID #GJ-12294-RM

2848 1/2 Orchard Avenue

Page 1 of 5

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
1	133227	00	DS	1.7		*	Gas line east side of apartment
		07	DS	9.9		*	
		13	DS	1.3		*	
2	138274	00	DS	3.8		*	Northeast of primary structure
		06	DS	2.1		*	
3	140230	03	TC	11.4		*	North yard DC = 15 inches Based on the deconvolution graph
		06	TC	13.4		*	
		09	TC	12.1		*	
		12	TC	9.7		*	
		15	TC	6.4		*	
		18	TC	5.3		*	
		21	TC	4.7		*	
		24	TC	4.5		*	
4	140238	27	TC	4.3		*	
		03	TC	10.3		*	North yard by fence DC = 15 inches Based on the deconvolution graph
		06	TC	10.3		*	
		09	TC	8.1		*	
		12	TC	6.2		*	
		15	TC	5.0		*	
		18	TC	4.5		*	
		21	TC	4.4		*	
		24	TC	4.4		*	
5	144227	27	TC	4.4		*	
		30	TC	4.4		*	
		03	TC	8.3		*	Sewer line east side of apartment
		06	TC	9.6		*	
		09	TC	9.3		*	
		12	TC	8.2		*	DC = 15 inches Based on all available data
		15	TC	6.8		*	
		18	TC	5.6		*	
		21	TC	5.0		*	
		24	TC	4.5		*	
		27	TC	4.3		*	
		30	TC	4.3		*	
		33	TC	4.3		*	
		36	TC	4.3		*	
		39	TC	4.4		*	
		42	TC	4.4		*	
		45	TC	4.2		*	
		48	TC	4.2		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-12294-RM

2848 1/2 Orchard Avenue

Page 2 of 5

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
5	144227	51	TC	4.1		*	
		54	TC	4.2		*	
6	144242	00	DS	3.5		*	North yard
		06	DS	2.5		*	
		12	DS	1.0		*	
7	145235	03	TC	9.5		*	North yard DC = 9 inches Based on the deconvolution graph
		06	TC	7.6		*	
		09	TC	5.7		*	
		12	TC	4.9		*	
		15	TC	4.4		*	
		18	TC	4.2		*	
		21	TC	4.2		*	
8	150227	00	DS	4.7		*	East of apartment
		06	DS	4.9		*	
		12	DS	2.4		*	
9	150235	00	DS	4.7		*	East of apartment
		06	DS	1.2		*	
10	155275	00	DS	1.2		*	Background
11	160221	03	TC	3.5		*	West of apartment DC = 0 inches
		06	TC	3.7		*	
		09	TC	3.8		*	
		12	TC	3.8		*	
		15	TC	3.9		*	
		18	TC	4.0		*	
		21	TC	3.9		*	
		24	TC	4.0		*	
		27	TC	4.0		*	
		30	TC	4.0		*	
		33	TC	4.0		*	
		36	TC	3.9		*	
		39	TC	4.0		*	
		42	TC	3.9		*	
		45	TC	3.8		*	
		48	TC	3.8		*	
		51	TC	3.7		*	
		54	TC	3.8		*	
		57	TC	3.9		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-12294-RM

2848 1/2 Orchard Avenue

Page 3 of 5

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
12	164216	00	DS	4.7		*	South of apartment
		06	DS	2.8		*	
		12	DS	1.7		*	
13	165194	00	DS	8.2		*	West property line
		06	DS	1.6		*	
14	165206	00	DS	4.0		*	South of apartment
		06	DS	<1.0		*	
15	165213	00	DS	2.5		*	South of apartment
		06	DS	1.5		*	
16	170215	03	TC	7.2		*	In driveway DC = 9 inches Based on the deconvolution graph
		06	TC	5.8		*	
		09	TC	4.7		*	
		12	TC	4.3		*	
		15	TC	4.1		*	
		18	TC	4.0		*	
		21	TC	4.0		*	
		24	TC	4.0		*	
		27	TC	4.0		*	
		30	TC	4.1		*	
17	171227	00	DS	3.3		*	West of primary structure
		06	DS	2.4		*	
		12	DS	1.4		*	
18	176216	00	DS	4.7		*	West of primary structure
		06	DS	3.0		*	
		12	DS	1.8		*	
19	183239	03	TC	3.4		*	Sewer line west of primary structure DC = 0 inches
		06	TC	3.7		*	
		09	TC	3.8		*	
		12	TC	3.9		*	
		15	TC	3.9		*	
		18	TC	3.9		*	
		21	TC	3.9		*	
		24	TC	4.0		*	
		27	TC	4.1		*	
		30	TC	4.0		*	
		33	TC	4.1		*	
		36	TC	4.1		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-12294-RM

2848 1/2 Orchard Avenue

Page 4 of 5

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
19	183239	39	TC	4.1		*	
20	184270	00	DS	1.4		*	Gas line east of primary structure
		15	DS	<1.0		*	
21	185278	00	DS	3.9		*	East of primary structure
		06	DS	3.2		*	
		12	DS	1.5		*	
22	188273	03	TC	3.1		*	Water line east of primary structure DC = 0 inches
		06	TC	3.4		*	
		09	TC	3.6		*	
		12	TC	3.7		*	
		15	TC	3.7		*	
		18	TC	3.7		*	
		21	TC	3.8		*	
		24	TC	3.8		*	
		27	TC	3.8		*	
		30	TC	3.8		*	
		33	TC	3.8		*	
		36	TC	3.8		*	
		39	TC	3.7		*	
		42	TC	3.7		*	
		45	TC	3.6		*	
		48	TC	3.6		*	
		51	TC	3.6		*	
		54	TC	3.6		*	
		57	TC	3.5		*	
		60	TC	3.6		*	
23	199263	03	TC	3.4		*	South of primary structure DC = 0 inches
		06	TC	3.5		*	
		09	TC	3.7		*	
		12	TC	3.7		*	
		15	TC	3.8		*	
		18	TC	3.8		*	
		21	TC	3.9		*	
		24	TC	3.9		*	
		27	TC	4.0		*	
		30	TC	4.0		*	
		33	TC	4.0		*	
		36	TC	4.0		*	
		39	TC	4.0		*	
		42	TC	4.1		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-12294-RM

2848 1/2 Orchard Avenue

Page 5 of 5

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
23	199263	45	TC	4.0		*	
		48	TC	4.1		*	
		51	TC	4.2		*	
		54	TC	4.1		*	
24	206230	00	DS	2.7		*	North of primary structure
		06	DS	1.3		*	
25	213213	00	DS	4.4		*	Southwest of primary structure
		06	DS	1.4		*	
26	219218	00	DS	2.8		*	Southwest of primary structure
		06	DS	2.0		*	

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 = 06-06-85
 Team Leader = TF

Table 3.2

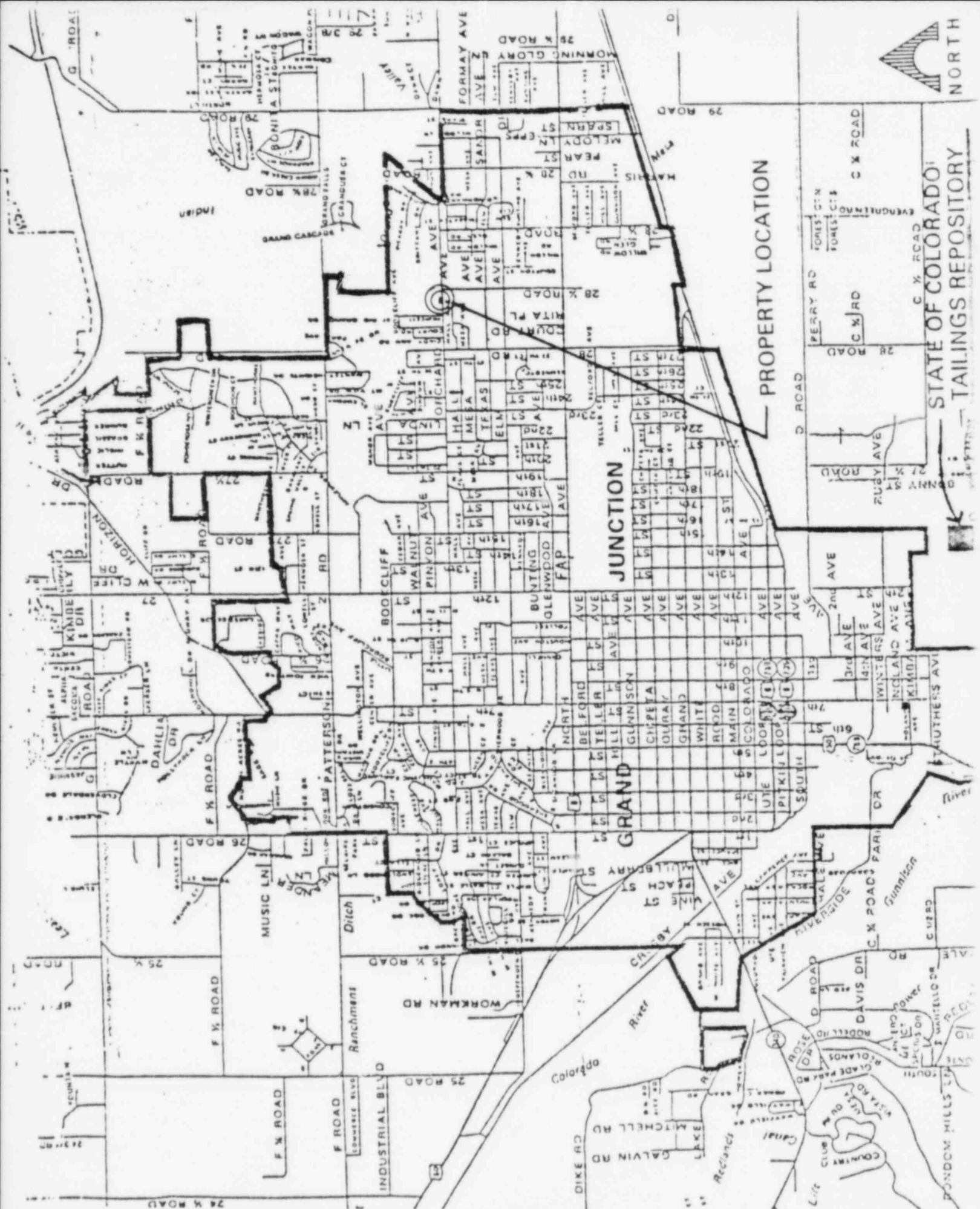
Summary of Interior Gamma Exposure Rates

DOE ID No. GJ-12294-RM 2848 1/2 Orchard 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)
GROUND FLOOR	*	*	*	*	15-16	*
APARTMENT	*	*	*	*	15-17	*

* The historical data indicate the absence of interior contamination at this property. This information was investigated by performing a walking gamma scan.

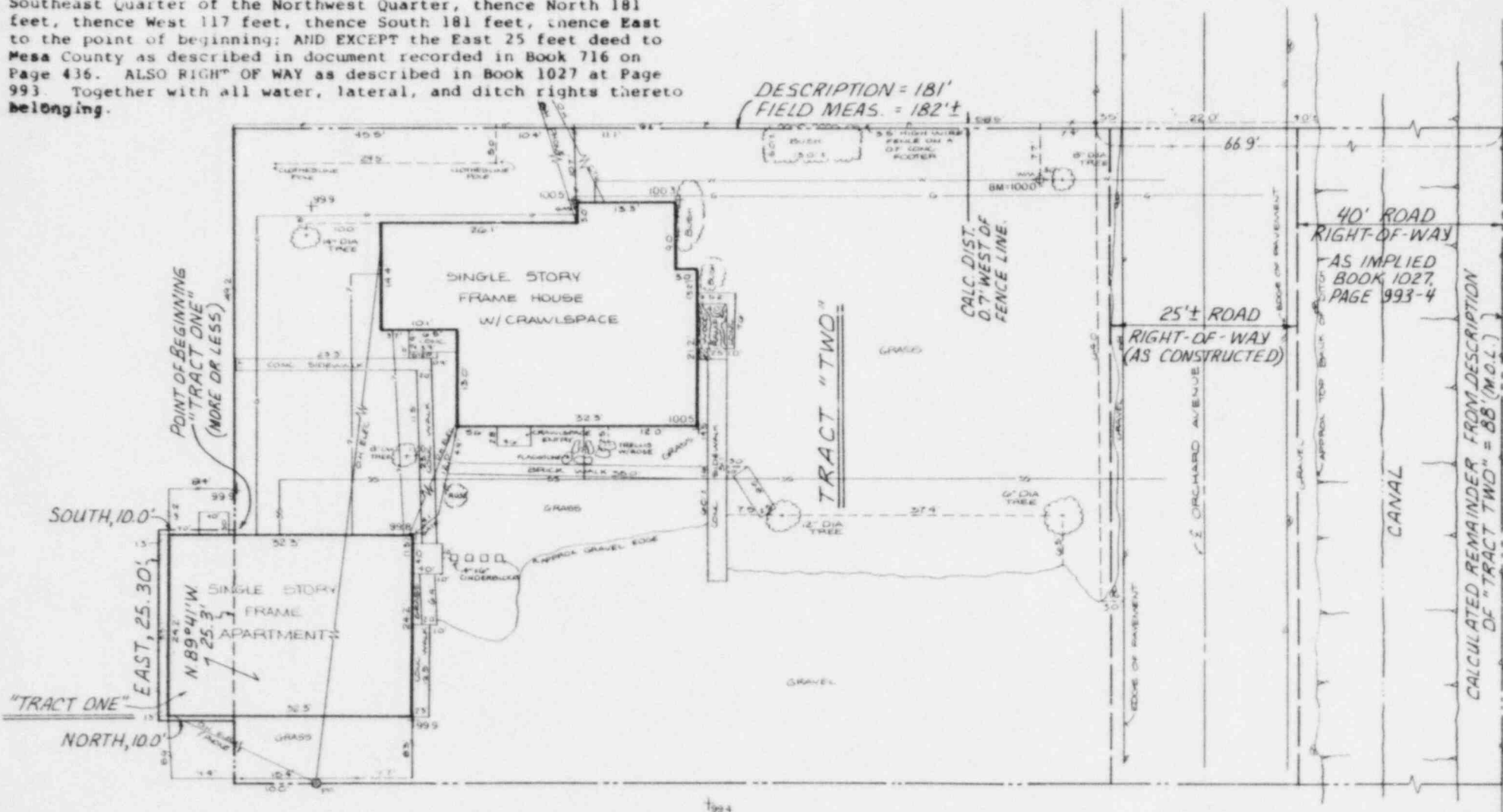


Tract Two ; BOOK 1244, PAGE 45, (2943-072-00-025)

The South 181 Feet of East 10 Acres of the Southeast Quarter of the Northwest Quarter of Section Seven (7), Township One (1) South, Range One (1) East of the Ute Meridian; EXCEPT Beginning at the Southwest Corner of said East 10 Acres, thence North 181 feet, thence East 125 feet, thence South 181 feet, thence West 125 feet; AND EXCEPT Beginning at the Southeast Corner of said Southeast Quarter of the Northwest Quarter, thence North 181 feet, thence West 117 feet, thence South 181 feet, thence East to the point of beginning; AND EXCEPT the East 25 feet deed to Mesa County as described in document recorded in Book 716 on Page 436. ALSO RIGHT OF WAY as described in Book 1027 at Page 993. Together with all water, lateral, and ditch rights thereto belonging.

Tract One ; BOOK 1244, PAGE 45, (2943-072-00-044)

Beginning 181 feet North and North 89°41' West 162.29 feet from Southeast Corner Northwest 1/4 Section 7, Township 1 South, Range 1 East, North 89°41', West 25.30 feet, North 10.0 feet, East 25.30 feet, South 10.0 feet to beginning.



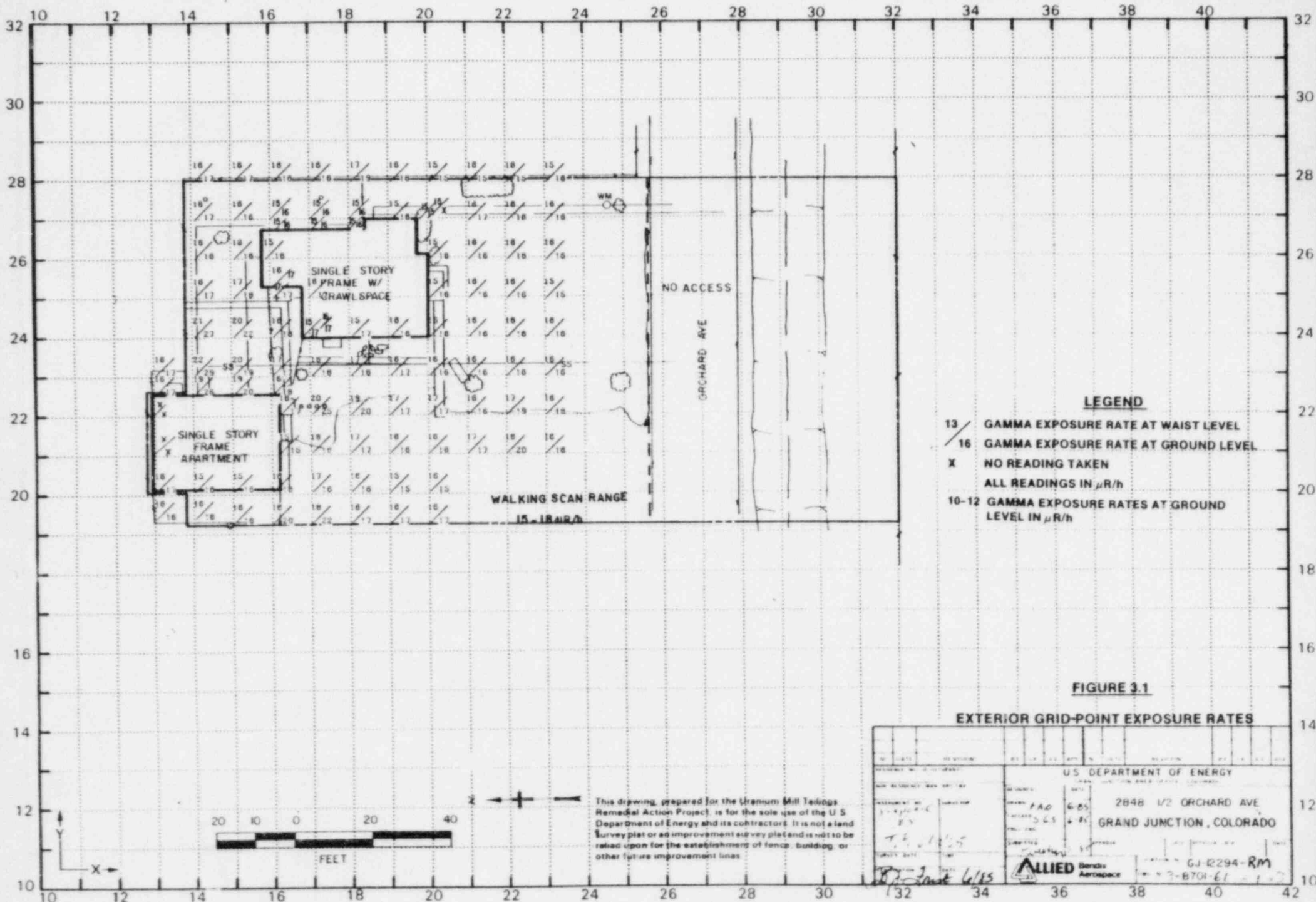
NOTE: "TRACT ONE" AND "TRACT TWO" ARE DESCRIBED IN BOOK 1244, PAGE 45, MESA COUNTY CLERK & RECORDER'S OFFICE. THE DESCRIPTIONS SHOWN ON THIS MAP ARE ENLARGED PHOTO COPIES OF THE ABOVE BOOK AND PAGE.

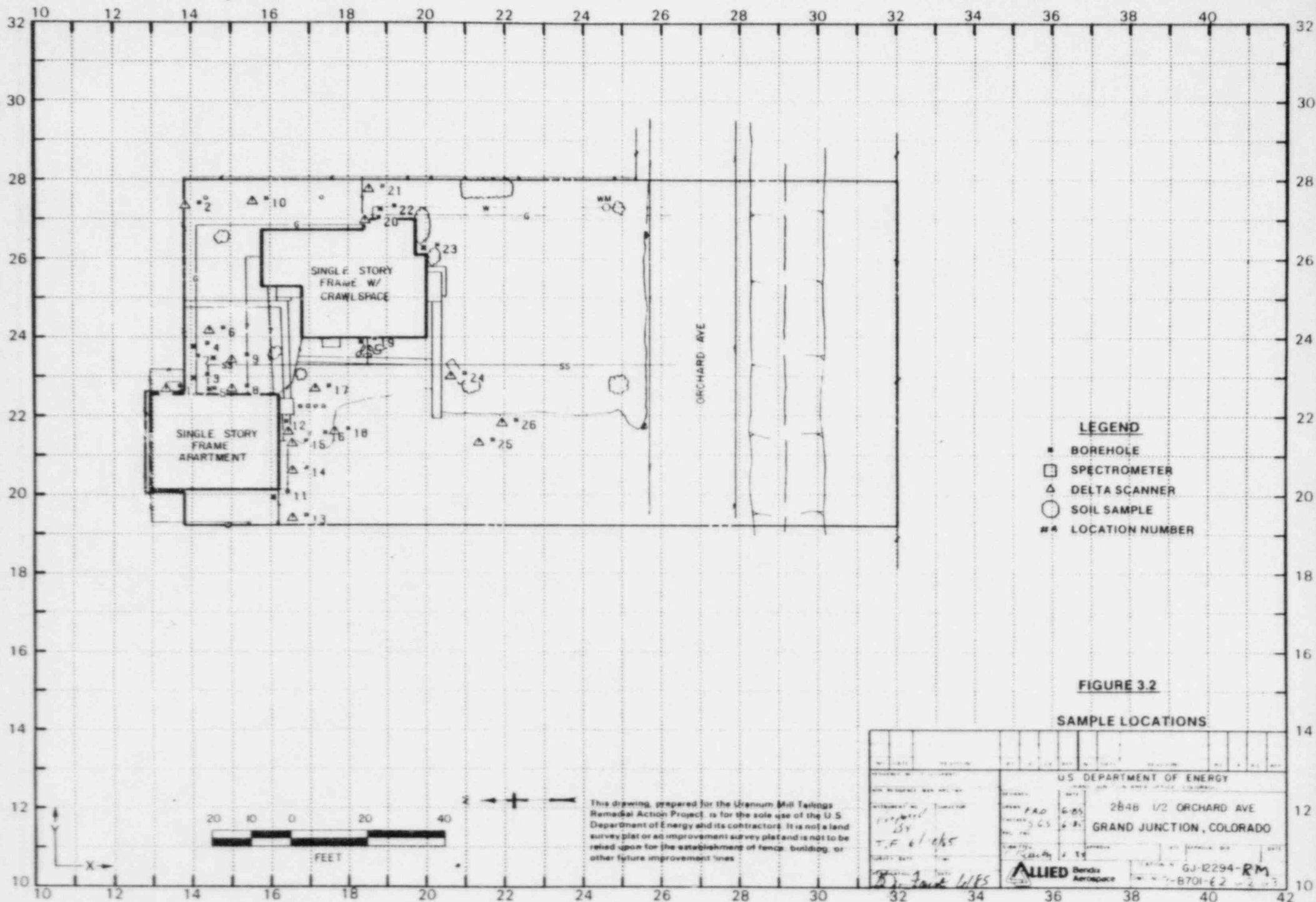
FIGURE 2.2 SITE PLAN

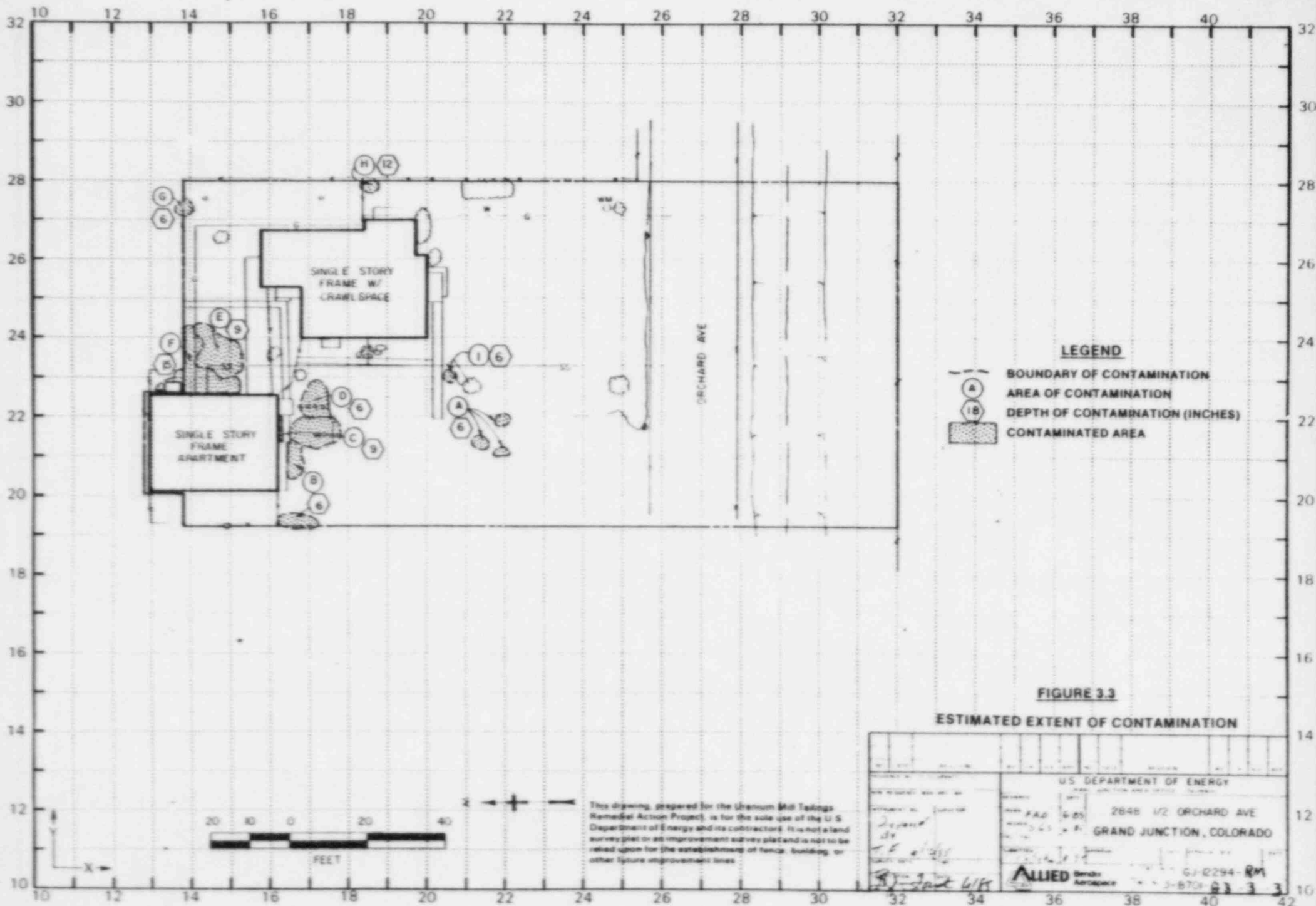


This drawing, prepared for the Uranium Mill Tailings Remedial Action Project, is for the sole use of the U. S. Department of Energy and its contractors. It is not a land survey plat or an improvement survey plat and is not to be relied upon for the establishment of fence, building, or other future improvement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

U.S. DEPARTMENT OF ENERGY		DOE ID NO
GRAND JUNCTION PROJECT OFFICE COLORADO		GJ 12294 R M
ADDRESS 2848 1/2 ORCHARD AVE		ALLIED <small>INCORPORATED</small> Branch Engineering Corporation Grand Junction, Colorado
GRAND JUNCTION, COLO		
SURV RLB / 5-28-85	DRAFT KAS / 5-30-85	CR 1-2-85
DRAWING NO 3-C701-F1		SHEET 1 OF 1







DOE ID NO. GJ-12294-RM

Date 6/6/85

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

Official Survey Report

Property Address 2848 1/2 Orchard Avenue
Property Owner Ralph and Dan Ingram
Address of Owner (if different from above) same
Report Prepared By Tom Flores

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 = 17 uR/h
HOG = 29 uR/h

ALLIED Bendix
Aerospace

Bendix Field Engineering Corporation
Grand Junction Operations
Grand Junction, Colorado

Date: June 6, 1985

To: Files

From: Thomas Flores

Subject: Team Leader Notes - GJ-12294-RM

Address: 2848-1/2 Orchard Avenue

Owner: Ralph and Dan Ingram

Team Members

T. Flores (Team Leader)
P. Hardy
R. Wilkins
S. Garcia

V. Hebel
R. Herman
M. Duran

The Bendix crew members arrived on the property at 7:30 AM.

After performing an exterior gamma scan, we discovered elevated readings in the backyard of the primary structure and in the east yard of the apartment. Elevated readings were also discovered in the front of the apartment and in the driveway.

After performing deltas on the gas line of the apartment we discovered contamination around the line entering the apartment. Boreholes were augered in the east yard of the apartment.

No interior contamination was discovered in either structure.

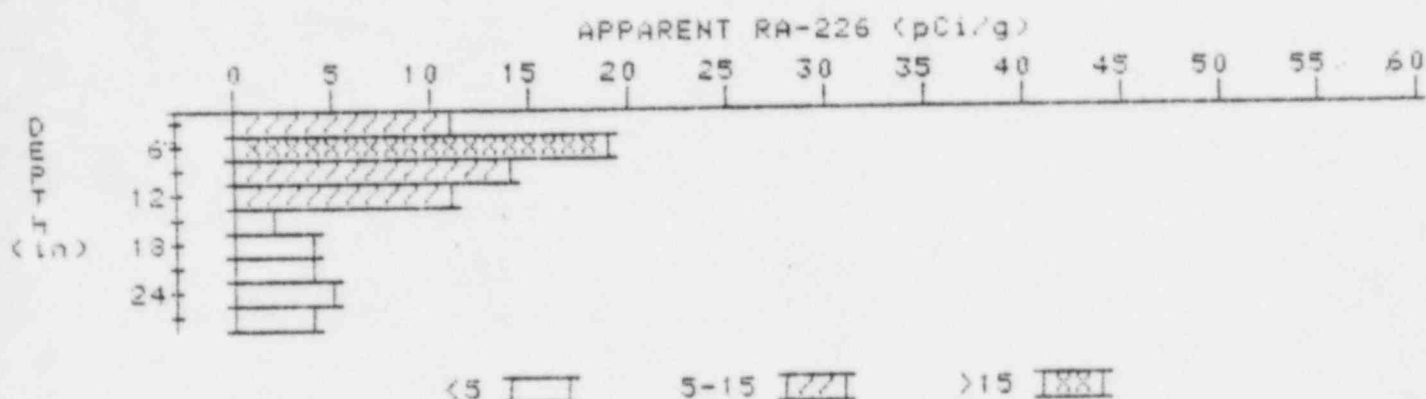
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

3

PROPERTY NUMBER: GJ-12294-RM

HOLE NUMBER: 3

LOCATION: 140230



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	11.4	11.4
6	13.4	19.3
9	12.1	14.1
12	9.7	11.3
15	6.4	2.5
18	5.3	4.4
21	4.7	4.0
24	4.5	4.5
27	4.3	4.3

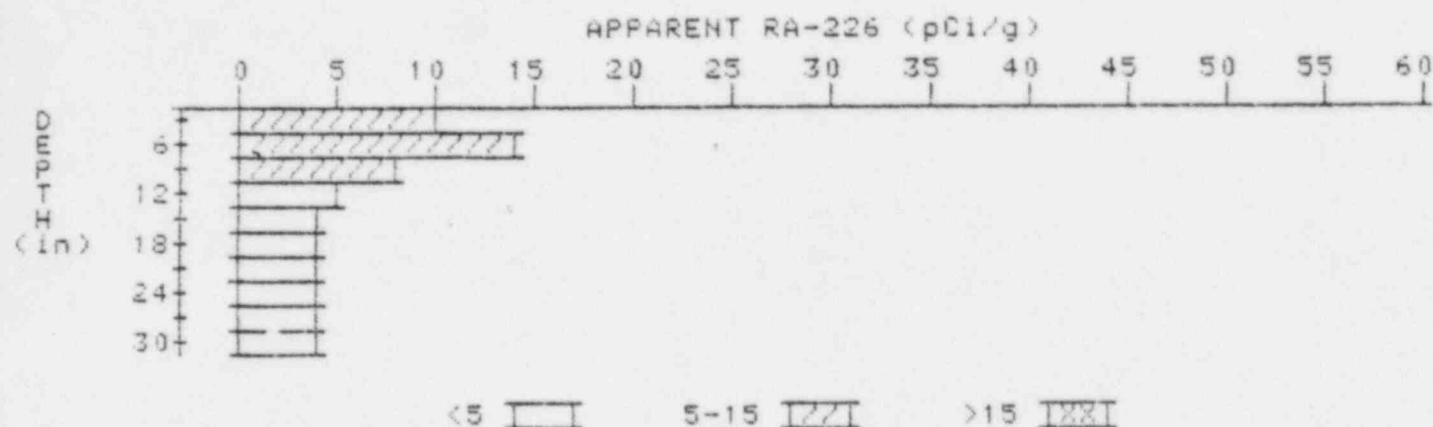
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

4

PROPERTY NUMBER: GJ-12294-RM

HOLE NUMBER: 4

LOCATION: 140238



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	10.3	10.3
6	10.3	14.2
9	8.1	7.6
12	6.2	5.0
15	5.0	3.8
18	4.5	3.8
21	4.4	4.2
24	4.4	4.4
27	4.4	4.4
30	4.4	4.4

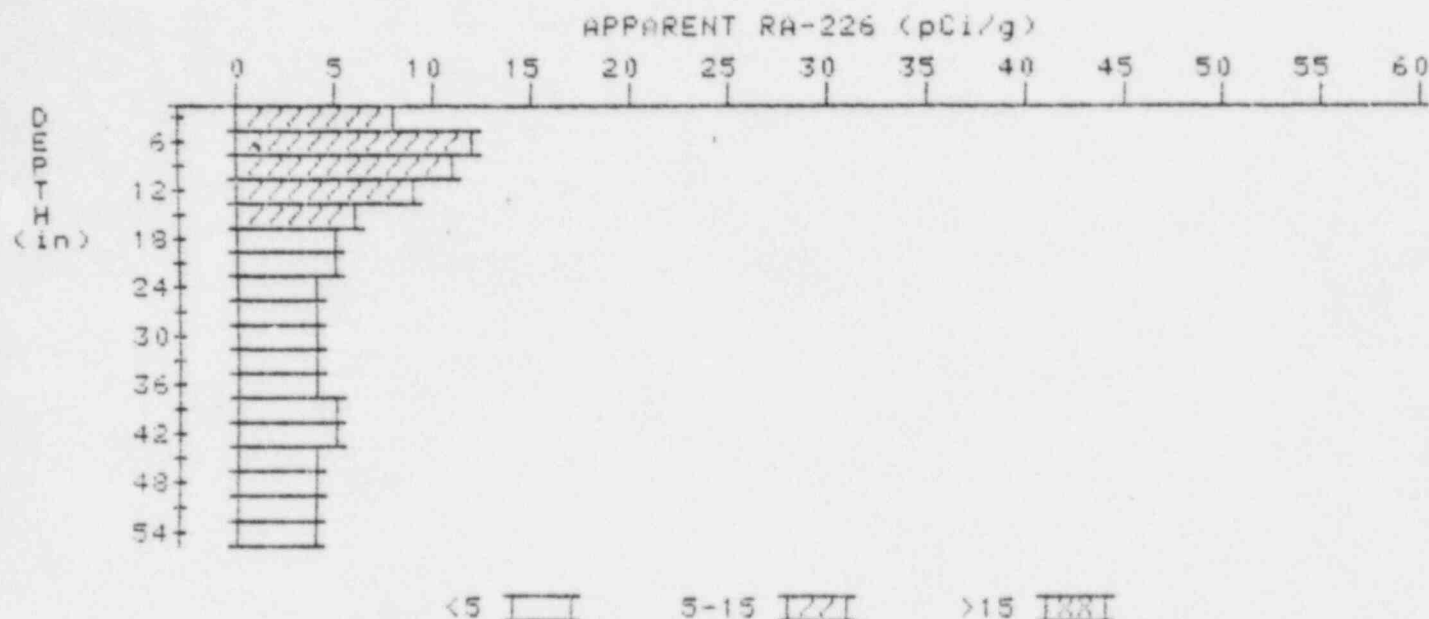
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

5

PROPERTY NUMBER: GJ-12294-RM

HOLE NUMBER: 5

LOCATION: 144227

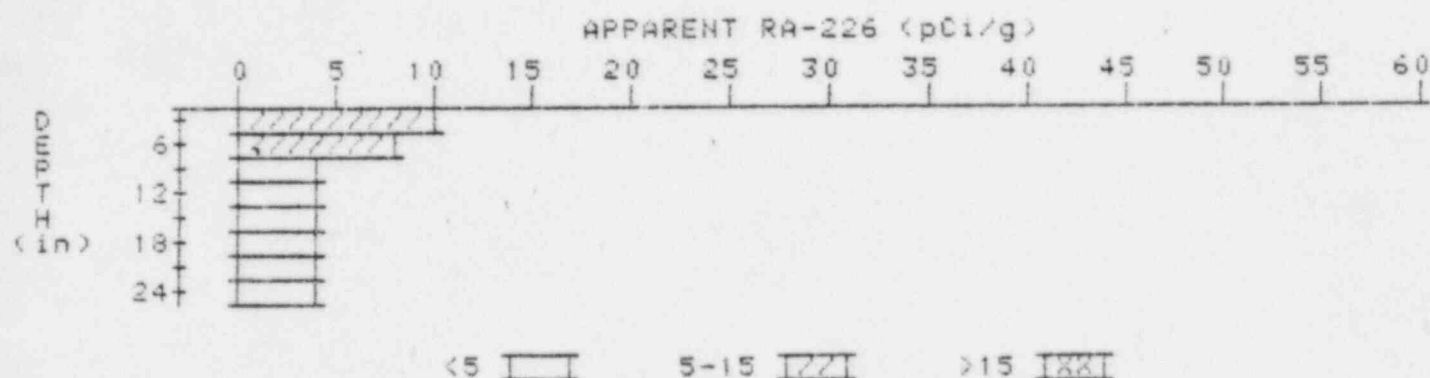


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	8.3	8.3
6	9.6	12.4
9	9.3	10.7
12	8.2	8.7
15	6.8	6.4
18	5.6	4.5
21	5.0	4.8
24	4.5	4.0
27	4.3	3.9
30	4.3	4.1
36	4.3	4.1
39	4.4	4.6
42	4.4	4.8
45	4.2	3.8
48	4.2	4.4
51	4.1	3.7
54	4.2	4.2

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

7

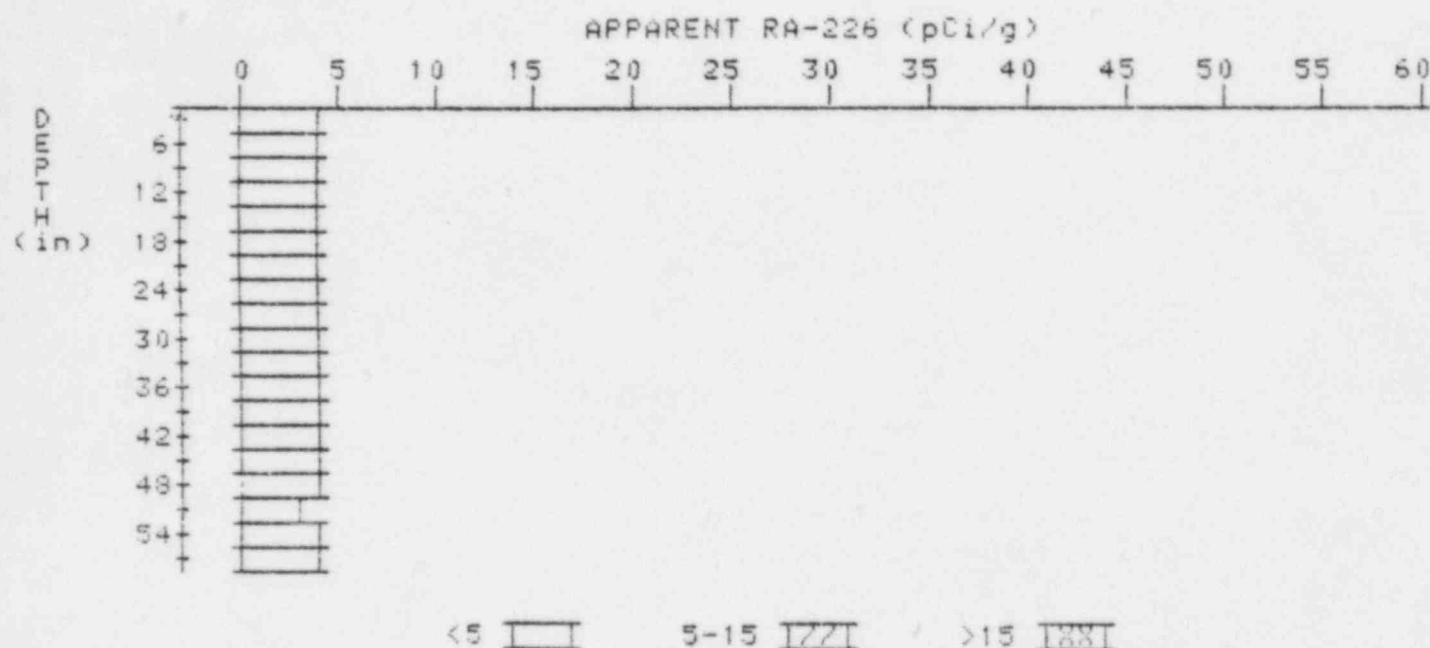
PROPERTY NUMBER: GJ-12294-RM
HOLE NUMBER: 7
LOCATION: 145235



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	9.5	9.5
6	7.6	7.6
9	5.7	3.7
12	4.9	4.4
15	4.4	3.9
18	4.2	3.3
21	4.2	4.0
24	4.3	4.3

APPARENT RADIUM-226 CONCENTRATION 11 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12294-RM
HOLE NUMBER: 11
LOCATION: 160221



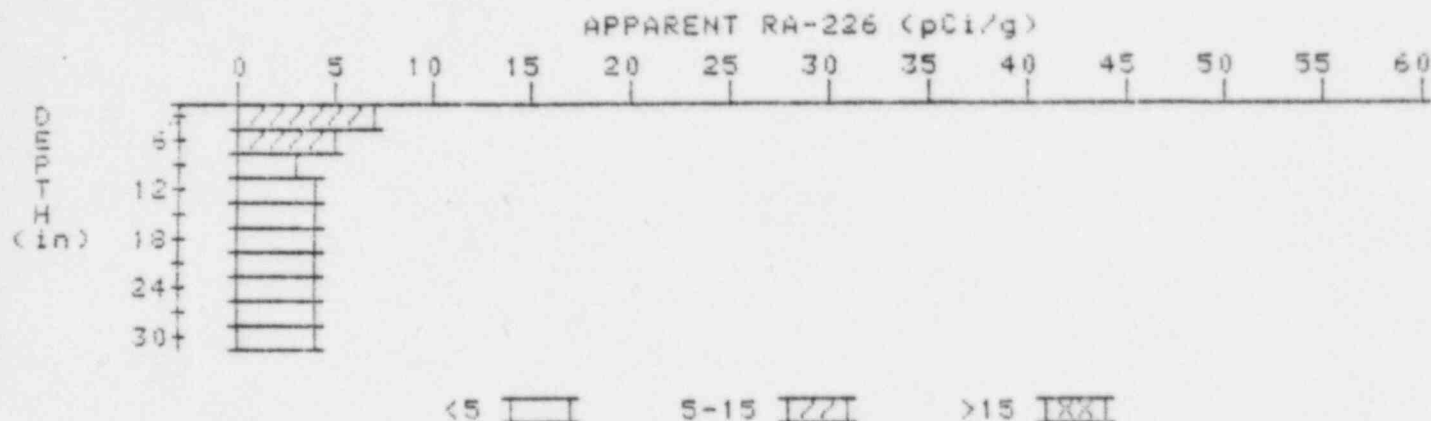
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.5	3.5
6	3.7	3.9
9	3.8	4.0
12	3.8	3.6
15	3.9	3.9
18	4.0	4.4
21	3.9	3.5
24	4.0	4.2
27	-	-
30	4.0	4.0
33	4.0	4.2
36	3.9	3.5
39	4.0	4.4
42	3.9	3.9
45	3.8	3.6
48	3.8	4.0
51	-	-

APPARENT RADIUM-226 CONCENTRATION 16 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12294-RM

HOLE NUMBER: 16

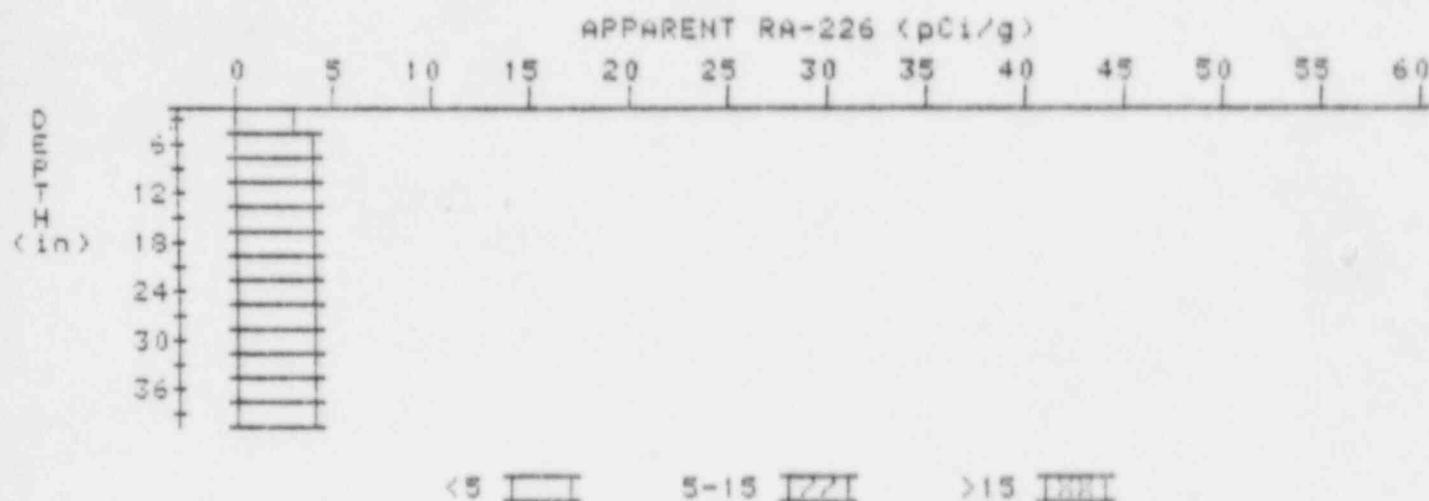
LOCATION: 170215



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	7.2	7.2
6	5.3	5.3
9	4.7	3.5
12	4.3	3.9
15	4.1	3.9
18	4.0	3.3
21	4.0	4.0
24	4.0	4.0
27	4.0	3.3
30	4.1	4.1

APPARENT RADIUM-226 CONCENTRATION 19 DECONVOLUTION GRAPH

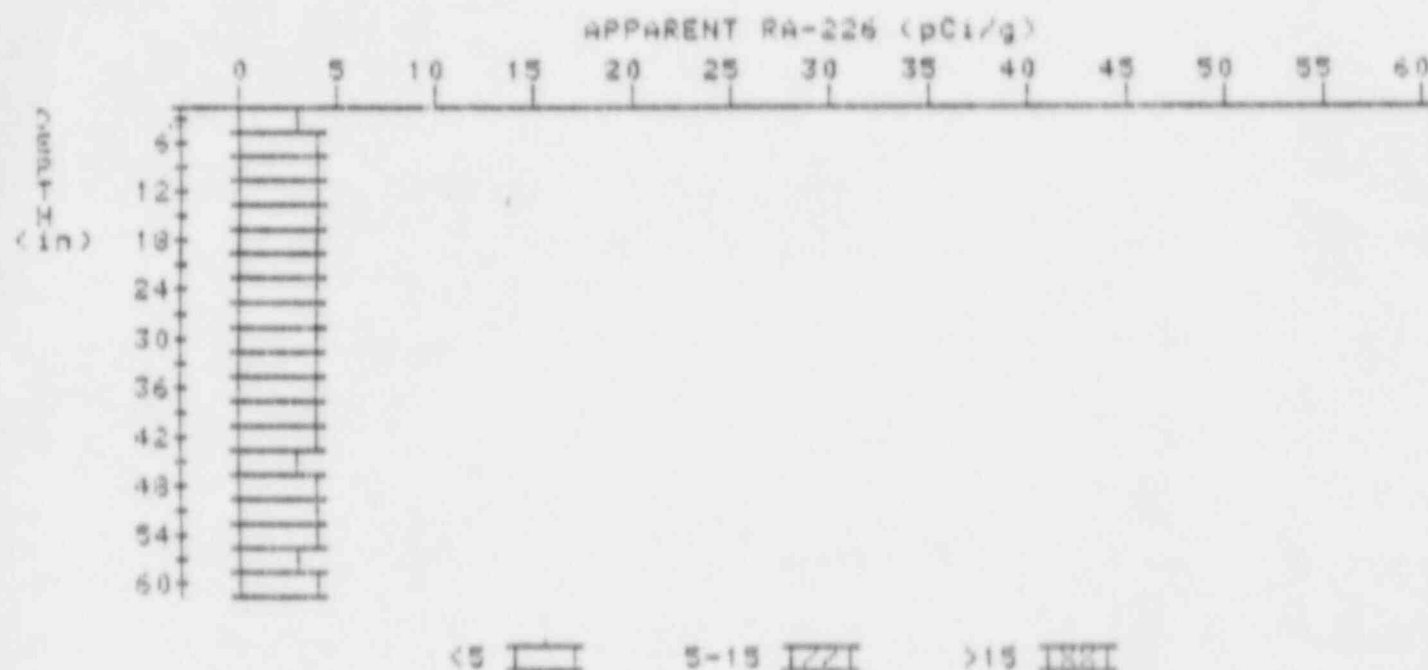
PROPERTY NUMBER: GJ-12294-RM
HOLE NUMBER: 19
LOCATION: 183239



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.4	3.4
6	3.7	4.1
9	3.9	3.9
12	3.9	4.1
15	3.9	3.9
18	3.9	3.9
21	3.9	3.7
24	4.0	4.0
27	4.1	4.8
30	4.0	3.6
33	4.1	4.8
36	4.1	4.1
39	4.1	4.1

APPARENT RADIUM-226 CONCENTRATION 22 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12294-RM
HOLE NUMBER: 22
LOCATION: 188273



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.1	3.1
6	3.4	3.6
9	3.6	3.8
12	3.7	3.9
15	3.7	3.7
18	3.7	3.5
21	3.8	4.0
24	3.8	3.8
33	3.8	3.8
36	3.8	4.0
39	3.7	3.5
42	3.7	3.9
45	3.6	3.4
48	3.6	3.6
51	3.6	3.6
54	3.6	3.8

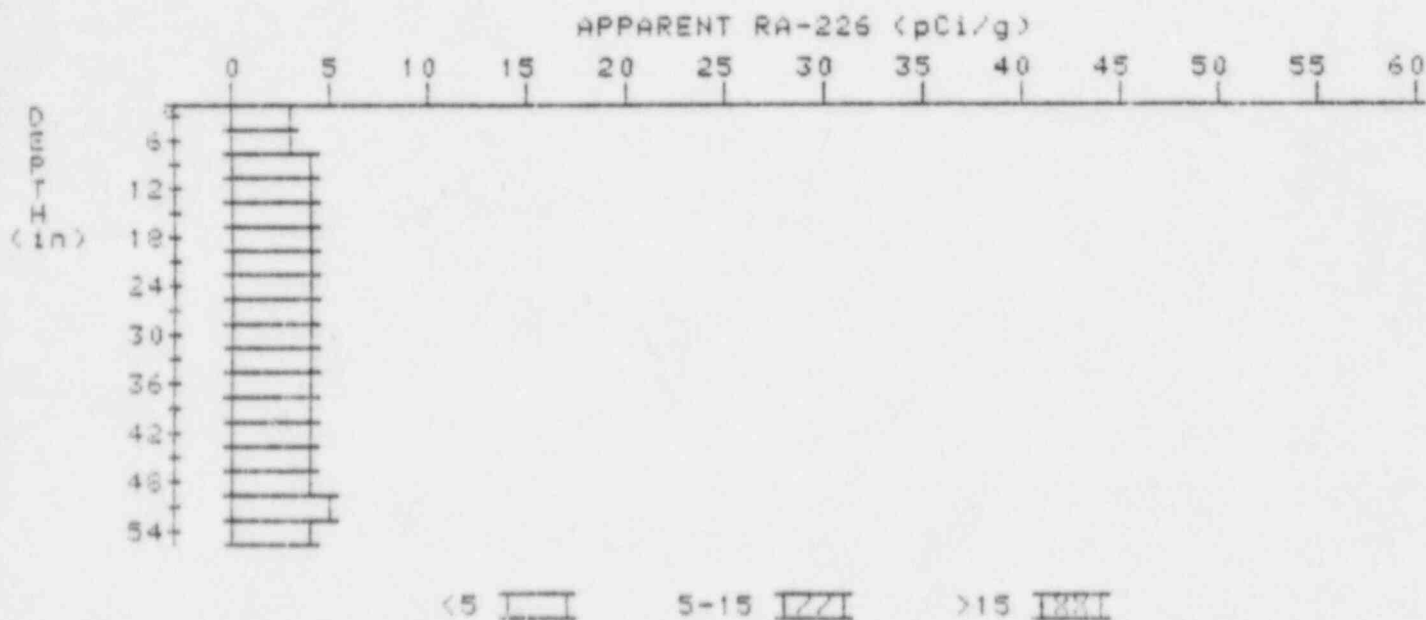
57
60

3.5
3.6

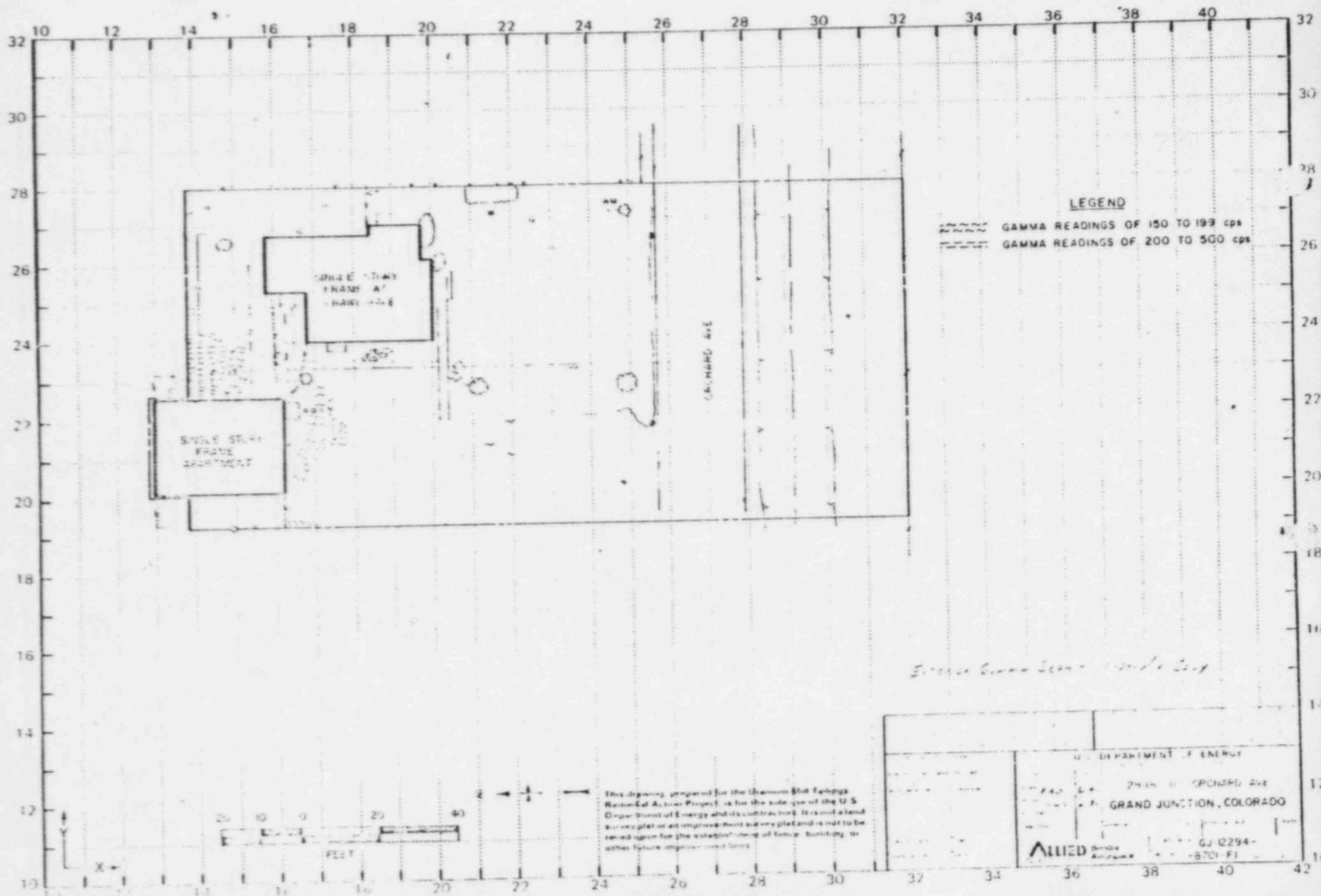
3.1
3.6

APPARENT RADIUM-226 CONCENTRATION 23 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12294-RM
HOLE NUMBER: 23
LOCATION: 199263

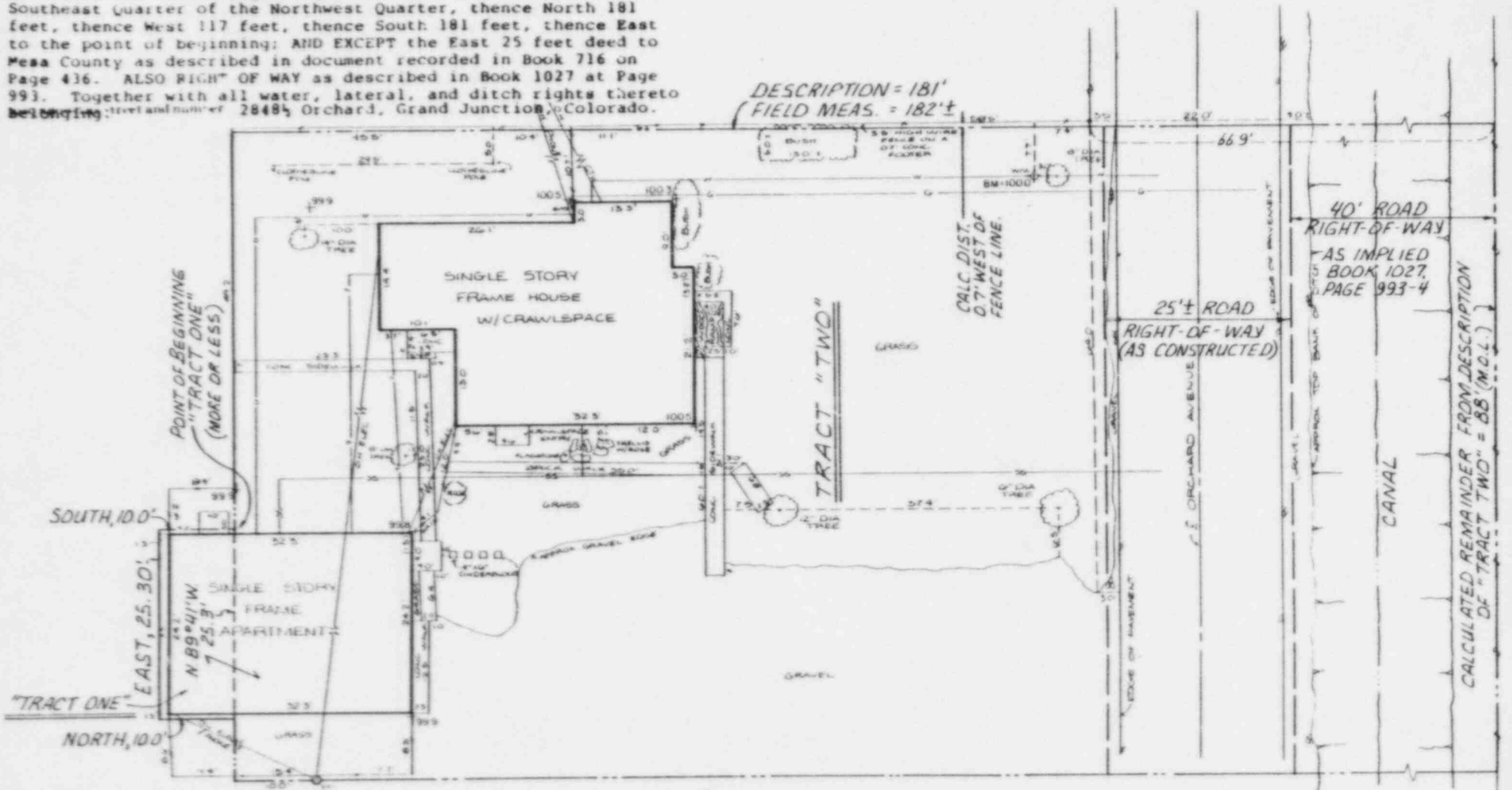


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.4	3.4
6	3.5	3.3
9	3.7	4.1
12	3.7	3.7
15	3.8	4.0
18	3.8	3.6
21	3.9	4.1
24	3.9	3.7
27	4.0	4.2
30	4.0	4.0
33	4.0	3.8
36	4.0	4.0
39	4.1	4.5
42	4.1	3.6
45	4.1	4.1
48	4.2	4.6
51	4.1	4.1
54	4.1	4.1



The South 151 Feet of East 10 Acres of the Southeast Quarter of the Northwest Quarter of Section Seven (7), Township One (1) South, Range One (1) East of the Ute Meridian; EXCEPT Beginning at the Southwest Corner of said East 10 Acres, thence North 181 feet, thence East 125 feet, thence South 181 feet, thence West 125 feet; AND EXCEPT Beginning at the Southeast Corner of said Southeast Quarter of the Northwest Quarter, thence North 181 feet, thence West 117 feet, thence South 181 feet, thence East to the point of beginning; AND EXCEPT the East 25 feet deed to Mesa County as described in document recorded in Book 716 on Page 436. ALSO RIGHT OF WAY as described in Book 1027 at Page 993. Together with all water, lateral, and ditch rights thereto belonging; street and number 2848 1/2 Orchard, Grand Junction, Colorado.

Beginning 181 feet North and North 89°41' West 162.29 feet from Southeast Corner Northwest 1/4 Section 7, Township 1 South, Range 1 East, North 89°41', West 25.30 feet, North 10.0 feet, East 25.30 feet, South 10.0 feet to beginning.



NOTE "TRACT ONE" AND "TRACT TWO" ARE DESCRIBED IN BOOK 1244, PAGE 45, MESA COUNTY CLERK & RECORDER'S OFFICE. THE DESCRIPTIONS SHOWN ON THIS MAP ARE ENLARGED PHOTO COPIES OF THE ABOVE BOOK AND PAGE.

FIGURE 2.2 SITE PLAN

SCALE IN FEET



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 engineering 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		DOE IG NO
GRAND JUNCTION PROJECT OFFICE, COLORADO		GJ 12294 R-6
ADDRESS 2848 1/2 ORCHARD AVE		ALLIED
GRAND JUNCTION, COLO		Builder Field Engineering Corporation
SURV ALB/52885	DRAFT KAS/53085	DATE 12-2-85
DRAWING NO 3-CTOI-F1		SHEET 1 OF 1

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-01133-RS
ADDRESS: 2533 ELM AVENUE

JULY 1985

FOR

URANIUM MULL 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
M. TUCKER
DOE PROJECT ENGINEER

DATE

July 11, 1985

REA01133:REA-701

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-01133-RS, is a single-family residence located at 2533 Elm 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, 14 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is \$1,077. Remedial action on this property will take approximately 4 days to complete.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 2533 Elm Avenue, Grand Junction, Colorado

Zoning: Residential (RSF-8)

Lot Size: Approximately 6,600 sf (0.15 acre)

Legal Description: Lot 2, Block 1, 2nd Houlton Re-subdivision,
City of Grand Junction, County of Mesa, State
of Colorado.

Point of Reference: This property is located approximately 2 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:	Elm Avenue
South:	Single-family residence
East:	Single-family residence
West:	Single-family residence

2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-story residence with attached carport
Size:	Approximately 850 sf
Construction Date:	1955
Construction:	Wood-frame
Foundation:	Concrete stemwall on spread footing
Footing Depth:	Not determined
Basement:	None
Crawl Space:	Yes - under entire living area
Condition:	Good

Other Structures:

Type:	Attached carport
Size:	Approximately 280 sf
Construction:	Wood-frame
Foundation:	Concrete slab-on-grade
Condition:	Good
Type:	Sheds 1, 2, 3, and 4
Size:	Approximately 95, 42, 27, and 15 sf, respectively
Construction:	Wood-frame, wood, metal prefabricated, and wood-frame, respectively
Foundation:	Concrete slab, none, none, and none, respectively
Condition:	Good (all four)

General Remarks:

Structures, utilities, landscaping, and other special features of this property are included in Appendix Figure 2.2.

Historical Data:

This structure is not over 50 years old. Therefore, it does not meet the eligibility criteria for consideration of inclusion on the National Register of Historic Places.

3.0 RADIOLOGIC SURVEY

3.1 Introduction

Radiologic data were collected by Bendix at DOE ID No. GJ-01133-RS on May 23, 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 in the south yard and along the fence line.

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, team leader notes, deconvolution graphs, and Exterior Gamma Scan map 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): 32 uR/h

Exterior radium-concentration measurements are presented in Appendix Table 3.1. Grid-point survey results are shown in Appendix Figure 3.1.

3.2.2 Interior Findings

Background Readings: 15 to 17 uR/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 Figure 3.2 shows 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 3.2 and 3.3. 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 Figures 3.4a and 3.4b show identified areas and estimated depths of contamination on this property, based on assessments of all measurements taken. As noted in these figures, areas recommended for remedial action that contain identified residual radioactive materials are:

- (AREA A) In the southeast corner of Shed No. 2, a small deposit of contamination is 6 inches in depth (approximately 2 sf).
- (AREA B) In the southeast part of the property, a small section of the lawn is contaminated 9 inches in depth (approximately 33 sf).
- (AREA C) In the garden area located in the southeast corner of the property, contamination is 12 inches deep (approximately 100 sf).
- (AREA D) In the garden area located in the south part of the yard, the depth of contamination is 9 inches. This deposit is next to Area A (approximately 325 sf).

Note: Shed No. 2 in Area A is portable and shall be considered as exterior involvement.

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-01133-RS, includes removal of all areas identified as containing radioactive material (as discussed in Section 3.5 and shown in Appendix Figures 3.4a and 3.4b) 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 \$1,077.

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	Interior Gamma Exposure Rates and Sample Locations
Figure 3.3	Exterior Sample Locations
Figure 3.4a	Interior Estimated Extent of Contamination
Figure 3.4b	Exterior Estimated Extent of Contamination

Official Survey Report

Team Leader Notes

Deconvolution Graphs (Apparent Radium-226 Concentration)

Gamma Scan Field Map

Radium Concentrations at Exterior Locations

DOE ID #GJ-01133-RS

2533 Elm Avenue

Page 1 of 5

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
3	152220	00	DS	<1.0		*	Background
		03	TC	2.6		*	
		06	TC	3.0		*	DC = 0 inches
		09	TC	3.0		*	
		12	BH	3.0	1.1	*	
		15	TC	3.0		*	
		18	TC	3.1		*	
		21	TC	3.0		*	
		24	BH	3.1	<1.0	*	
		27	TC	3.2		*	
		30	TC	3.1		*	
		33	TC	3.2		*	
		36	BH	3.1	1.2	*	
		39	TC	3.1		*	
4	174261	03	TC	3.3		*	Water line
		06	TC	3.6		*	
		09	TC	3.7		*	DC = 0 inches
		12	TC	3.8		*	
		15	TC	3.8		*	
		18	TC	3.9		*	
		21	TC	3.8		*	
		24	TC	3.9		*	
		27	TC	3.9		*	
		30	TC	4.0		*	
		33	TC	4.0		*	
		36	TC	4.0		*	
		39	TC	4.2		*	
		42	TC	4.1		*	
		45	TC	4.1		*	
		48	TC	4.1		*	
		51	TC	3.9		*	
		54	TC	3.7		*	
		57	TC	3.6		*	
		60	TC	3.5		*	
		63	TC	3.8		*	
		66	TC	4.0		*	
		69	TC	4.1		*	
		72	TC	4.2		*	
		75	TC	4.3		*	
		78	TC	4.1		*	
		81	TC	3.9		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-01133-RS

2533 Elm Avenue

Page 2 of 5

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
4	174261	84	TC	3.8		*	
		87	TC	3.9		*	
		90	TC	4.0		*	
5	178240	00	DS	1.0		*	East side of
		06	DS	<1.0		*	north porch
6	184271	00	DS	1.6		*	Gas line
		12	DS	<1.0		*	
7	205254	03	TC	3.5		*	Sewer line
		06	TC	3.7		*	
		09	TC	3.8		*	DC = 0 inches
		12	TC	3.8		*	
		15	TC	3.7		*	
		18	TC	3.6		*	
		21	TC	3.8		*	
		24	TC	3.7		*	
		27	TC	3.8		*	
		30	TC	3.8		*	
		33	TC	4.0		*	
		36	TC	3.9		*	
		39	TC	4.0		*	
		42	TC	4.1		*	
		45	TC	4.0		*	
		48	TC	3.9		*	
		51	TC	3.7		*	
		54	TC	3.5		*	
		57	TC	3.6		*	
		60	TC	3.7		*	
8	230260	03	TC	2.7		*	Backyard
		06	TC	3.0		*	
		09	TC	3.2		*	DC = 0 inches
		12	TC	3.2		*	
		15	TC	3.3		*	
		18	TC	3.3		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-01133-RS

2533 Elm Avenue

Page 3 of 5

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
8	230260	21	TC	3.4		*	
		24	TC	3.4		*	
		27	TC	3.4		*	
		30	TC	3.5		*	
		33	TC	3.4		*	
		36	TC	3.6		*	
		39	TC	3.4		*	
9	237242	03	TC	3.1		*	South yard
		06	TC	3.2		*	
		09	TC	3.3		*	DC = 0 inches
		12	TC	3.5		*	
		15	TC	3.7		*	
		18	TC	3.8		*	
		21	TC	4.0		*	
		24	TC	4.0		*	
		27	TC	4.0		*	
		30	TC	4.1		*	
		33	TC	4.1		*	
10	238278	03	TC	8.1		*	Southeast fence
		06	TC	7.1		*	edge of garden
		09	TC	5.7		*	
		12	TC	4.8		*	DC = 9 inches
		15	TC	4.4		*	Based on the
		18	TC	4.2		*	deconvolution graph
		21	TC	4.3		*	
		24	TC	4.3		*	
		27	TC	4.2		*	
		30	TC	4.2		*	
		33	TC	4.2		*	
11	240242	00	DS	2.2		*	Northwest edge
		06	DS	1.1		*	of garden
12	240260	00	DS	2.0		*	North edge of
		06	DS	1.2		*	garden
13	246276	03	TC	11.3		*	East garden
		06	TC	9.0		*	
		09	TC	6.8		*	DC = 12 inches
		12	BH	5.5	4.0	*	Based on the
		15	TC	4.9		*	deconvolution graph
		18	TC	4.6		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-01133-RS

2533 Elm Avenue

Page 4 of 5

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
13	246276	21	TC	4.5		*	
		24	BH	4.4	2.1	*	
		27	TC	4.3		*	
		30	TC	4.2		*	
		33	TC	4.0		*	
		36	BH	3.8	1.7	*	
14	247217	00	DS	1.5		*	Southwest corner
		06	DS	1.2		*	of yard
15	248230	00	DS	1.5		*	Along south fence
		06	DS	<1.0		*	
16	248237	03	TC	6.2		*	South of Shed #2
		06	TC	6.1		*	
		09	TC	5.0		*	DC = 9 inches
		12	TC	4.2		*	Based on the
		15	TC	3.7		*	deconvolution graph
		18	TC	3.6		*	
		21	TC	3.5		*	
		24	TC	3.6		*	
		27	TC	3.5		*	
		30	TC	3.6		*	
		33	TC	3.6		*	
		36	TC	3.5		*	
17	249247	03	TC	6.5		*	Garden
		06	TC	6.1		*	
		09	TC	4.8		*	DC = 9 inches
		12	TC	4.1		*	Based on the
		15	TC	3.7		*	deconvolution graph
		18	TC	3.6		*	
		21	TC	3.5		*	
		24	TC	3.5		*	
		27	TC	3.6		*	
		30	TC	3.5		*	
		33	TC	3.5		*	
		36	TC	3.5		*	
18	249254	00	DS	8.7		*	Along south fence
		06	DS	4.8		*	in garden
		12	DS	1.5		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-01133-RS

2533 Elm Avenue

Page 5 of 5

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
19	249261	03	TC	7.0		*	DC = 9 inches
		06	TC	5.4		*	Based on all
		09	TC	4.8		*	available data
		12	TC	4.4		*	
		15	TC	4.4		*	
		18	TC	4.3		*	
		21	TC	4.3		*	
		24	TC	4.3		*	
		27	TC	4.2		*	
		30	TC	4.1		*	
		33	TC	4.0		*	
		36	TC	3.7		*	

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 = 05-23-85
Team Leader = JH

Radium Concentrations at Interior Locations

DOE ID #GJ-01133-RS

2533 Elm Avenue

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	5.2		*	Southeast corner of
		06	DS	<1.0		*	Shed #2 DC = 6 inches
2		00	DS	<1.0		*	Northwest corner of
		06	DS	1.0		*	Shed #2

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 = 05-23-85
 Team Leader = JH

Table 3.3
Summary of Interior Gamma Exposure Rates

DOE ID# GJ-01133-RS 2533 Elm 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)
Crawl Space	*	*	*	*	16-17	*
Shed #1	*	*	*	*	15-16	*
Shed #2	04	15-17	16	04	16-20	17
Shed #3	*	*	*	*	15-16	*
Shed #4	*	*	*	*	15-16	*

=====

* The historical data indicates the absence of interior contamination at this property. This information was investigated by performing walking gamma scans. Exposure rates in Shed #2 are shown in Appendix Figure 3.2.

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-01133-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					
A	2 x 1 =	2	x 0.5 =	1	
B	3 x 11 =	33	x 0.8 =	26	
C	10 x 10 =	100	x 1.0 =	100	
D	10 x 30 =	300			
	5 x 5 =	25			
		<hr/>			
		325	x 0.8 =	260	
				<hr/>	
Volume of Fill				387 =	387/27 = 14
TOTAL VOLUME - EXTERIOR					<hr/> 14

Note: Shed No. 2 in Area A is portable and shall be considered as exterior involvement.

See Appendix Figures 3.4a and 3.4b For Areas

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Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-01133-RS

Page 1 of 1

EXTERIOR

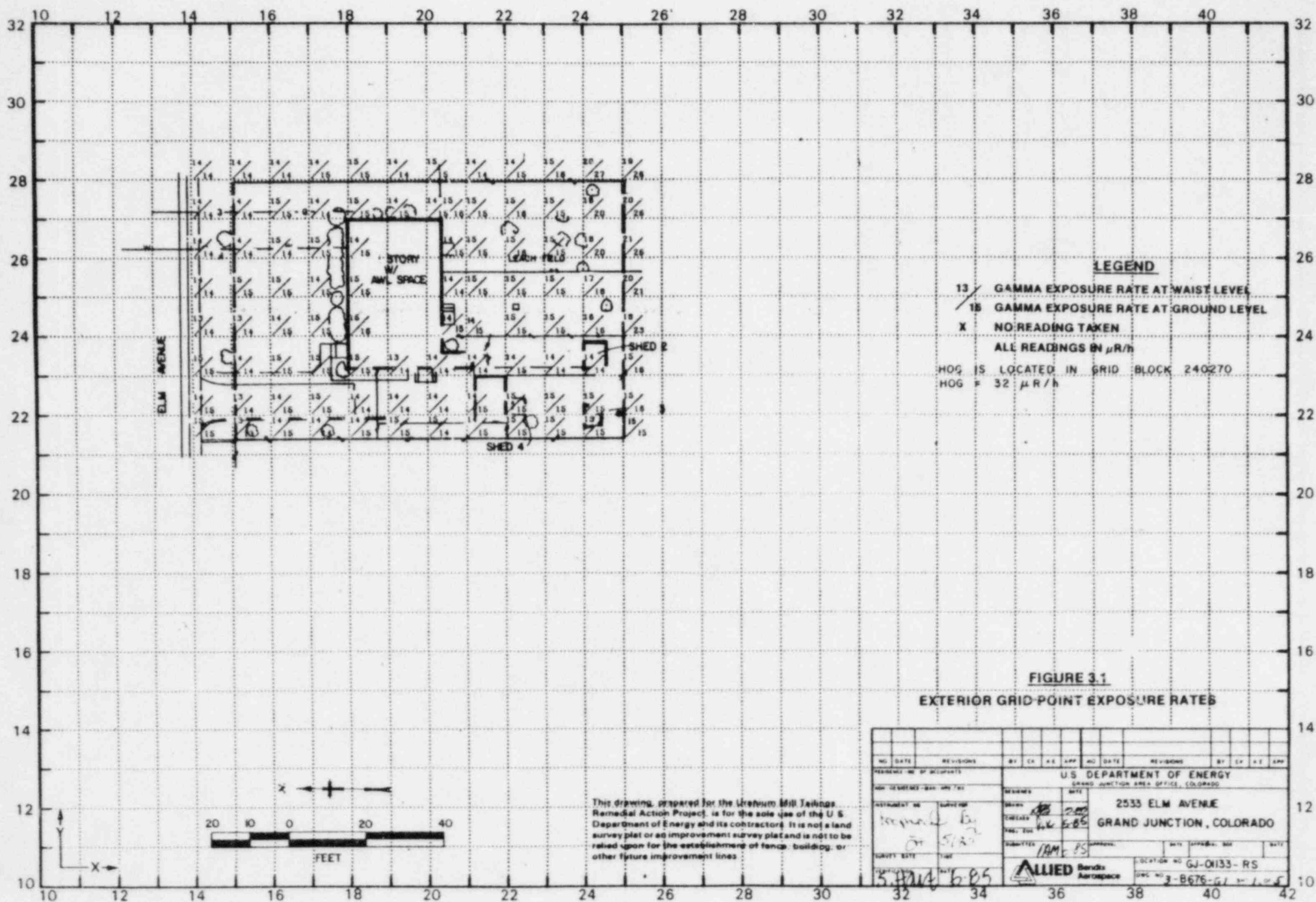
Remove identified residual radioactive material 14 cy @ \$14.50/cy (machine-open)	\$ 203
Replace areas with topsoil 14 cy @ \$9.50/cy	133
Replace areas with sod 33 sf @ \$.50/sf	17
Replace plants and 2 fruit trees Lump sum	200
	<hr/>
TOTAL EXTERIOR	\$ 553
TOTAL INTERIOR	0
ACCESS CONTROL	100
	<hr/>
SUBTOTAL	\$ 653
CONTINGENCY @ 10%	65
	<hr/>
SUBTOTAL	\$ 718
CONTRACTOR OVERHEAD & PROFIT @ 50%	359
	<hr/>
GRAND TOTAL	\$ 1,077

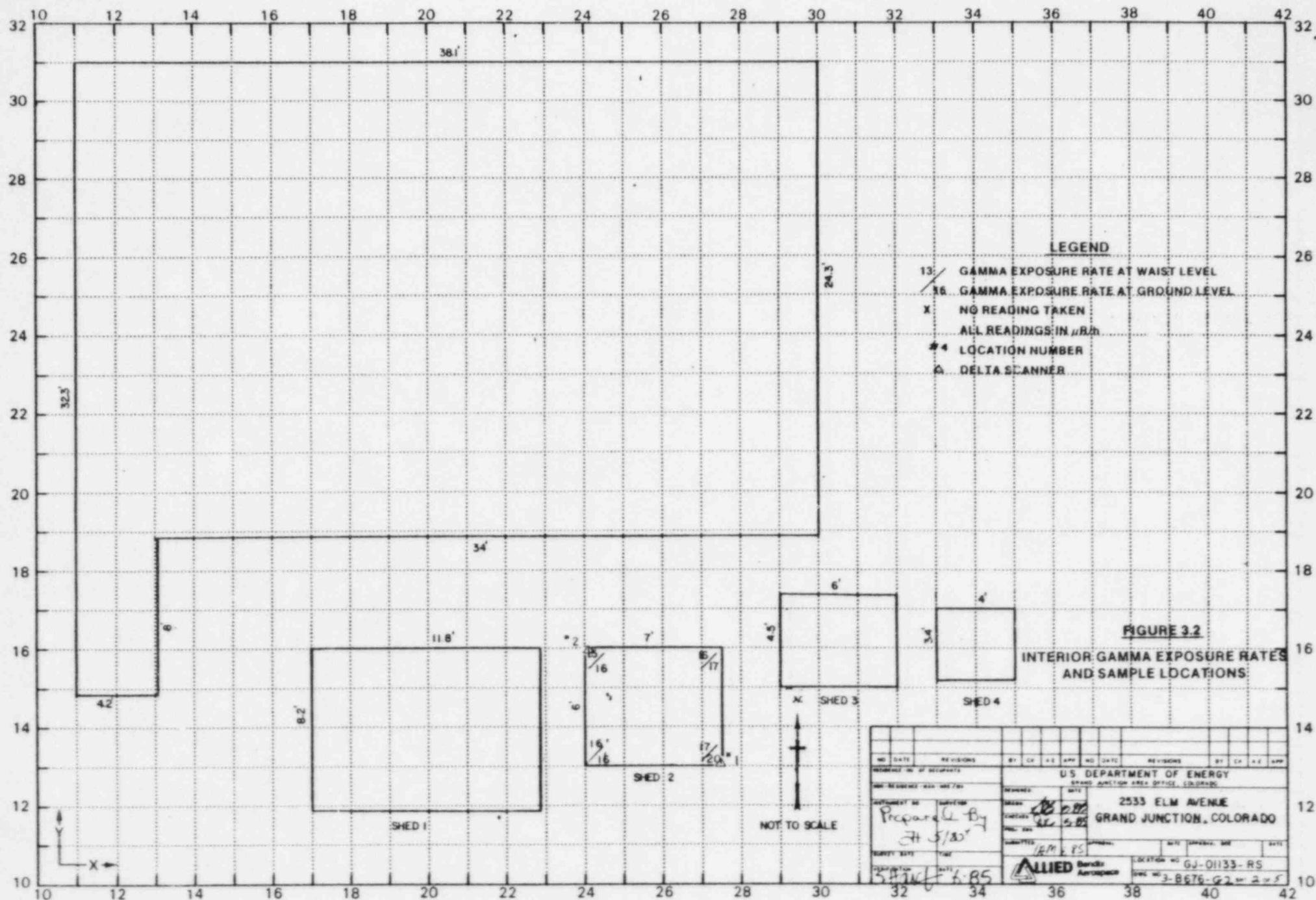
FAV070585
REA01133/REA-701/AP

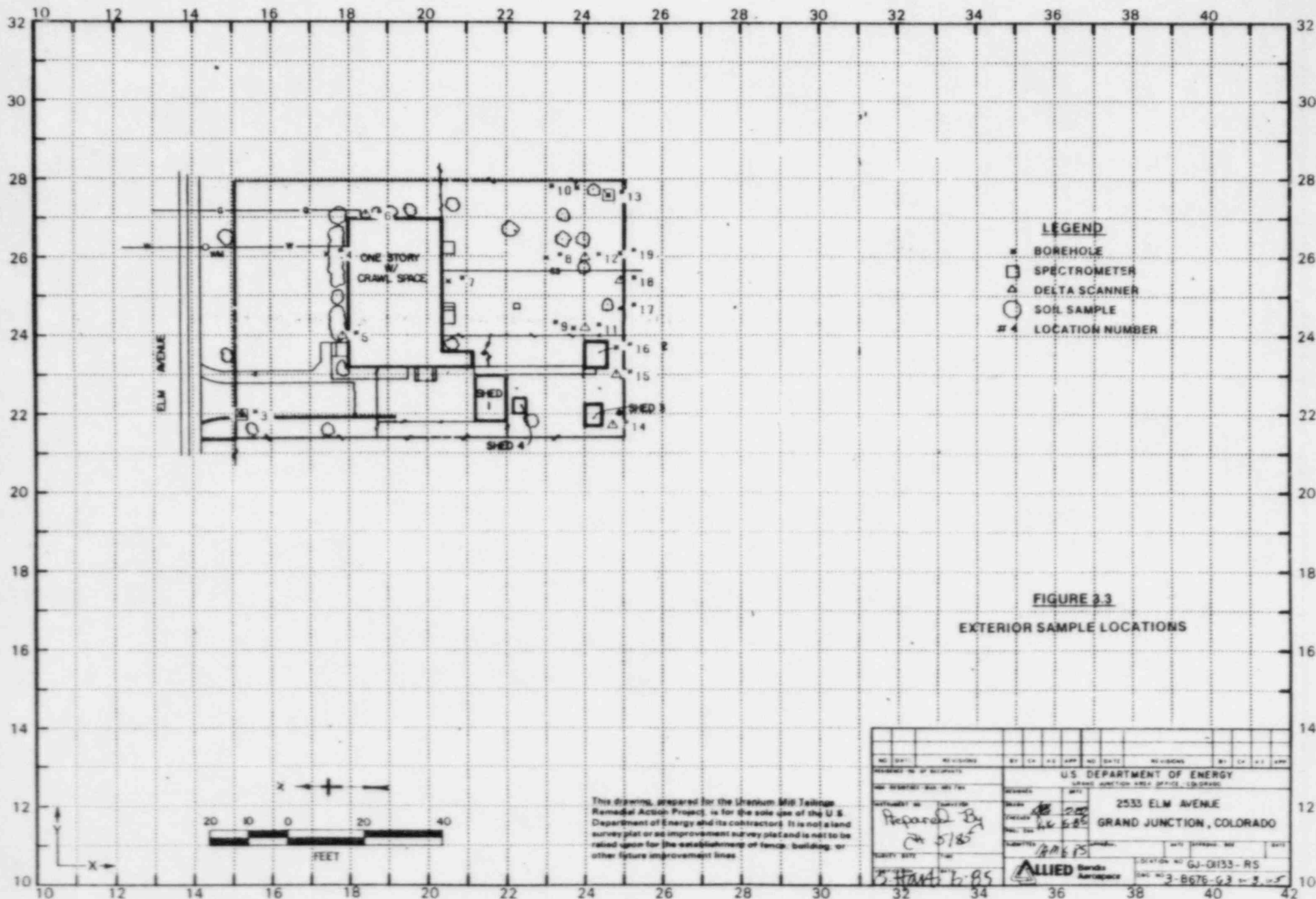


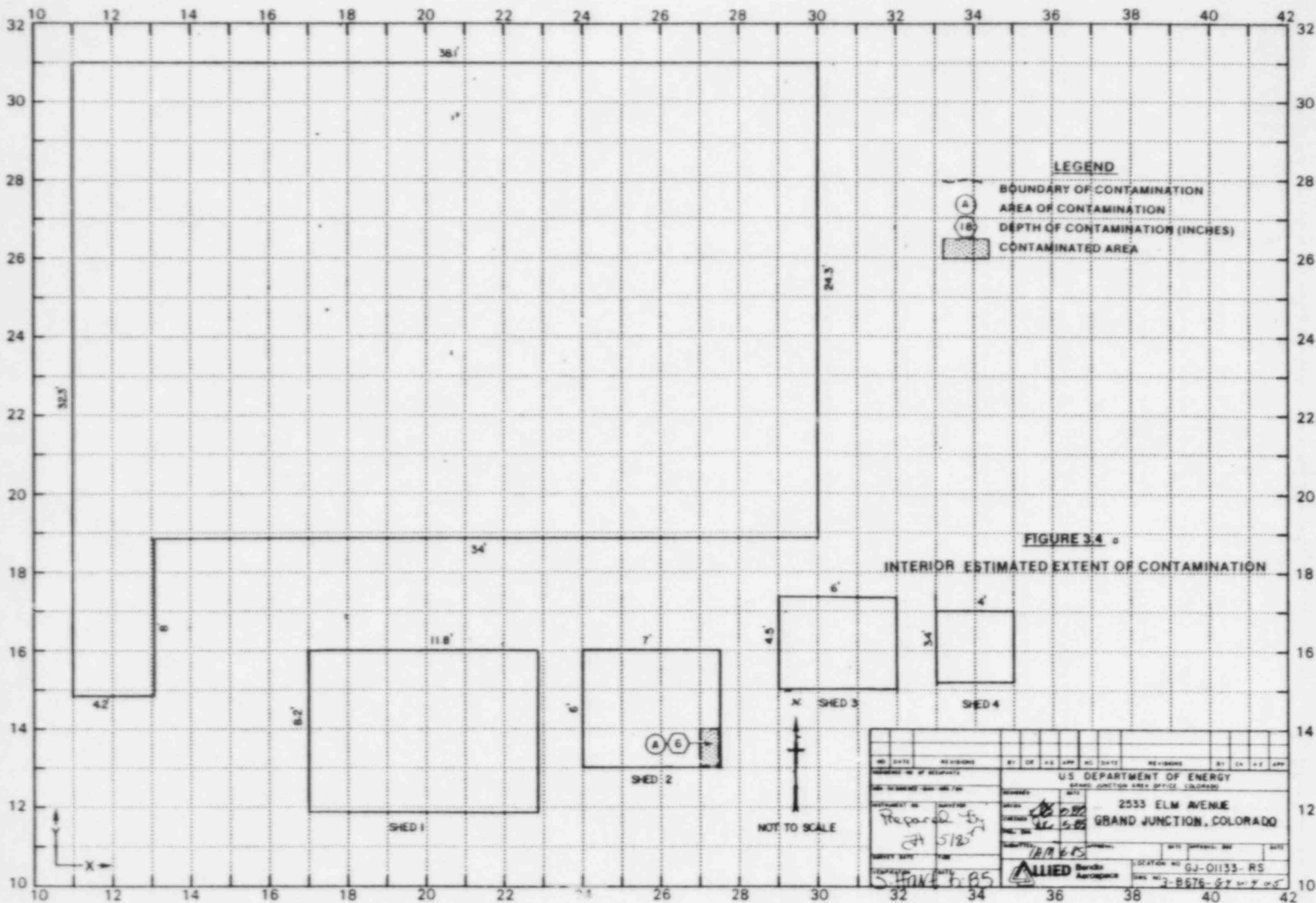
FIGURE 2.1
VICINITY MAP



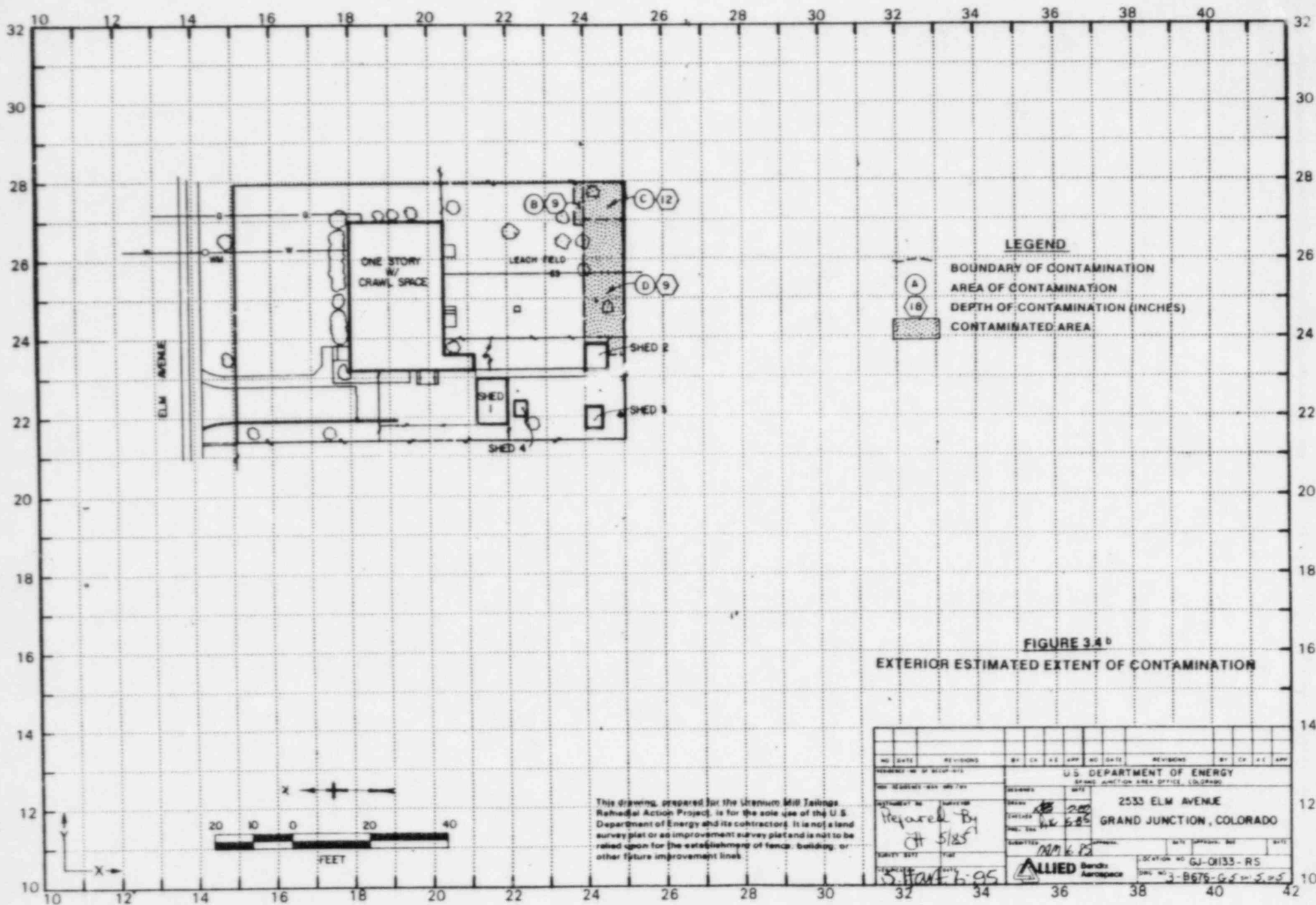








NO.	DATE	REVISIONS	BY	OF	NO.	DATE	REVISIONS	BY	OF	NO.	DATE
U.S. DEPARTMENT OF ENERGY GRAND JUNCTION AREA OFFICE (COLORADO) 2533 ELM AVENUE GRAND JUNCTION, COLORADO											
PREPARED BY JH 5/85						DATE 5/85					
CHECKED BY JH 5/85						DATE 5/85					
APPROVED BY JH 5/85						DATE 5/85					
ALLIED SERVICES AEROSPACE						LOCATION NO. GJ-01133-RS DATE NO. 2-B676-57-1-7-0-5					



3/85

DOE ID NO. GJ-01133-RS Date June 11, 1985

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

Official Survey Report

Property Address 2533 Elm Avenue
Property Owner Mr. and Mrs. Arthur Hatch
Address of Owner (if different from above) -----
Report Prepared By Jana Hebel

I. PRESENCE/ABSENCE OF RESIDUAL RADIOACTIVE MATERIALS

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

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

1 XX 1 In open areas.

1 XX 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 = 17 uR/h
HOG = 32 uR/h

ALLIED Bendix
Aerospace

Bendix Field Engineering Corporation
Grand Junction Operations
Grand Junction, Colorado

Date: May 24, 1985

To: Files

From: Juna Hebel

Subject: *Juna Hebel*
Team Leader Notes - GJ-01133-RS

Address: 2533 Elm Avenue

Owner: Mr. and Mrs. Arthur Hatch

Telephone: 242-6791

Occupancy: Two

Weather: Sunny, nice.

Colorado Department of Health (CDH) and Oak Ridge National Laboratory (ORNL) data indicates contamination to be located in the south section of the property.

Team Members

J. Hebel (Team Leader)	D. Dow
M. Gilfillan	S. Southern
L. Fula	P.J. Bonner
A. Raabe	

Instruments

Scintillometers - C-1042, C-1182, C-1149, C-1205, C-1115
Delta Scintillometers - C-3942, C-3935
Total Count Meters - C-4006, C-1062
Spectrometers - C-3431, C-3361

Bendix field members were met by Mr. Hatch; approval to survey was verbally given. Mr. Hatch was not aware of a leach field in the south yard.

An interior gamma survey was performed in the crawl space; no elevated readings were discovered.

An interior walking scan was also conducted in the four sheds on the property. No elevated readings were discovered in Shed 1, 3, or 4. Elevated measurements were discovered in the southeast corner of Shed 2. This area was further investigated by conducting grid points in all four corners of the shed, also two delta measurements, one in the northwest and one in the southeast corners at surface and subsurface (6 inches). The shed had no door or permanent floor so no foundation contamination was found.

On the exterior, the property was laid out in 10-foot by 10-foot grids. An exterior gamma scan and grid point exposure-rates measurements were taken to verify or deny data taken by CDH or (ORNL).

Elevated measurements were detected in the south yard, mostly in the garden area. This area was further investigated by deltas, downhole spectrometer measurements, and auger boreholes, which were then logged with a Total Count Meter.

Along the south fence line, elevated measurements were detected going out of the property boundary. This area included parts of two different properties.

No one was home at the two residences, so approval to scan further, or obtain the owner's name was impossible.

Bendix team members scanned as far as they could from the fence line, approximately 2- to 3-feet out onto the properties, southeast to the southwest. According to the scintillometer readings, the range went from 130 to 225 cps.

A memo will be sent to R. Critchfield for a spillover inclusion and a spillover form will need to be filled out for both of these properties.

Team Leader Notes
Juna Hebel
GJ-01133-RS
May 24, 1985
Page 3

All utility lines were investigated by auger boreholes that were logged with a Total Count Meter. A surface and subsurface delta was performed over and on top of the gas line. No evidence of contamination was found.

No evidence of contamination was discovered around the foundation of the primary structure.

All actions and work details were performed in a safe manner. No accidents occurred while on the site.

All team members were frisked for possible contamination, none was found on persons.

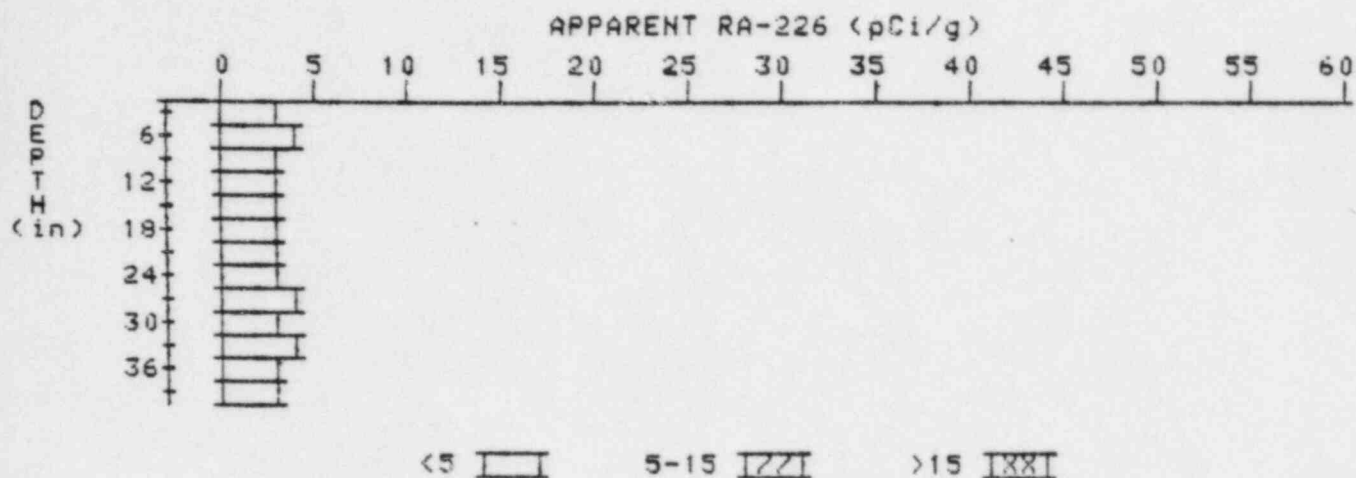
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

3

PROPERTY NUMBER: GJ-01133-RS

HOLE NUMBER: 3

LOCATION: 152220



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.6	2.6
6	3.0	3.7
9	3.0	3.0
12	3.0	3.0
15	3.0	2.8
18	3.1	3.5
21	3.0	2.6
24	3.1	3.1
27	3.2	3.6
30	3.1	2.7
33	3.2	3.6
36	3.1	2.9
39	3.1	3.1

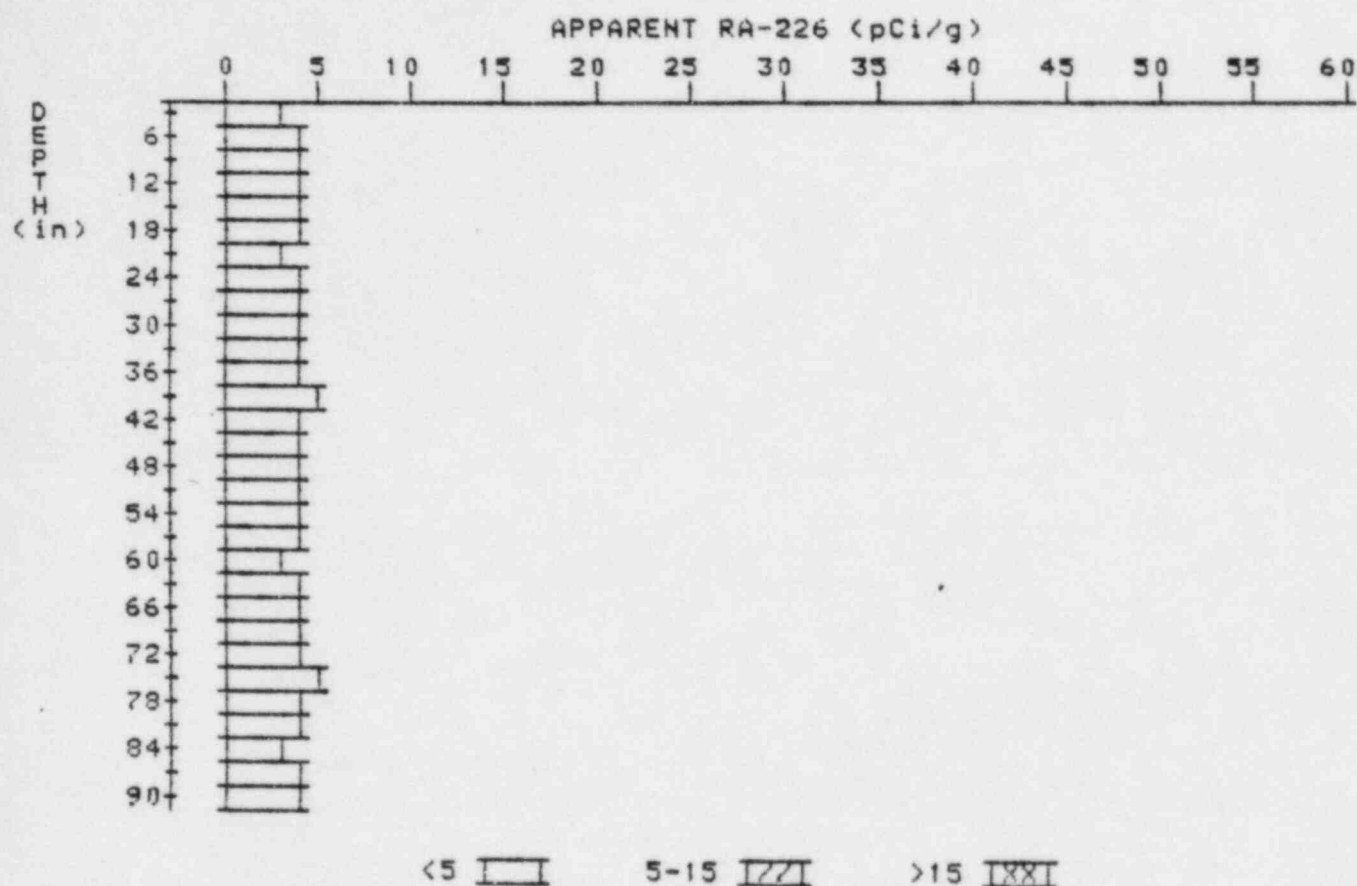
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

4

PROPERTY NUMBER: GJ-01133-RS

HOLE NUMBER: 4

LOCATION: 174261



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.3	3.3
6	3.6	4.0
9	3.7	3.7
12	3.8	4.0
15	3.8	3.6
18	3.9	4.3
21	3.8	3.4
24	3.9	4.1
27	3.9	3.7
30	4.0	4.2

33	4.0	4.0
36	4.0	3.6
39	4.2	4.7
42	4.1	3.9
45	4.1	4.1
48	4.1	4.5
51	3.9	3.9
54	3.7	3.5
57	3.6	3.6
60	3.5	2.8
63	3.8	4.0
66	4.0	4.2
69	4.1	4.1
72	4.2	4.2
75	4.3	4.8
78	4.1	4.1
81	3.9	3.7
84	3.8	3.4
87	3.9	3.9
90	4.0	4.0

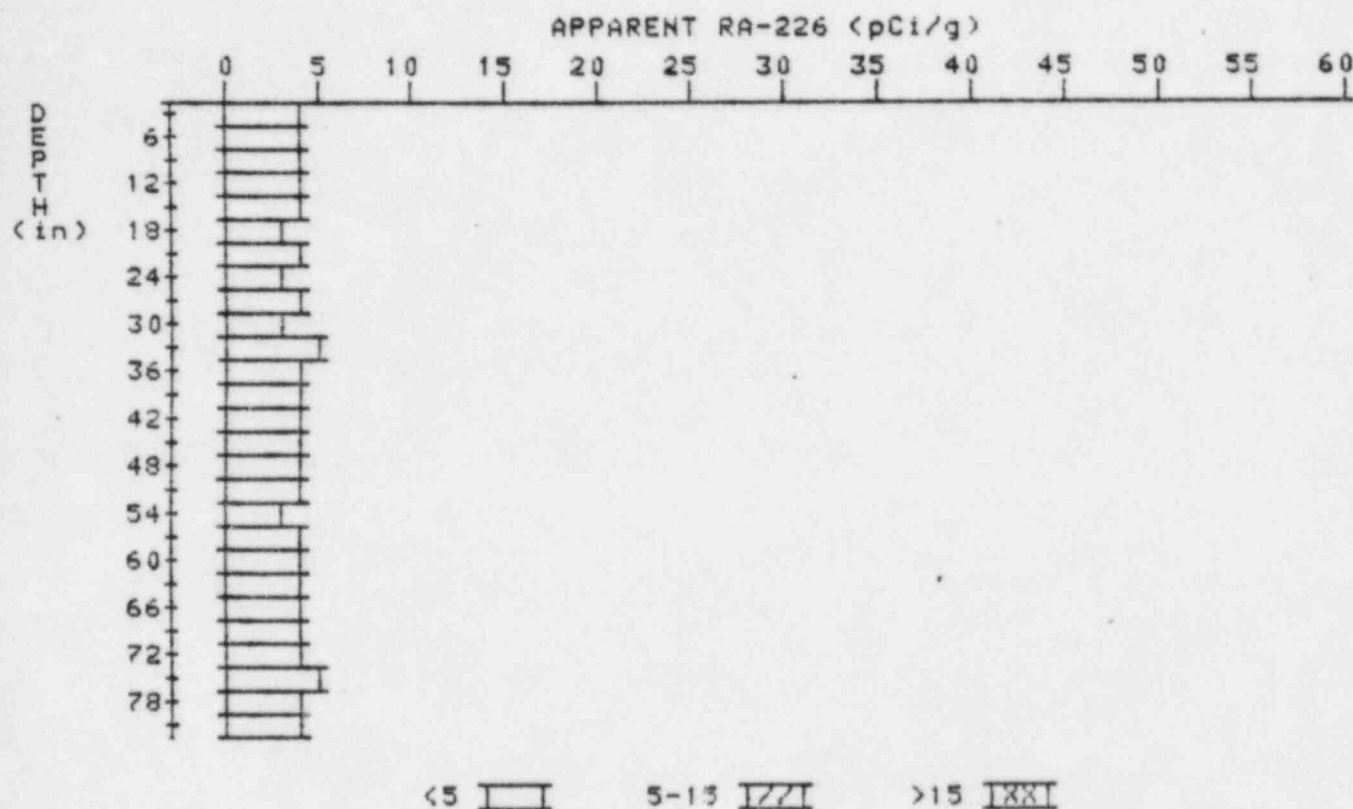
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

7

PROPERTY NUMBER: GJ-01133-RS

HOLE NUMBER: 7

LOCATION: 205254



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.5	3.5
6	3.7	3.9
9	3.8	4.0
12	3.8	4.0
15	3.7	3.7
18	3.6	3.1
21	3.8	4.3
24	3.7	3.3
27	3.8	4.0
30	3.8	3.4
33	4.0	4.5
36	3.9	3.5

39	4.0	4.0
42	4.1	4.5
45	4.0	4.0
48	3.9	4.1
51	3.7	3.7
54	3.5	3.0
57	3.6	3.6
60	3.7	3.5
63	3.9	4.3
66	3.9	3.7
69	4.0	4.0
72	4.1	4.1
75	4.2	4.6
78	4.1	4.1
81	4.0	4.0

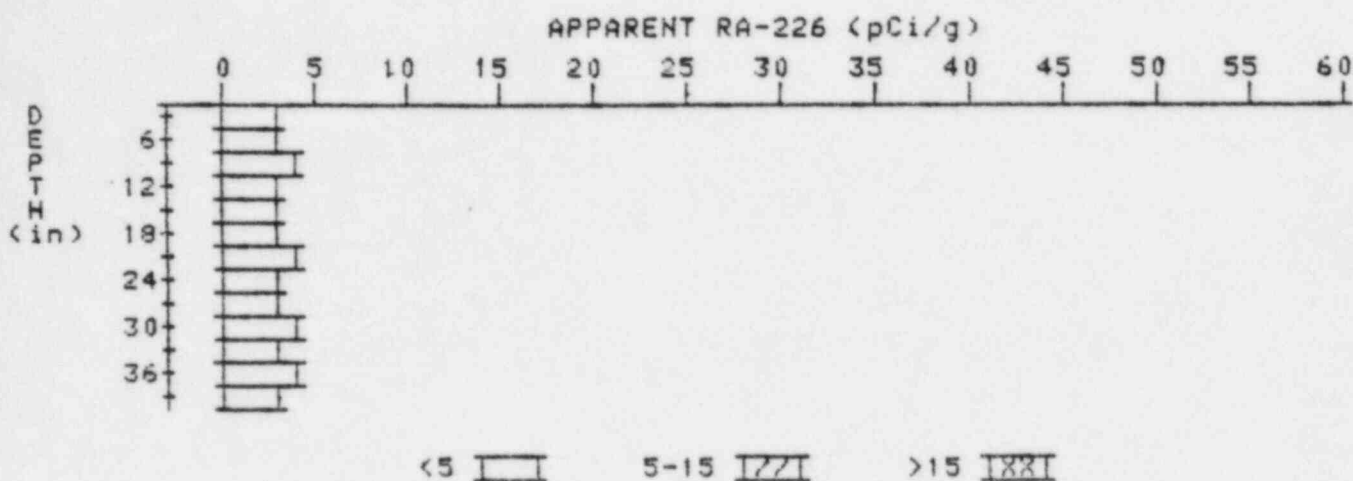
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

8

PROPERTY NUMBER: GJ-01133-RS

HOLE NUMBER: 8

LOCATION: 230260



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.7	2.7
6	3.0	3.2
9	3.2	3.6
12	3.2	3.0
15	3.3	3.5
18	3.3	3.1
21	3.4	3.6
24	3.4	3.4
27	3.4	3.2
30	3.5	3.9
33	3.4	2.9
36	3.6	4.3
39	3.4	3.4

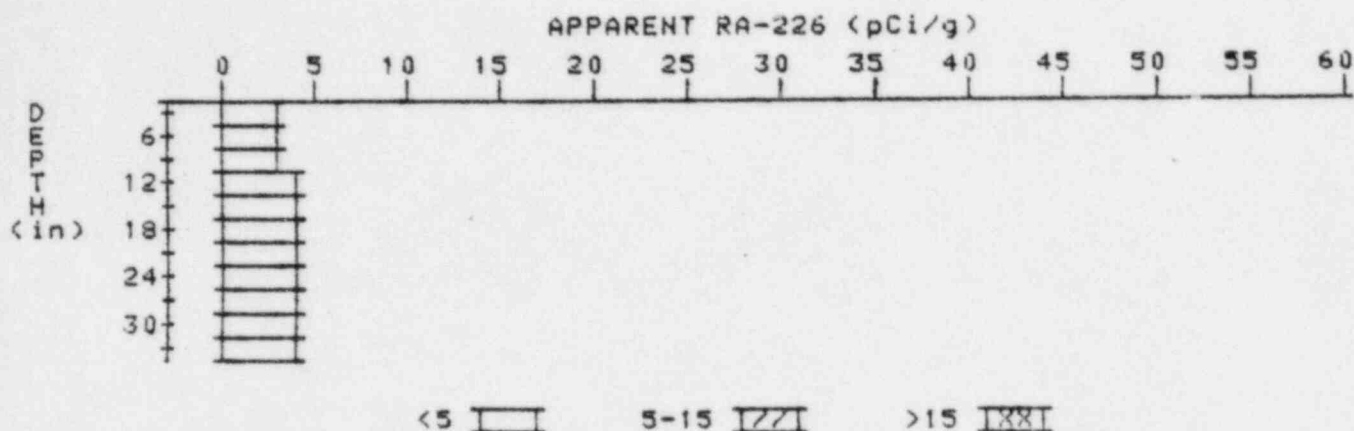
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

9

PROPERTY NUMBER: GJ-01133-RS

HOLE NUMBER: 9

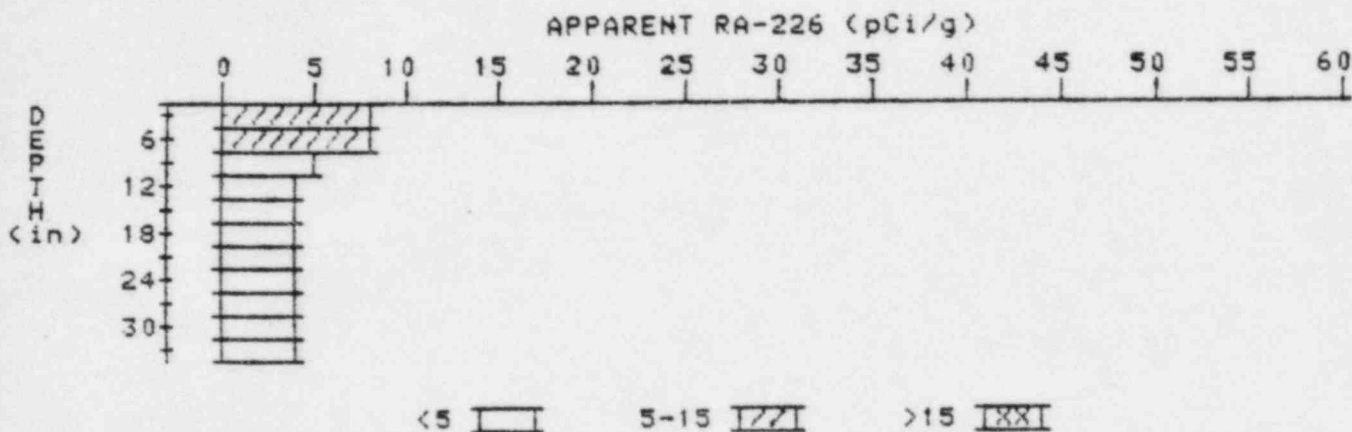
LOCATION: 237242



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.1	3.1
6	3.2	3.2
9	3.3	3.1
12	3.5	3.5
15	3.7	3.9
18	3.8	3.6
21	4.0	4.4
24	4.0	4.0
27	4.0	3.8
30	4.1	4.3
33	4.1	4.1

APPARENT RADIUM-226 CONCENTRATION 10 DECONVOLUTION GRAPH

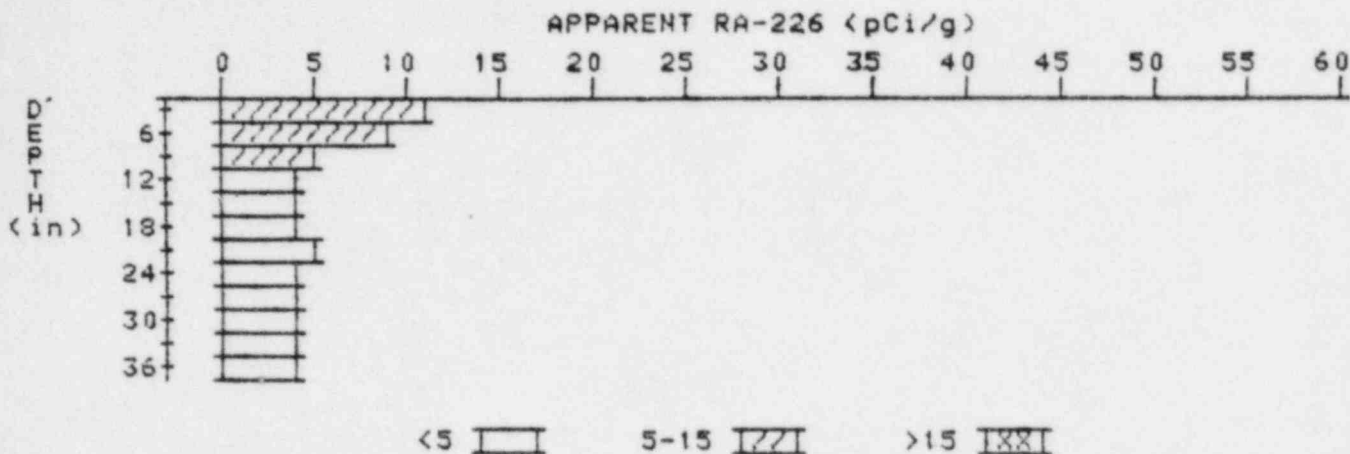
PROPERTY NUMBER: GJ-01133-RS
HOLE NUMBER: 10
LOCATION: 238278



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	8.1	8.1
6	7.1	7.8
9	5.7	4.8
12	4.8	3.9
15	4.4	4.0
18	4.2	3.7
21	4.3	4.5
24	4.3	4.5
27	4.2	4.0
30	4.2	4.2
33	4.2	4.2

APPARENT RADIUM-226 CONCENTRATION 13 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01133-RS
HOLE NUMBER: 13
LOCATION: 246276



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	11.3	11.3
6	9.0	8.8
9	6.8	5.2
12	5.5	4.3
15	4.9	4.4
18	4.6	4.2
21	4.5	4.5
24	4.4	4.4
27	4.3	4.3
30	4.2	4.4
33	4.0	4.0
36	3.8	3.8

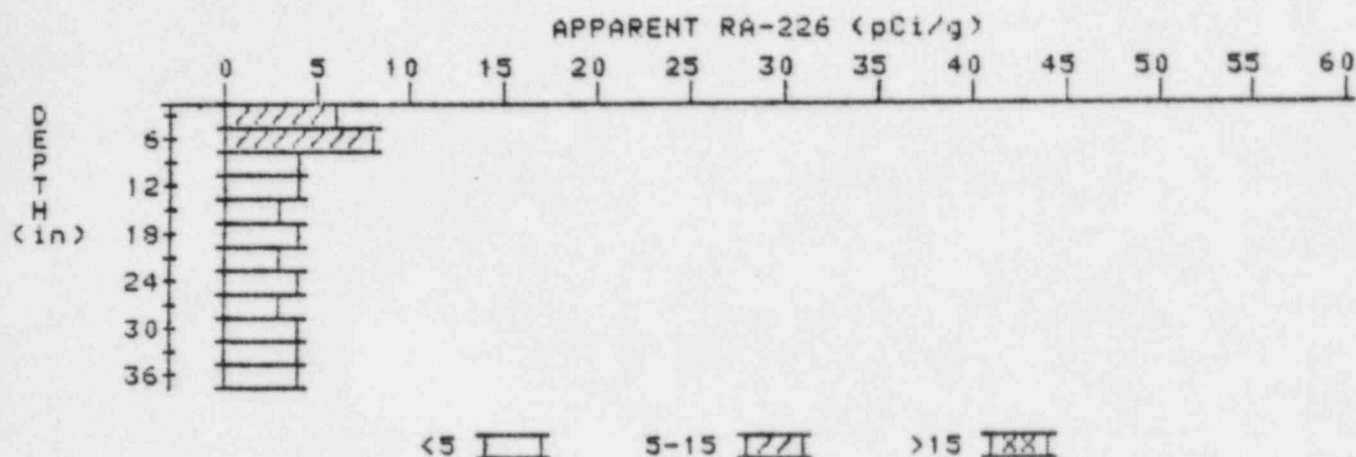
APPARENT RADIUM-226 CONCENTRATION 16

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01133-RS

HOLE NUMBER: 16

LOCATION: 248237



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	6.2	6.2
6	6.1	7.9
9	5.0	4.5
12	4.2	3.7
15	3.7	3.0
18	3.6	3.6
21	3.5	3.1
24	3.6	4.0
27	3.5	3.1
30	3.6	3.8
33	3.6	3.8
36	3.5	3.5

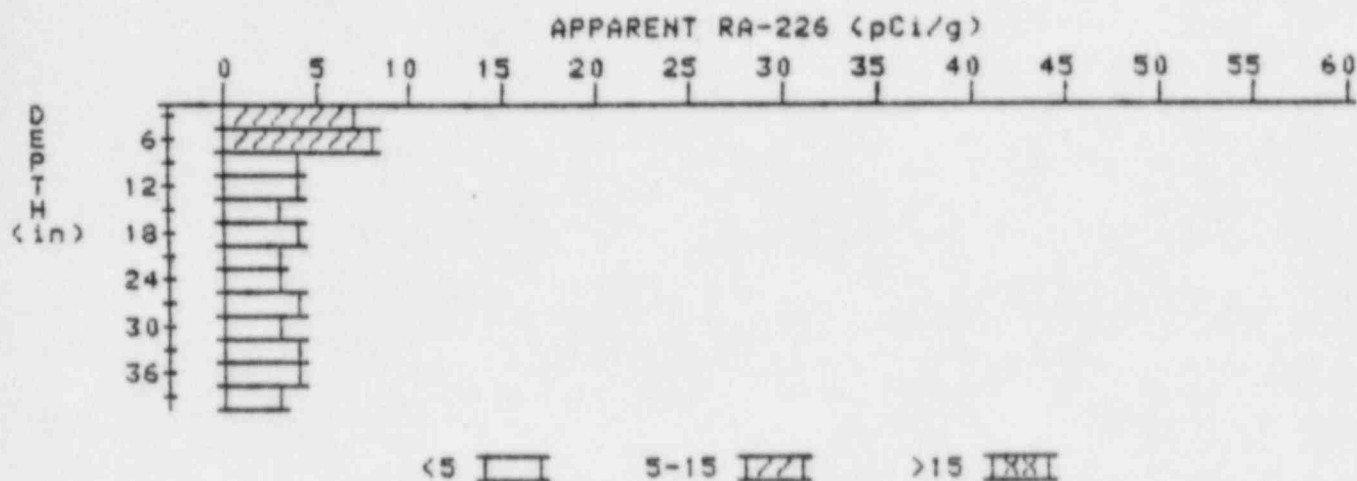
APPARENT RADIUM-226 CONCENTRATION 17

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01133-RS

HOLE NUMBER: 17

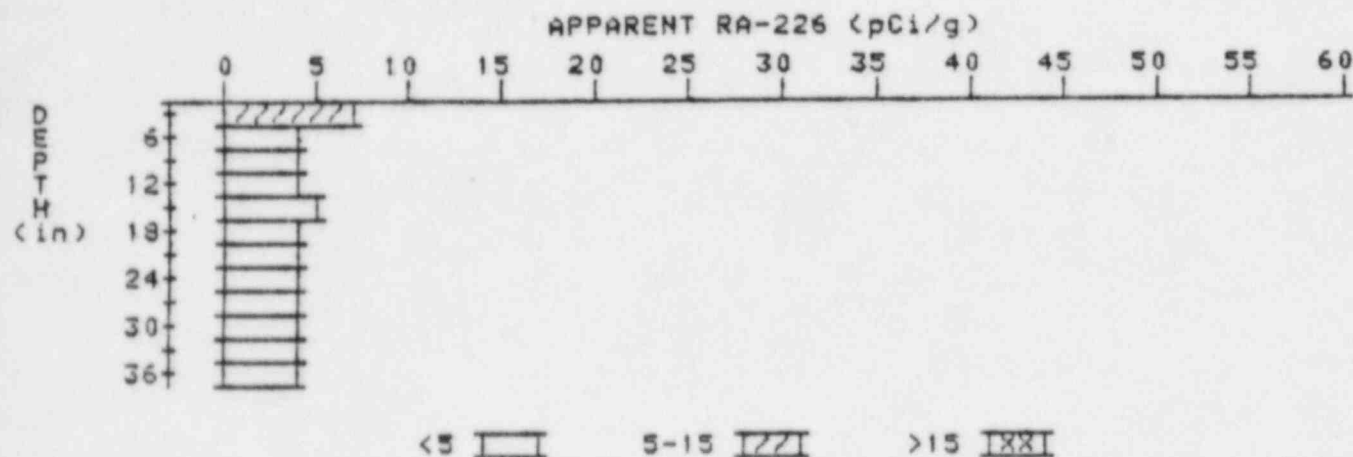
LOCATION: 249247



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	6.5	6.5
6	6.1	7.7
9	4.8	3.7
12	4.1	3.6
15	3.7	3.2
18	3.6	3.6
21	3.5	3.3
24	3.5	3.3
27	3.6	4.0
30	3.5	3.3
33	3.5	3.5
36	3.5	3.9
39	3.3	3.3

APPARENT RADIUM-226 CONCENTRATION 19 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01133-R3
HOLE NUMBER: 19
LOCATION: 249261



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	7.0	7.0
6	5.4	3.6
9	4.8	4.4
12	4.4	3.7
15	4.4	4.6
18	4.3	4.1
21	4.3	4.3
24	4.3	4.5
27	4.2	4.2
30	4.1	4.1
33	4.0	4.4
36	3.7	3.7

