

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-00237-MR
ADDRESS: 522 West Main

MAY 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

BENDIX FIELD ENGINEERING CORPORATION
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APPROVED BY

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DATE

July 17, 1985

REA00237:REA-602

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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	5
3.1 Introduction	5
3.2 Gamma Exposure-Rate Surveys	5
3.2.1 Exterior Findings	5
3.2.2 Interior Findings	5
3.3 Boreholes, Soil Samples, and Other Measurements	6
3.4 Radon/Radon Daughter Concentration	6
3.5 Extent of Contamination	6
4.0 RECOMMENDED REMEDIAL ACTION	8
4.1 Decontamination and Restoration	8
4.2 Evaluation of Recommended Remedial Action	8
5.0 REFERENCES	9
6.0 APPENDIX	10

1.0 EXECUTIVE SUMMARY

1.1 Introduction

The location, DOE ID No. GJ-00237-MR, is a single-family residence located at 522 West Main Street, Grand Junction, Colorado.

The purpose of this assessment is to evaluate the extent of uranium millsite contamination at this property. This assessment includes recommended remedial action, estimated volume of material to be removed, and estimated cost of the proposed action.

1.2 Evaluation and Recommendation

The action recommended is the removal of exterior contaminated material excluding the interior Area A as discussed in Section 4.0, and the restoration of the property to its original condition. The identified residual radioactive material found on this property is tailings; the estimated volume is: exterior, 82 cu. yd.; interior, 21 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is \$10,556. Remedial action on this property will take approximately 21 days to complete.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 522 West Main Street

Zoning: Residential (RSF-8)

Lot Size: Approximately 7,885 sf (0.18 acres)

Legal Description: Beginning 324.5 ft North and 384.5 ft West of Southeast Corner NW1/4 SE1/4 Section 15 T1S, R1W North 157.7 ft, West 50 ft, South 157.7 ft, East 50 ft to beginning, City of Grand Junction, County of Mesa, State of Colorado.

Point of Reference: This property is located approximately 1.5 miles northwest of the State of Colorado Tailings Repository. Appendix Figure 2.1 shows the property location relative to its surroundings.

Utilities: Utility locations are shown in Appendix Figure 2.2.

Electrical:	Overhead
Gas:	Underground
Telephone:	Overhead
Sewer:	Underground
Water:	Underground
Cable TV:	Overhead

Bordering Properties:

North:	Vacant land
South:	West Main Street
East:	Single-family residence
West:	Single-family residence

2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-family residence
Size:	Approximately 1,421 sf
Construction Date:	1906
Construction:	Single-story, wood-frame over partial basement and crawl space
Foundation:	Concrete foundation wall and footing in original structure: concrete slab with thickened edge under southwest portion of addition; 12" x 16" concrete footing under the northwest portion of the addition.
Footing Depth:	Approximately 36" to bottom of footing from grade

Basement: Small furnace room in middle of original structure
 Crawl Space: Around perimeter of original structure and northwest portion of addition
 Condition: Fair

Other Structures:

Type: Wood Shed (No. 2)
 Size: Approximately 91 sf
 Construction: Wood-frame
 Foundation: Wood skids
 Condition: Fair

Type: Wood shed (No. 1)
 Size: Approximately 52 sf
 Construction: Wood-frame
 Foundation: Wood skids
 Condition: Fair

Improvements or Attachments to Structure:

Additions: Attached to southwest portion of primary structure; wood floor built over concrete slab

Porches:

Type: Wood-frame
 Size: Approximately 300 sf
 Location: Southeast portion of primary structure

Patios:

Type: Concrete
 Size: Approximately 351 sf
 Location: Northwest of primary structure

Driveways:

Type: Concrete
 Location: South of primary structure
 Type: Dirt/gravel
 Location: Northern portion of lot off of alley (dirt/gravel)

Sidewalks:

Type: Concrete
 Location: East, north, and west around primary structure, in street right-of-way, and along portions of northwest and east property line

Fences:

Type: Snow fence
 Location: Between leach field and north driveway
 Type: Chain link
 Location: East property line and middle portion of west property line
 Type: Woven wire
 Location: Enclosing south yard
 Type: Chicken wire

Location: North portion of west property line, and
surrounding northeast garden plot
Type: Wood picket
Location: Southern portion of west property line

General Remarks: General condition of yard is fair. Structures,
utilities, landscaping, and other special
features of this property are included
in Appendix Figure 2.2.

Historical Data:

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

Alterations to Structure: Addition on southwest portion of primary
structure.

Architectural Significance: None

Historical Significance: None

3.0 RADIOLOGIC SURVEY

3.1 Introduction

Radiologic data were collected by Bendix at DOE ID No. GJ-00237-MR on February 22, 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 that contamination exists around the primary structure, near the west corner of the property, and beneath the addition to the primary structure.

The Bendix radiologic survey was designed to investigate the entire property, with emphasis on previously identified areas of contamination. Conclusions based upon data analyses are discussed in Section 3.5, Extent of Contamination. Photocopies of the Official Survey Report, Memo of Understanding, team leader notes, and deconvolution graphs are included in the Appendix (Section 6.0).

3.2 Gamma Exposure-Rate Surveys

3.2.1 Exterior Findings

Background Readings: 12 to 15 uR/h
Highest Outside Gamma Reading (HOG): 89 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: 10 to 14 uR/h
Highest Inside Gamma Reading (HIG): 24 uR/h

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

3.3 Boreholes, Soil Samples, and Other Measurements

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

3.4 Radon/Radon Daughter Concentration (RDC)

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

3.5 Extent of Contamination

Appendix Figures 3.5a and 3.5b show identified areas and estimated depths of contamination on this property, based on assessments of all measurements taken. As noted in these figures, areas recommended for remedial action that contain identified residual radioactive materials are:

- (AREA A) There is contamination beneath an addition to the primary structure. A deposit under the uncontaminated 6-inch-thick concrete slab extends to an estimated depth of 12 inches, based on information collected in Area L. The total depth of contamination is 18 inches (approximately 330 sf). (The removal of contamination in this area will be assessed after RDC measurements are taken.)
- (AREA B) A deposit under Shed 2 extends to an estimated depth of 9 inches, based on information collected in Area F. The shed has a wooden floor (approximately 91 sf).
- (AREA C) Contaminated soil north of the property, in the gravel alley, extends to a depth of 6 inches (approximately 212 sf).
- (AREA D) Contaminated soil south of Area C extends to a depth of 12 inches (approximately 497 sf).
- (AREA E) North of Shed 2, contamination extends to a depth of 9 inches under an uncontaminated 3-inch-thick concrete slab. The total depth of contamination is 12 inches (approximately 300 sf).
- (AREA F) Contamination in the soil east of Shed 2 extends to a depth of 9 inches (approximately 180 sf).
- (AREA G) A deposit east of Area F is contaminated to a depth of 6 inches (approximately 236 sf).
- (AREA H) Two isolated dirt areas southeast of Area G are contaminated to an estimated depth of 6 inches, based on information collected in Area G (approximately 20 sf).

- (AREA I) A small deposit in the lawn, north of the primary structure, is contaminated to a depth of 12 inches (approximately 13 sf).
- (AREA J) The soil northeast of the primary structure is contaminated to a depth of 12 inches (approximately 50 sf).
- (AREA K) Along the east and south sides of the primary structure there is a 4-inch-thick contaminated concrete sidewalk. Beneath this sidewalk there is 2 inches of contaminated fill material, over another 4-inch-thick contaminated concrete sidewalk, covering an additional 5 inches of contaminated material. The total depth of contamination is 15 inches. The south steps are included in this area. (approximately 237 sf).
- (AREA L) The soil along the west side of the driveway is contaminated to a depth of 12 inches (approximately 77 sf).
- (AREA M) The soil under the 4-inch-thick concrete slab, immediately north of the street right-of-way's 6-inch-wide curb and including the concrete driveway apron, is contaminated to a depth of 14 inches. The total depth of contamination is 18 inches (approximately 360 sf).
- (AREA N) The soil under the uncontaminated 6-inch-thick concrete slab extends to an estimated depth of 12 inches, based on information collected in Area L. The total depth of contamination is 18 inches (approximately 33 sf).

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-00237-MR, includes phasing the removal of the areas identified as containing radioactive material (as discussed in Section 3.5 and shown in Appendix Figures 3.5a and 3.5b) and transport of removed material to the disposal site.

Phase I includes the removal of exterior contaminated material. After Phase I 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, 1985), and Statement of Work for Construction Subcontractor.

RDC measurements will be taken in interior Area A to determine if EPA Standards are exceeded. If the EPA standards are exceeded, Phase II of the remedial action would be recommended.

Phase II includes the removal of contaminated material from Area A. After Phase II remedial action is completed, the area will be restored to original condition in accordance with the Bendix drawings, Vicinity Properties General Construction Specification (Bendix Field Engineering Corporation, 1985), and Statement of Work for Construction Subcontractor.

Phase II would require dislocation of the occupants for approximately 4 weeks. Therefore, dislocation cost estimates are presented in Appendix 4.4.

4.2 Evaluation of Recommended Remedial Action

Phase I volume calculations of the areas included for remedial action are presented in Appendix Table 4.1 and cost estimates are presented in Appendix Table 4.2.

Estimated cost of remedial action is \$10,556.

Phase II volume calculations for Area A area presented in Appendix Table 4.1, and the Phase II cost estimates are presented in Appendix Table 4.3.

Estimated cost of Phase II is \$15,881.

Estimated cost of Phase II dislocation is \$897.

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

The owner indicates a preference to be able to move across the street during Phase II remedial action for health and security reasons. 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 (Phase I)
Table 4.3	Estimated Cost of Decontamination and Restoration (Phase II)
Table 4.4	Dislocation Estimated Cost Summary (Phase II)

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 Location
Figure 3.3b	Interior Gamma Exposure Rates and Sample Locations
Figure 3.4	Exterior Sample Locations
Figure 3.5a	Interior Estimated Extent of Contamination
Figure 3.5b	Exterior Estimated Extent of Contamination

Official Survey Report

Memo of Understanding

Team Leader Notes

Deconvolution Graphs (Apparent Radium-226 Concentration)

Radium Concentrations at Exterior Locations

DOE ID No. GJ-00237-MR

522 West Main Street

Page 1 of 7

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot.	Ct Spectr.		
4	125255	00	DS	3.1		*	North property
		06	DS	3.2		*	
		00-06	SS			9.5	
		03	TC	4.3		*	DC = 9 inches Based on all data available
		06	TC	4.4		*	
		09	TC	4.3		*	
		12	TC	4.2		*	
		15	TC	4.3		*	
		18	TC	4.3		*	
		21	TC	4.3		*	
		24	TC	4.2		*	
		27	TC	4.1		*	
		30	TC	3.9		*	
		33	TC	3.8		*	
		36	TC	3.9		*	
5	130263	00	DS	2.2		*	North property line
		06	DS	2.0		*	
6	136265	00	DS	<1.0		*	Next to garden plot
7	140260	00	DS	16.0		*	Backyard
		03	TC	11.3		*	
		06	TC	10.0		*	
		09	TC	7.7		*	DC = 12 inches Based on the deconvolution graph
		12	TC	5.9		*	
		15	TC	4.9		*	
		18	TC	4.3		*	
		21	TC	4.1		*	
		24	TC	3.9		*	
		27	TC	3.9		*	
		30	TC	3.7		*	
		33	TC	3.7		*	
		36	TC	3.5		*	
		39	TC	3.4		*	
		42	TC	3.3		*	
		45	TC	3.1		*	
		48	TC	3.1		*	
		51	TC	3.0		*	
		54	TC	2.9		*	
		57	TC	2.7		*	

Radium Concentrations at Exterior Locations

DOE ID No. GJ-00237-MR

522 West Main Street

Page 2 of 7

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
8	145245	00	DS	8.1		*	North concrete slab
		00-03	SS			3.4	Concrete core
		03-09	SS			34.9	Soil under core
		03	TC	12.1		*	
		06	TC	10.4		*	DC = 12 inches
		09	TC	7.6		*	Based on the
		12	TC	6.0		*	deconvolution graph
		15	TC	5.0		*	
		18	TC	4.6		*	
		21	TC	4.4		*	
		24	TC	4.2		*	
		27	TC	4.1		*	
		30	TC	4.0		*	
		33	TC	4.0		*	
9	145270	00	DS	2.5		*	West side of garden
		06	DS	2.0		*	plot
10	145280	00	DS	1.0			In garden plot
		06	DS	<1.0			
11	145285	00	DS	<1.0		*	Northeast garden
		06	DS	1.6		*	plot
12	154268	00	DS	2.0		*	North of house
13	155275	00	DS	<1.0		*	Concrete slab
							West of Shed 1
14	160276	00	DS	2.0		*	North of house
15	165265	00	DS	3.7		*	
		06	DS	2.0		*	
		00-06	SS			4.1	
16	176255	00	DS	6.0		*	North property
		03	TC	5.7		*	East of Shed 2
		06	TC	6.0		*	
		09	TC	5.3		*	DC = 9 inches
		12	TC	4.8		*	Based on the
		15	TC	4.5		*	deconvolution graph
		18	TC	4.5		*	

Radium Concentrations at Exterior Locations

DOE ID No. GJ-00237-MR

522 West Main Street

Page 3 of 7

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
16	176255	21	TC	4.3		*	
		24	TC	4.2		*	
		27	TC	4.1		*	
		30	TC	4.1		*	
		33	TC	3.9		*	
		36	TC	4.0		*	
		39	TC	3.9		*	
17	200260	00	DS	1.5		*	North of house
		00-06	SS			3.7	
		03	TC	3.1		*	DC = 0 inches
		06	TC	3.6		*	
		09	TC	3.9		*	
		12	TC	3.9		*	
		15	TC	4.0		*	
		18	TC	3.9		*	
		21	TC	3.9		*	
		24	TC	3.9		*	
		27	TC	3.9		*	
		30	TC	3.8		*	
		33	TC	3.7		*	
		36	TC	3.6		*	
18	212250	00	DS	<1.0		*	North of addition
		03	TC	3.2		*	
		06	TC	3.5		*	
		09	TC	3.7		*	DC = 0 inches
		12	TC	3.8		*	
		15	TC	3.7		*	
		18	TC	3.8		*	
		21	TC	3.8		*	
		24	TC	3.8		*	
		27	TC	3.8		*	
19	212273	00	DS	2.0		*	Northeast by
		03	TC	3.9		*	sidewalk
		06	TC	4.9		*	DC = 12 inches
		09	TC	5.0		*	Based on the
		12	TC	4.7		*	deconvolution graph
		15	TC	4.5		*	
		18	TC	4.3		*	
		21	TC	4.3		*	
		24	TC	4.3		*	

Radium Concentrations at Exterior Locations

DOE ID No. GJ-00237-MR

522 West Main Street

Page 4 of 7

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
19	212273	27	TC	4.2		*	
		30	TC	4.1		*	
		33	TC	4.1		*	
		36	TC	3.9		*	
		39	TC	3.8		*	
		42	TC	3.9		*	
		45	TC	3.9		*	
		48	TC	3.8		*	
		51	TC	3.8		*	
		54	TC	3.6		*	
		57	TC	3.6		*	
		60	TC	3.5		*	
		63	TC	3.4		*	
		66	TC	3.6		*	
		69	TC	3.5		*	
		72	TC	3.5		*	
20	217260	00	DS	1.3		*	On sidewalk
		00-05	SS			1.6	Concrete core
		05-11	SS			1.7	Soil under core
		03	TC	2.9		*	North of house
		06	TC	3.2		*	
		09	TC	3.3		*	
		12	TC	3.6		*	DC = 0 inches
		15	TC	3.5		*	
		18	TC	3.7		*	
		21	TC	3.7		*	
		24	TC	3.8		*	
		27	TC	3.8		*	
		30	TC	3.8		*	
		33	TC	3.6		*	
21	218287	00	DS	5.8		*	By northeast corner
		06	DS	2.7		*	of the house beside
		12	DS	1.2		*	the sidewalk
22	237239	00	DS	2.9		*	East side of house
		03	TC	4.0		*	
		06	TC	4.4		*	DC = 0 inches
		09	TC	4.2		*	
		12	TC	4.0		*	
		15	TC	4.0		*	
		18	TC	3.9		*	

Radium Concentrations at Exterior Locations

DOE ID No. GJ-00237-MR

522 West Main Street

Page 5 of 7

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
22	237239	21	TC	3.9		*	
		24	TC	3.9		*	
		27	TC	3.8		*	
		30	TC	3.8		*	
		33	TC	3.7		*	
23	241282	00	DS	17.4		*	Concrete walk
		00-04	SS			4.0	Concrete core
		04-06	SS			225.3	Soil under core
		06-10	SS			8.1	Concrete core
		03	TC	18.3		*	DC = 15 inches
		06	TC	19.0		*	Based on the
		09	TC	12.8		*	deconvolution graph
		12	TC	9.0		*	
		15	TC	6.8		*	
		18	TC	5.8		*	
		21	TC	5.2		*	
		24	TC	4.7		*	
		27	TC	4.5		*	
		30	TC	4.5		*	
24	250239	00	DS	4.3		*	East of new addition
		06	DS	3.3		*	
		12	DS	<1.0		*	
		00-06	SS			10.1	
25	263284	00	DS	2.0		*	Southeast of the
		03	TC	4.5		*	house by sidewalk
		06	TC	4.4		*	DC = 0 inches
		09	TC	4.0		*	
		12	TC	3.9		*	
		15	TC	3.8		*	
		18	TC	3.7		*	
		21	TC	3.5		*	
		24	TC	3.5		*	
		27	TC	3.4		*	
		30	TC	3.4		*	
		33	TC	3.4		*	
		36	TC	3.4		*	
		39	TC	3.4		*	
		42	TC	3.5		*	
		45	TC	3.4		*	
		48	TC	3.3		*	

Radium Concentrations at Exterior Locations

DOE ID No. GJ-00237-MR

522 West Main Street

Page 6 of 7

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
25	263284	51	TC	3.3		*	
		54	TC	3.3		*	
		57	TC	3.2		*	
		60	TC	3.2		*	
		63	TC	3.1		*	
		66	TC	3.2		*	
		69	TC	3.1		*	
26	265270	00	DS	6.8		*	Front top step
27	270255	00	DS	<1.0		*	Over gas line
		03	TC	3.0		*	DC = 0 inches
		06	TC	3.3		*	
		09	TC	3.5		*	
		12	TC	3.6		*	
		15	TC	3.7		*	
		18	TC	3.9		*	
		21	TC	3.8		*	
		24	TC	3.8		*	
		27	TC	3.9		*	
		30	TC	3.8		*	
		33	TC	3.8		*	
28	275265	00	DS	<1.0		*	South yard
		03	TC	3.1		*	DC = 0 inches
		06	TC	3.5		*	
		09	TC	3.8		*	
		12	TC	3.9		*	
		15	TC	4.0		*	
		18	TC	4.0		*	
		21	TC	4.0		*	
		24	TC	4.0		*	
		27	TC	3.9		*	
29	303260	00	DS	7.2		*	Concrete slab
		00-04	SS			2.6	Concrete core
		04-10	SS			6.1	Soil under core
		03	TC	9.0		*	
		06	TC	9.7		*	DC = 18 inches
		09	TC	7.9		*	Based on the
		12	TC	7.0		*	deconvolution graph
		15	TC	6.0		*	

Radium Concentrations at Exterior Locations

DOE ID No. GJ-00237-MR

522 West Main Street

Page 7 of 7

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
29	303260	18	TC	5.5		*	
		21	TC	5.3		*	
		24	TC	5.0		*	
		27	TC	4.9		*	
		30	TC	4.6		*	
		33	TC	4.5		*	
30	305283	00	DS	2.2		*	Concrete slab between sidewalk and street

Tool 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 = 02-22-85
 Team Leader = JJ

Radium Concentrations at Interior Locations

DOE ID No. GJ-00237-MR

522 West Main Street

Page 1 of 1

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
1		00	DS	<1.0		*	Basement
2		00	DS	8.4		*	Addition/ground floor
3		00	DS	6.7		*	In Shed 2

Tool 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 = 02-22-85
Team Leader = JJ

Location *	Number of Readings Taken at Waist Level	Range at Waist Level (uR/h)	Mean at Waist Level (uR/h)	Number of Readings Taken at Surface	Range at Surface (uR/h)	Mean Surface (uR/h)
BASEMENT	05	13-14	14	05	14-16	15
CRAWL SPACE	00	-	-	13	13-14	14
ROOM A	06	10-12	11	06	11-12	11
ROOM B	05	10-14	13	05	11-14	13
ROOM C	05	12-14	13	05	12-15	13
ROOM D	05	11-14	13	04	12-14	13
ROOM E	05	10-11	11	05	10-11	11
ROOM F	05	11-12	11	05	11-12	12
ROOM G	05	11-12	12	02	12-12	12
ROOM H	09	12-20	15	09	12-24	16
ROOM I	05	14-18	15	06	14-24	17
SHED 1	02	12-13	13	02	13-14	14
SHED 2	01	17-17	17	01	22-22	22

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

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-00237-MR

Page 1 of 3

<u>AREA</u>	<u>CALCULATIONS(ft)</u>	<u>SF</u>	<u>DEPTH(ft)</u>	<u>CF</u>	<u>CUBIC YARDS</u>
INTERIOR					
B	8.5 x 10.7 =	91	x 0.8 =	73	
				<hr/> 73	
				=	73/27 = 3
					<hr/>
	TOTAL VOLUME - INTERIOR (PHASE I)				= 3
INTERIOR					
*A	Concrete				
	22 x 15 =	330	x 0.5 =	165	
				=	165/27 = 6
*A	Soil				
	22 x 15 =	330	x 1.0 =	330	
				=	330/27 = 12
					<hr/>
	TOTAL VOLUME - INTERIOR (PHASE II)				= 18
EXTERIOR					
	Concrete				
E	30 x 10 =	300	x 0.3 =	90	
K	47 x 3 =	141			
	6 x 16 =	96			
		<hr/>			
		237	x 0.6 =	142	
M	9 x 40 =	360	x 0.3 =	108	
N	21.7 x 1.5 =	33	x 0.5 =	17	
				<hr/>	
				357	
				=	357/27 = 13
	Soils				
C	12 x 15 =	180			
	4 x 8 =	32			
		<hr/>			
		212	x 0.5 =	106	

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-00237-MR

Page 2 of 3

<u>AREA</u>	<u>CALCULATIONS(ft)</u>	<u>SF</u>	<u>DEPTH(ft)</u>	<u>CF</u>	<u>CUBIC YARDS</u>
D	29 x 13 =	377			
	20 x 4 =	80			
	10 x 4 =	40			
		<hr/>			
		497	x 1.0 =	497	
E	30 x 10 =	300	x 0.7 =	210	
F	20 x 9 =	180	x 0.8 =	144	
G	20 x 6 =	120			
	10 x 8 =	80			
	8 x 4 =	32			
	2 x 2 =	4			
		<hr/>			
		236	x 0.5 =	118	
H	1.5 x 1.5 x 3.1 =	7			
	2 x 2 x 3.1 =	13			
		<hr/>			
		20	x 0.5 =	10	
I	2 x 2 x 3.1 =	13	x 1.0 =	13	
J	10 x 5 =	50	x 1.0 =	50	
K	Soil				
	47 x 3 =	141			
	6 x 16 =	96			
		<hr/>			
		237	x 0.7 =	166	

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-00237-MR

<u>AREA</u>	<u>CALCULATIONS(ft)</u>	<u>SF</u>	<u>DEPTH(ft)</u>	<u>CF</u>	<u>CUBIC YARDS</u>
L	51 x 1.5 =	77	x 1.0 =	77	
M	9 x 40 =	360	x 1.2 =	432	
N	21.7 x 1.5 =	33	x 1.0 =	33	
				1,856 = 1,856/27 =	69 13
TOTAL VOLUME - EXTERIOR					82

*Area A has been excluded from Phase I of this assessment as noted in Chapter 4 of this FEA.

See Appendix Figures 3.a and 3.5b For Areas

=====

INTERIOR	
Remove/store/replace personal property items	\$ 200
Remove/store/replace wood shed	200
Remove identified residual radioactive material (machine) 3 cy @ \$14.50/cy	44
Replace area with compacted roadbase 3 cy @ \$11.50/cy	35
Cleanup	200
	<hr/>
SUBTOTAL - INTERIOR	\$ 679
EXTERIOR	
Remove/store/replace personal property items	\$ 500
Remove/reset fencing 80 lf @ \$2.00/lf	160
Saw-cut concrete 25 lf @ \$2.50/lf	63
Remove concrete (including portion of Area K) 1,180 sf @ \$2.00/sf	2,360
Remove identified residual radioactive materials (manual) 4.8 cy @ \$44.00/cy	211
Remove identified residual radioactive materials (machine) 62.8 cy @ \$14.50	911
Replace areas with compacted roadbase 56.6 cy @ \$11.50/cy	651
Replace areas with topsoil 5.3 cy @ \$9.50/cy	50
Replace drive with 3/4" washed gravel 5.7 cy @ \$15.00/cy	86

Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-00237-MR

Page 2 of 2

Replace concrete 943 sf @ \$1.50/sf		\$ 1,415
Replace sod 13 sf @ \$0.50/sf		7
Replace perennials 28 sf @ \$3.00/sf		84
Cleanup, dampproofing, etc.		200
		<hr/>
	TOTAL EXTERIOR	\$ 6,698
	TOTAL INTERIOR	679
	ACCESS CONTROL	300
		<hr/>
	SUBTOTAL	\$ 7,677
	CONTINGENCY @ 10%	768
		<hr/>
	SUBTOTAL	\$ 8,445
	CONTRACTOR OVERHEAD & PROFIT @ 25%	2,111
		<hr/>
	GRAND TOTAL	\$ 10,556

INTERIOR

Remove/store/replace personal property items	\$	500
Remove wood floor and framing 330 sf @ \$1.50/sf		495
Saw cut interior concrete floor and along west exterior wall 96 lf @ \$2.25/lf		216
Remove concrete floor (6") 330 sf @ \$3.00/sf		990
Undermine/shore non-load-bearing walls 321 lf @ \$3.00/lf		963
Undermine/shore load-bearing walls 371 lf @ \$6.00/lf		2,226
Remove identified residual radioactive materials (manual) 13 cy @ \$44.00/cy		572
Place reinforced concrete under load-bearing wall 2 cy @ \$187.00/cy		374
Replace wood floor framing 330 sf @ \$1.50/sf		495
Vent crawl space 4 vents @ \$30.00 each		120
Insulate/seal crawl space in total addition 403 sf @ \$8.00/sf		3,224

Table 4.3
Estimated Cost of Decontamination and Restoration (Phase II)
DOE ID No. GJ-00237-MR Page 2 of 2

Replace carpet 378 sf @ \$1.25/sf	473
Cleanup (bulk sum)	200
	<hr/>
TOTAL INTERIOR	\$ 10,848
ACCESS CONTROL	200
	<hr/>
SUBTOTAL	\$ 11,048
CONTINGENCY @ 15%	1,657
	<hr/>
SUBTOTAL	\$ 12,705
CONTRACTOR OVERHEAD & PROFIT @ 25%	3,176
	<hr/>
GRAND TOTAL	\$ 15,881

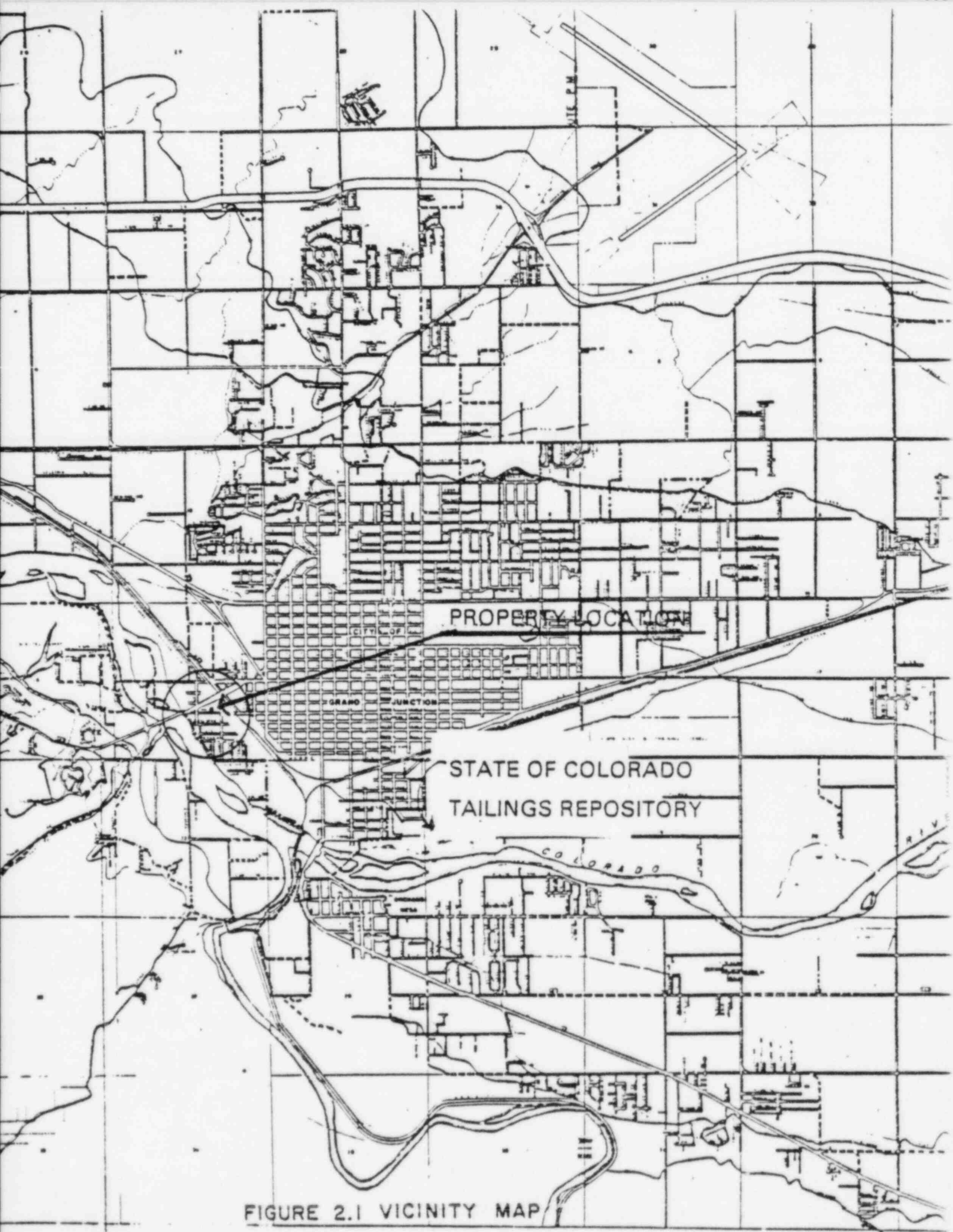
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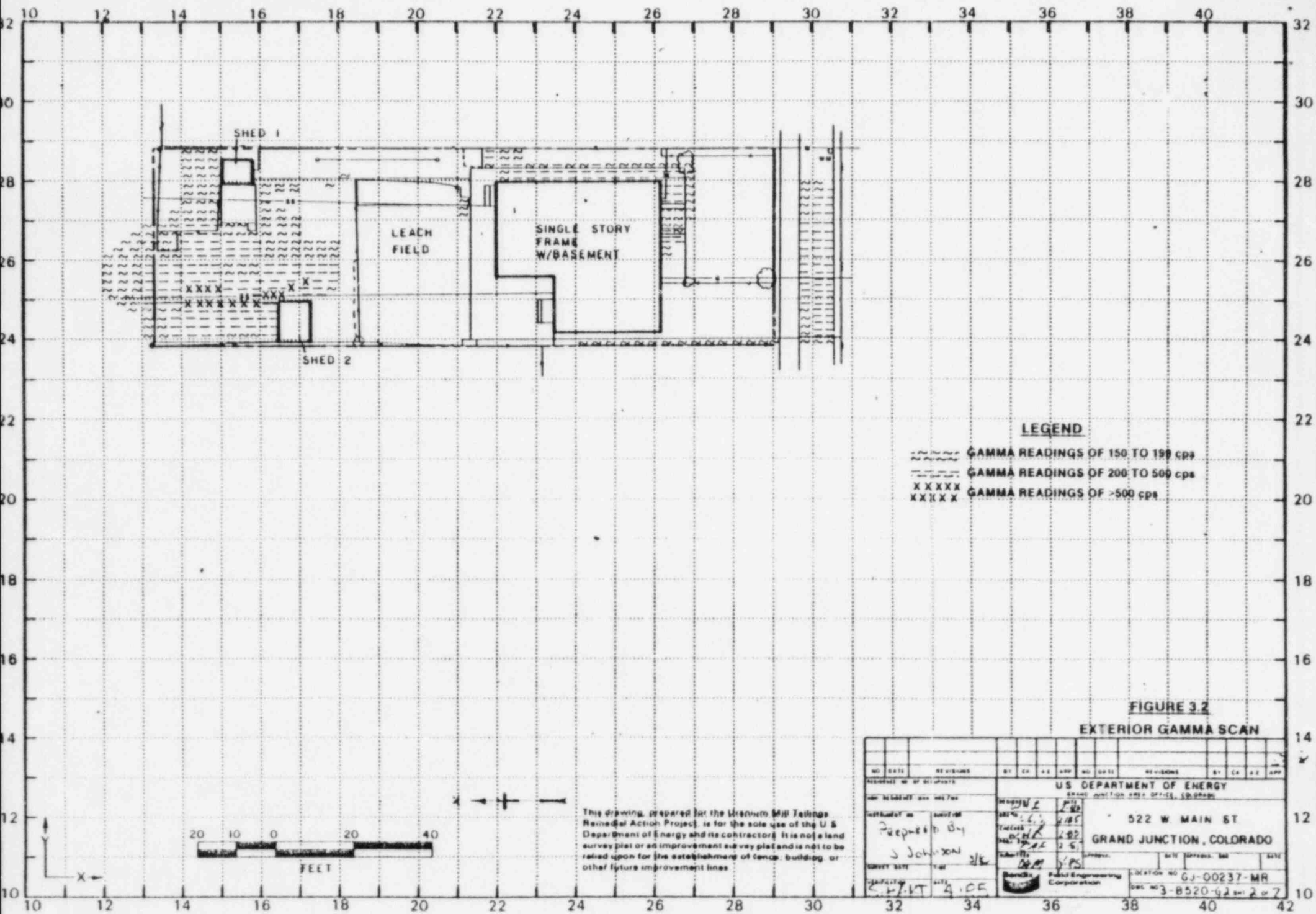
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REA00237/REA-602/LR

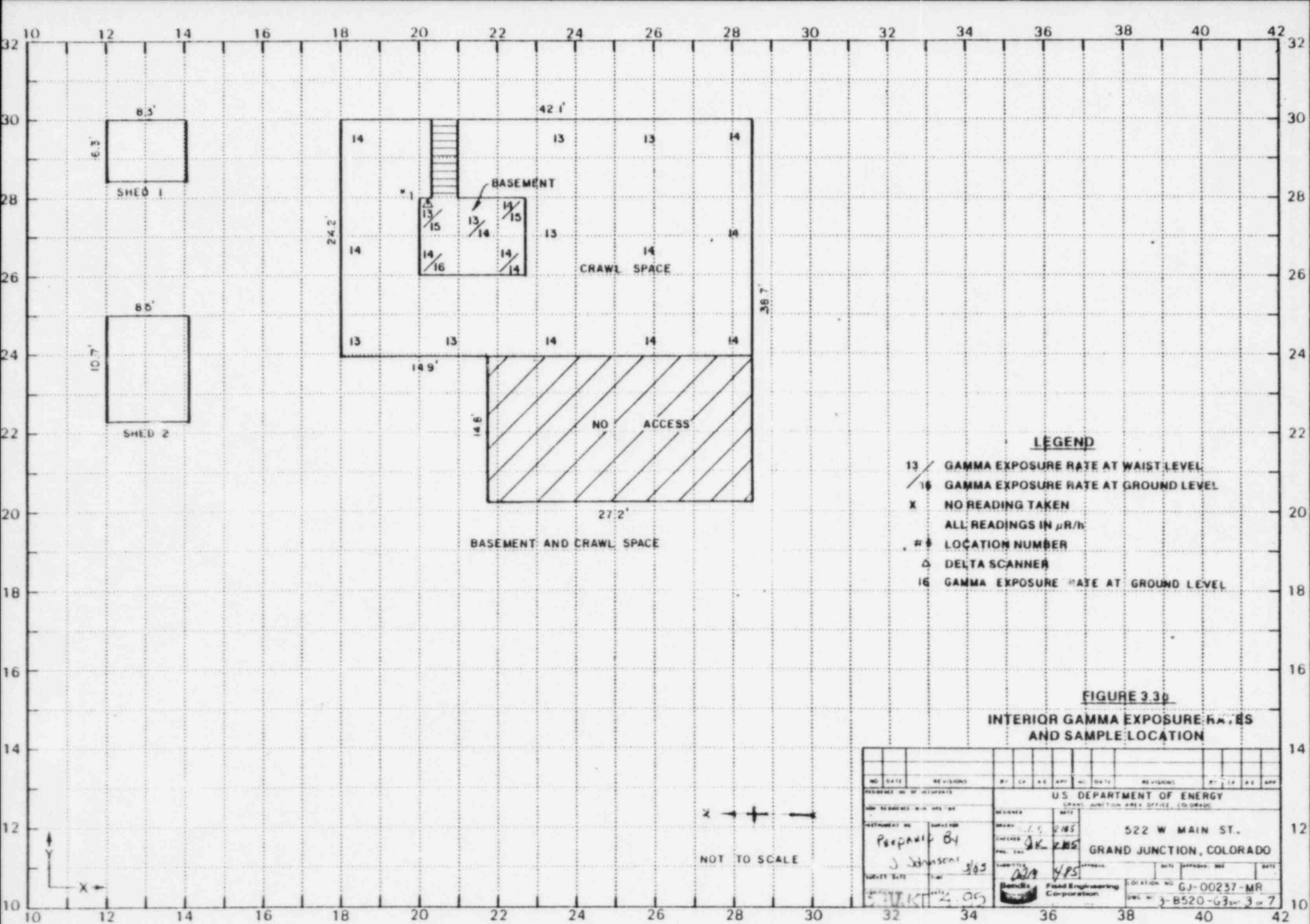
Table 4.4
Dislocation Estimated Cost Summary (Phase II)
(Residential)

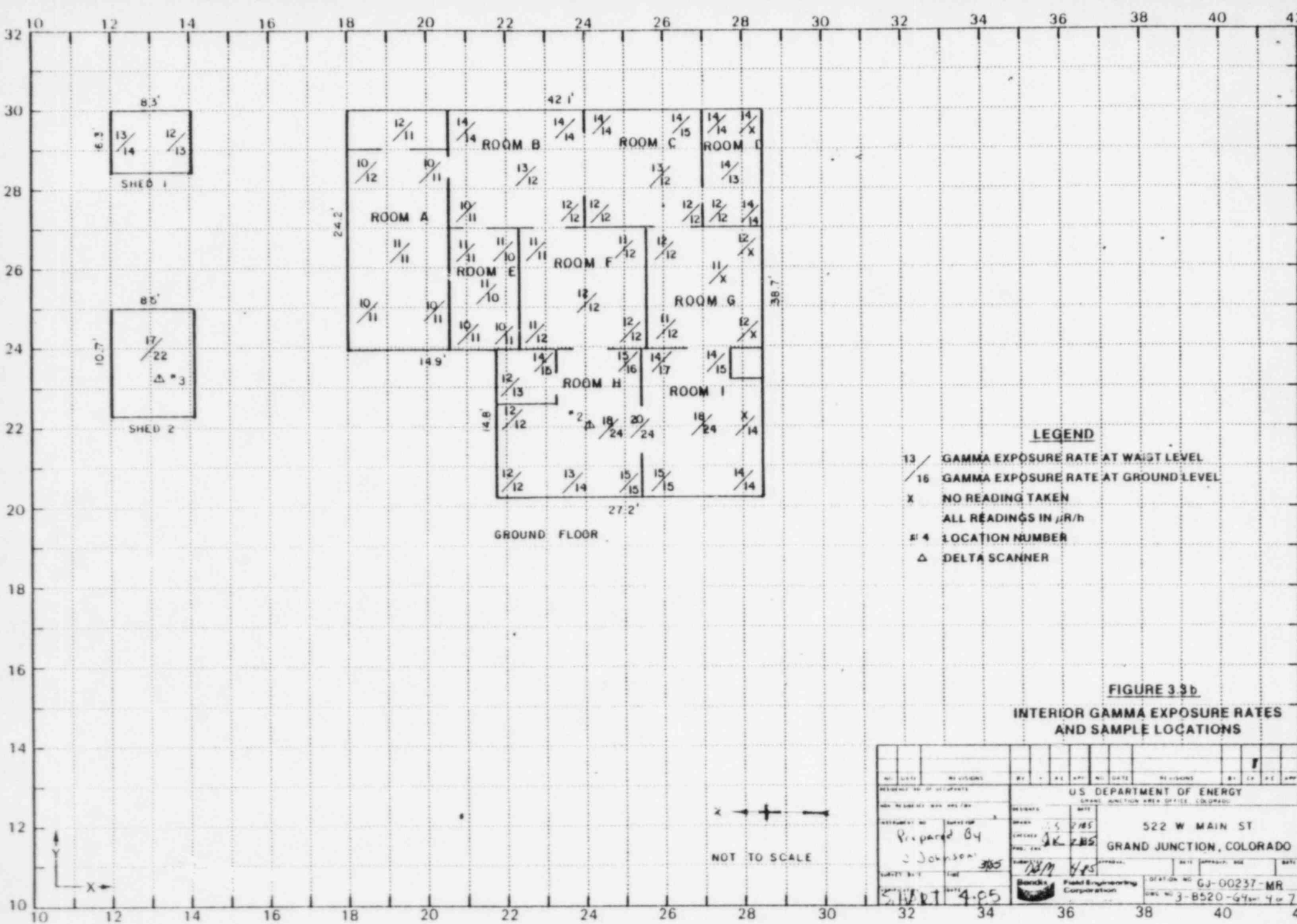
DOE ID No. : GJ-00237-MR
Address : 522 West Main Street, Grand Junction, Colorado Page 1 of 2
=====

Duration of Dislocation	: Construction Schedule 21 days. Move-out and move-back 7 days. Total: 1 month.		
Shelter Costs	: Monthly rent \$400.00 x 1 month.	TOTAL	\$ 400
Utility Costs	: Water/Sewer Usage per month \$16.00 x 1 month Gas/Electric: Usage per month \$23.00 x 1 month	TOTAL	\$ 39
Telephone Transfer Cost	: Transfer service out and back. \$69.00 each way	TOTAL	\$ 138
Cable T.V. Transfer Cost	: Transfer service out and back.	TOTAL	\$ 30
Moving Costs	: None	TOTAL	\$ 0
Storage Costs	: Items to be stored: In remainder of house 2 laborers 4 hours	TOTAL	\$ 150
Special Dislocation Items	: Special Items: One dog to be dislocated Cost per day \$10.00 x 14 days.	TOTAL	140
			<hr/>
ESTIMATED TOTAL COST FOR DISLOCATION			\$ 897

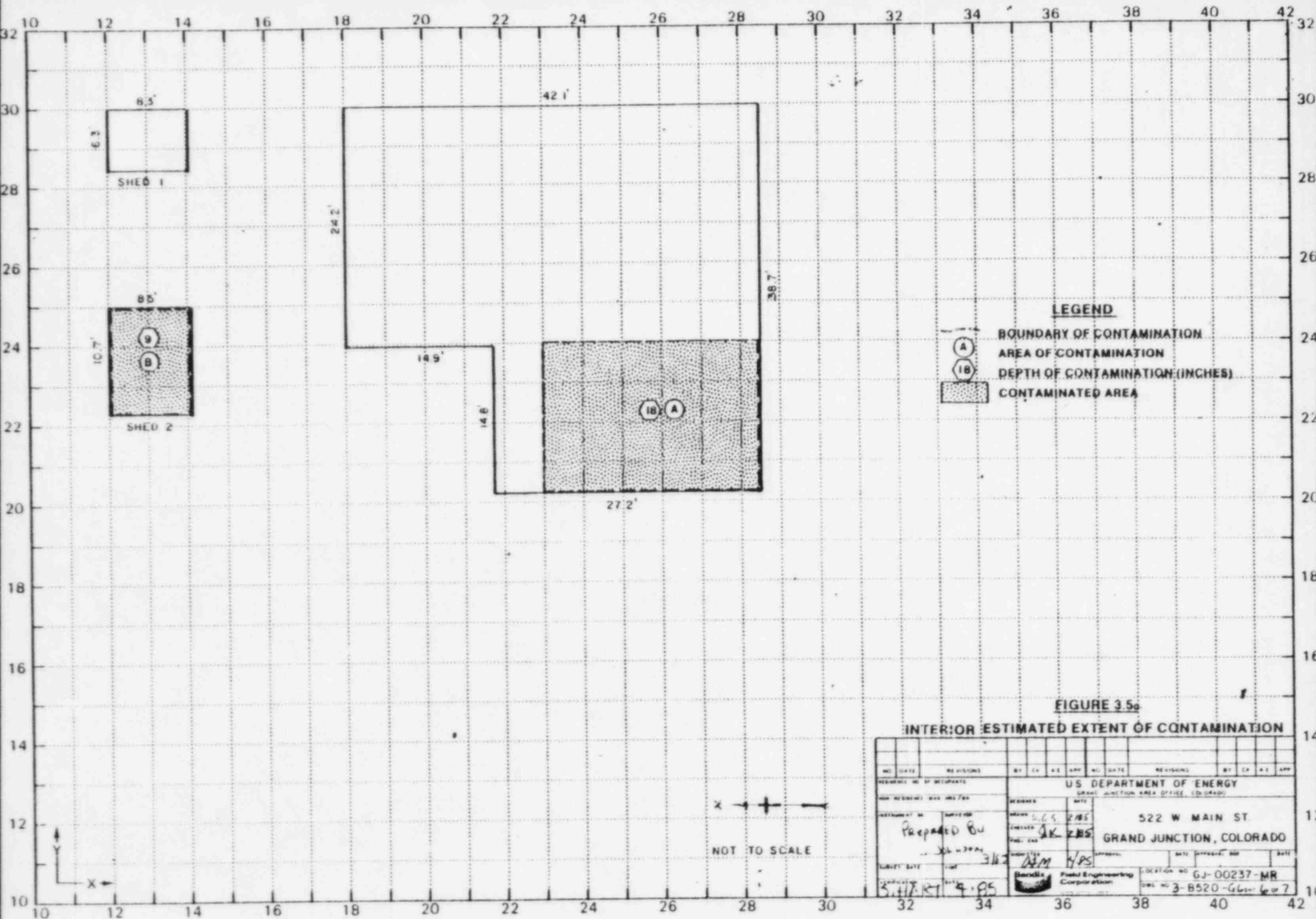








NO. OF DAYS		NO. OF VISITS		BY	DATE	NO. OF DAYS		BY	DATE
U.S. DEPARTMENT OF ENERGY									
GRAND JUNCTION AREA OFFICE, COLORADO									
PREPARED BY J. Johnson					522 W. MAIN ST. GRAND JUNCTION, COLORADO				
CHECKED BY J. K.					DATE 4-25				
APPROVED BY J. K.					DATE 4-25				
PROJECT NO. 4-95					LOCATION NO. GJ-00237-MR				
DATE 4-95					DOW NO. 3-B520-64-4 or 7				

[illegible]

3/85

DOE ID NO. G.I-00237-25 MR 34 Date 4-4-85

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

Official Survey Report

Property Address 522 West Main Street

Property Owner Wade E. Conwell

Address of Owner (if different from above) _____

Report Prepared By Jay Johnson

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 XX 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 = 24 uR/h
HOC = 29 uR/h

Bendix

Field Engineering Corporation

Grand Junction Operations

April 4, 1985

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

ATTN: Elaine Brummett

Subject: Memo of Understanding - GJ-00237-RS MR 9B

The following is in response to your questions and comments during the Technical Review concerning Department of Energy (DOE) Identification (ID) number GJ-00237-RS.

1. The memorandum will be corrected in the file from background to undetermined.
2. The distance from the basement floor to the outside grade is 55-inches.
3. The present owner of the property did not know when the basement was added to the structure. All utilities come through the crawl space wall.
4. Another delta was taken by Shed 1 with negative results.
5. The depth of contamination was omitted from Table 3.1 that was given to you. Location number 13 should be 6-inches and location number 14 should be 9-inches.
6. The borehole in the leach field was an auger refusal after 36-inches. We tried another flight with no success.

Elaine Brummett
Colorado Department of Health
GJ-00237-RS
April 4, 1985
Page 2

Bendix

7. The water meter read 130 to 160 cps (14 to 17 μ R/h).
8. A delta was taken in Shed 2 that showed positive results.
9. The borehole in the leach field was in the area of the septic tank.

Thank you for your time and cooperation. If you should have additional questions or comments you may reach me at 242-8621, extension 431.

Sincerely,

Jay Johnson
RSD Survey Team

JJ:pr

INTERNAL
MEMORANDUM

Bendix Field Engineering Corporation
Grand Junction Projects Office

Date: February 22, 1985

To: Files

From: Jay Johnson

Subject: Team Leader Notes - GJ-00237-BB MR 90

Address: 522 West Main Street

Team Members

J. Johnson	S. Milton
T. Coulson	M. Rangel
P. Hardy	C. Holmes
M. Heronema	J. Dickerson
K. Cary	D. Herrera

Instruments

C-3935, C-3937, C-3573, C-3956, C-1185, C-1149, C-1205, C-1184, C-1208, C-3958

This property contains a one-story house with a partial basement. The partial basement opens into a crawl space. A survey was completed in the basement and crawl space. While in the crawl space it was noted that the house had been lifted off the original foundation and raised approximately 18-inches.

It appears that an addition had been built onto the house using the carport as the major portion of the foundation, but on the north side a footing/foundation was constructed.

During the interior survey, elevated readings were found in this part of the house.

Because of this type of construction, the crew was not capable of further investigation under the addition.

Contamination was located at the south and east sides of the house and in the north yard.

Team Leader Notes
GJ-00237-RS
February 22, 1985
Jay Johnson
Page 2

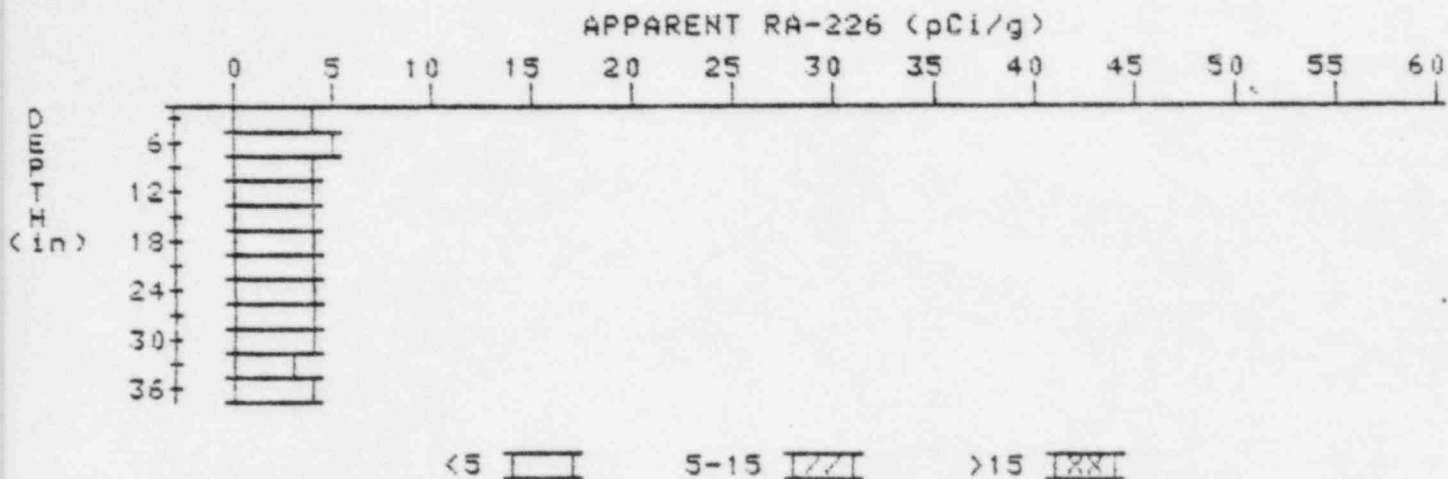
Scintillometer C-1185 became defective, readings taken with this instrument were verified with a working scintillometer.

A concrete sample was taken from the sidewalk east of the house. At this location coring went through one layer of concrete, then about 2-inches of tailings, and then another layer of concrete.

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

4

PROPERTY NUMBER: GJ-00237-MR
HOLE NUMBER: 4
LOCATION: 125255

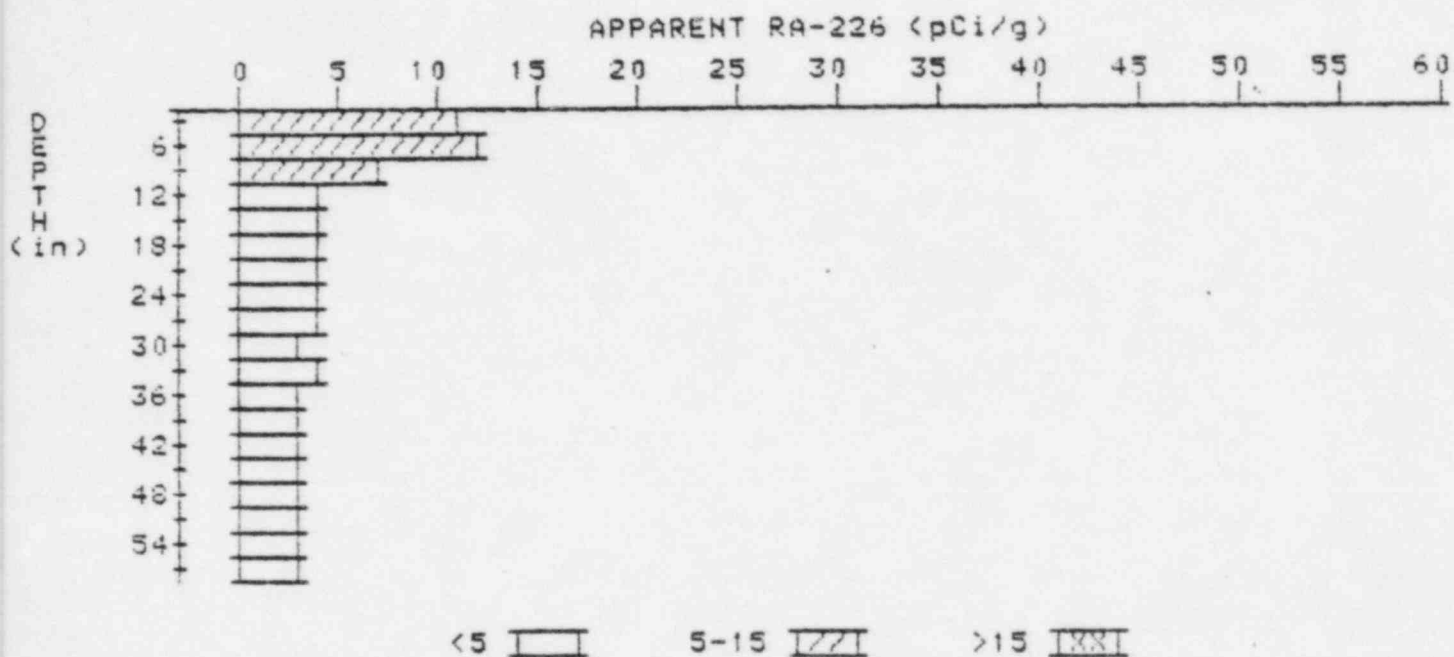


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.3	4.3
6	4.4	4.9
9	4.3	4.3
12	4.2	3.8
15	4.3	4.5
18	4.3	4.3
21	4.3	4.5
24	4.2	4.2
27	4.1	4.3
30	3.9	3.7
33	3.8	3.4
36	3.9	3.9

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

7

PROPERTY NUMBER: GJ-00237-MR
HOLE NUMBER: 7
LOCATION: 140260



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	11.3	11.3
6	10.0	11.3
9	7.7	6.8
12	5.9	4.5
15	4.9	4.2
18	4.3	3.6
21	4.1	4.1
24	3.9	3.5
27	3.9	4.3
30	3.7	3.3
33	3.7	4.1
36	3.5	3.3
39	3.4	3.4
42	3.3	3.5
45	3.1	2.7
48	3.1	3.3
51	3.0	3.0
54	2.9	3.1

57

2.7

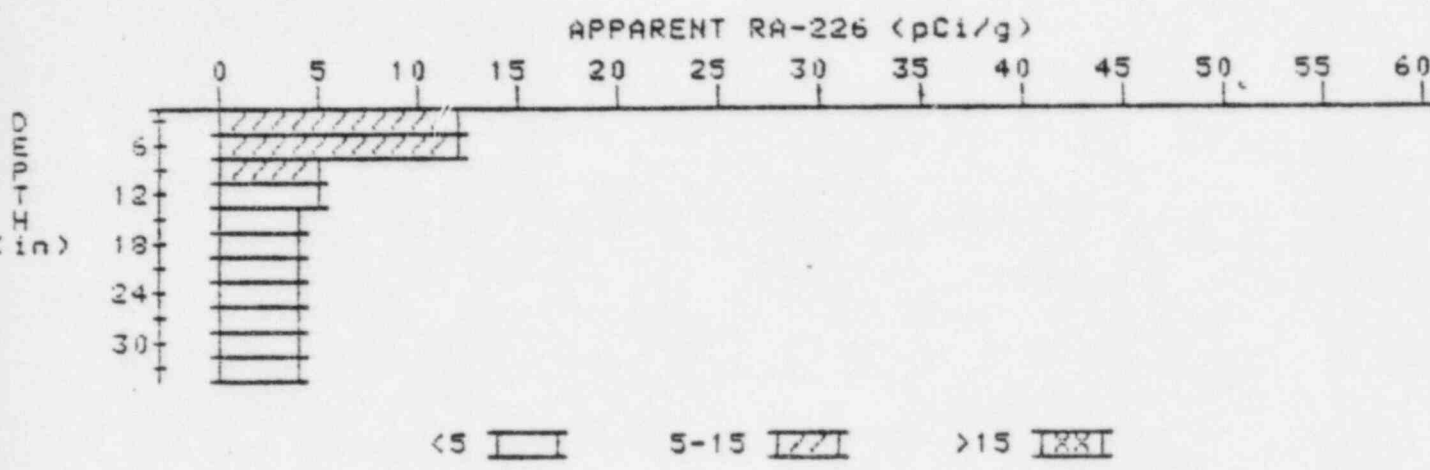
2.7

APPARENT RADIUM-226 CONCENTRATION

DECONVOLUTION GRAPH

8

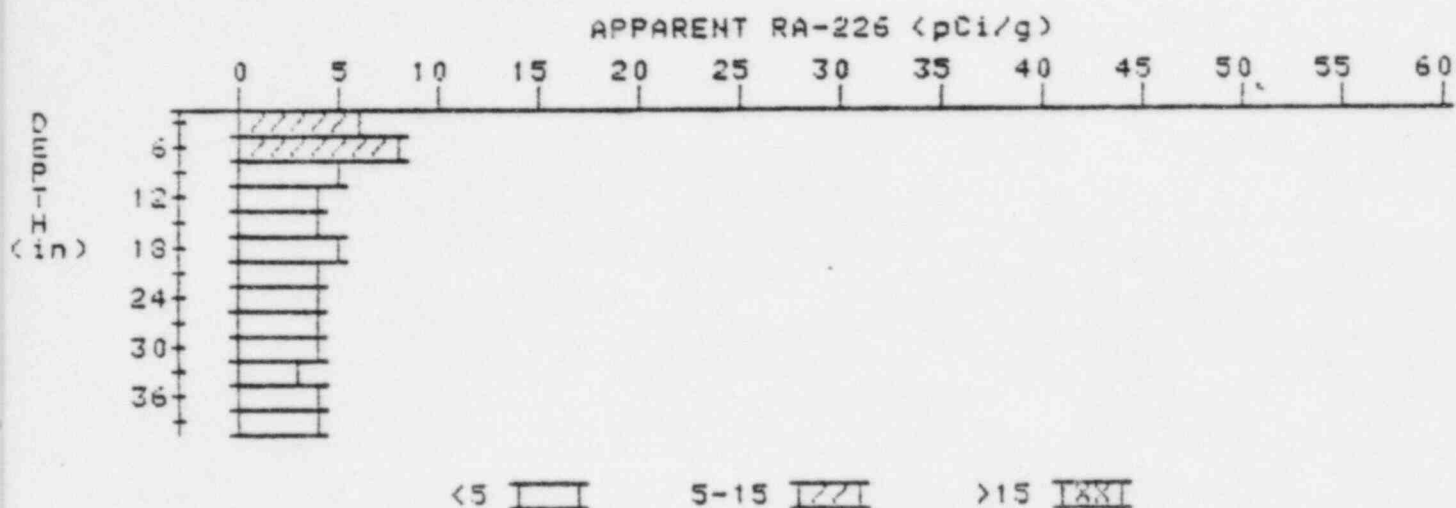
PROPERTY NUMBER: GJ-00237-MR
HOLE NUMBER: 8
LOCATION: 145245



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	12.1	12.1
6	10.4	12.4
9	7.6	5.5
12	6.0	4.9
15	5.0	3.9
18	4.6	4.2
21	4.4	4.4
24	4.2	4.0
27	4.1	4.1
30	4.0	3.8
33	4.0	4.0

APPARENT RADIUM-226 CONCENTRATION 16 DECONVOLUTION GRAPH

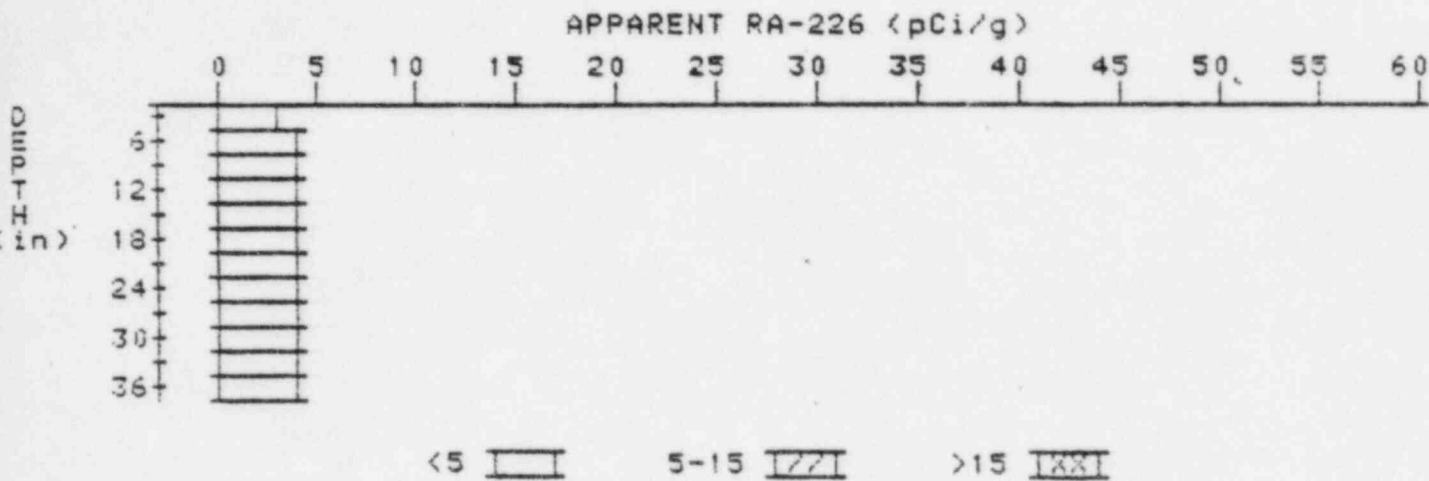
PROPERTY NUMBER: GJ-00237-MR
HOLE NUMBER: 16
LOCATION: 176255



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.7	5.7
6	6.0	7.8
9	5.3	4.9
12	4.8	4.4
15	4.5	4.0
18	4.5	4.9
21	4.3	4.1
24	4.2	4.2
27	4.1	3.9
30	4.1	4.5
33	3.9	3.4
36	4.0	4.4
39	3.9	3.9

APPARENT RADIUM-226 CONCENTRATION 17
DECONVOLUTION GRAPH

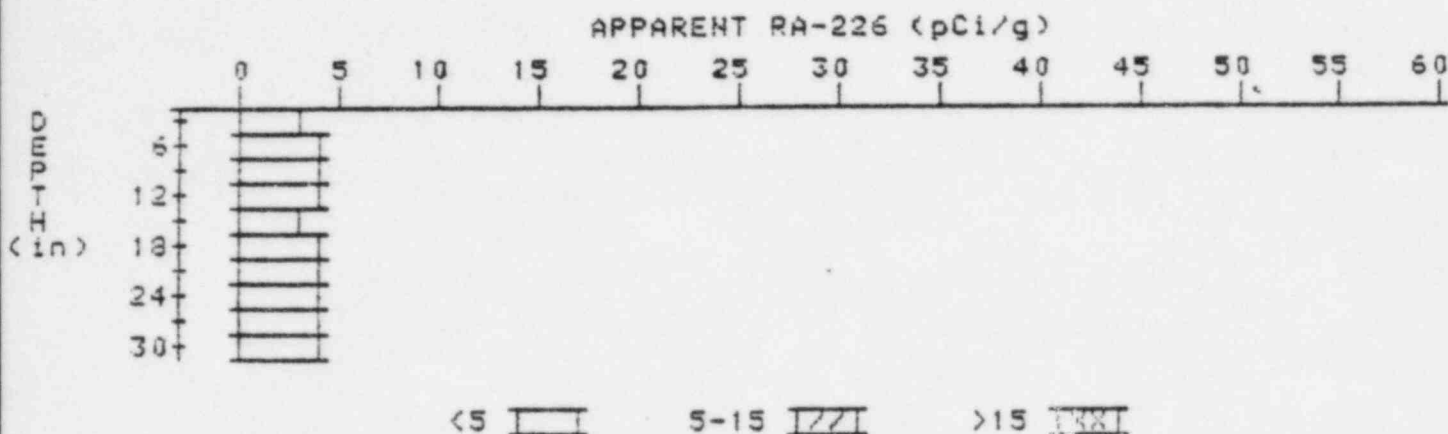
PROPERTY NUMBER: GJ-00237-MR
HOLE NUMBER: 17
LOCATION: 200260



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.1	3.1
6	3.6	4.0
9	3.9	4.4
12	3.9	3.7
15	4.0	4.4
18	3.9	3.7
21	3.9	3.9
24	3.9	3.9
27	3.9	4.1
30	3.8	3.8
33	3.7	3.7
36	3.6	3.6

APPARENT RADIUM-226 CONCENTRATION 18 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00237-MR
HOLE NUMBER: 18
LOCATION: 212250

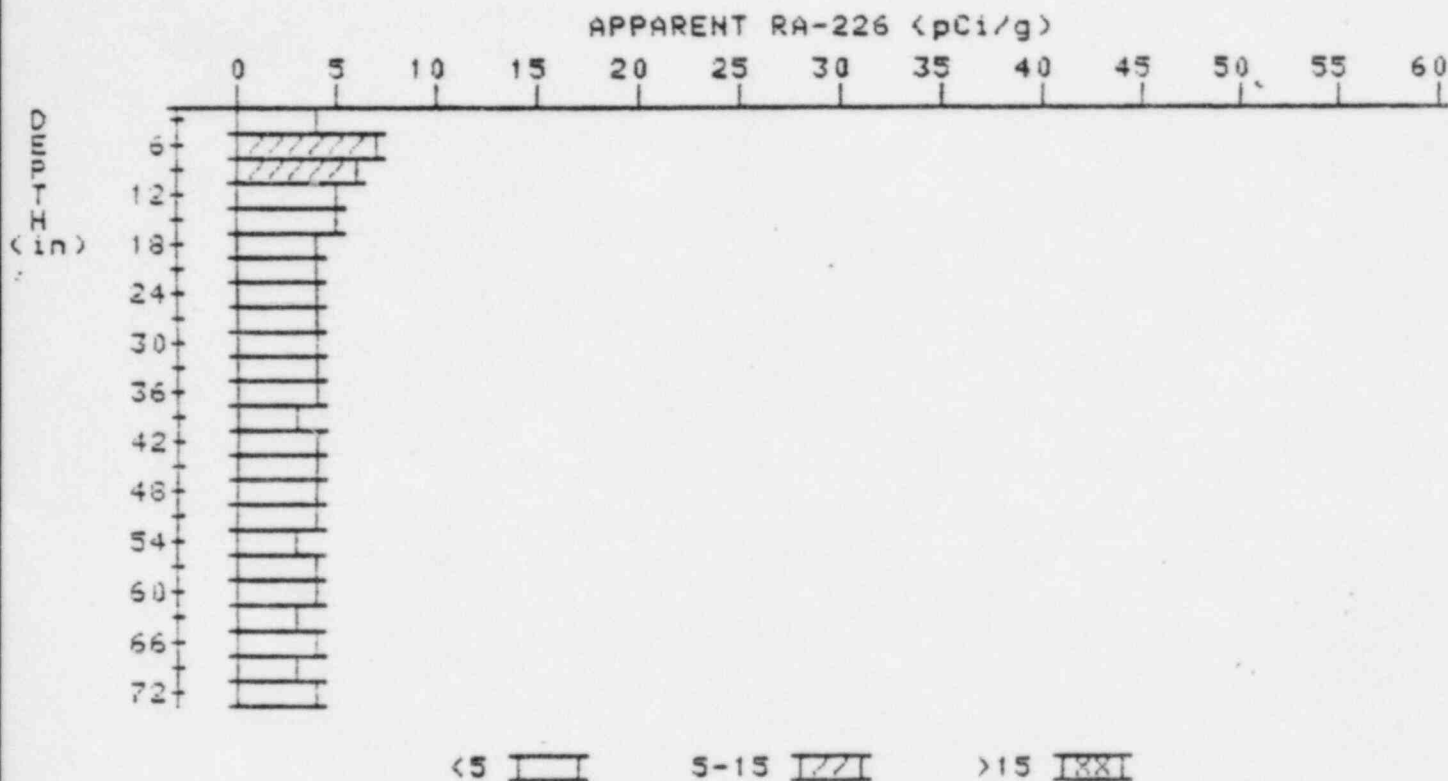


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
=====	=====	=====
3	3.2	3.2
6	3.5	3.7
9	3.7	3.9
12	3.8	4.2
15	3.7	3.3
18	3.8	4.0
21	3.8	3.8
24	3.8	3.8
27	3.8	4.0
30	3.7	3.7

APPARENT RADIUM-226 CONCENTRATION 19

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00237-MR
HOLE NUMBER: 19
LOCATION: 212273



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.9	3.9
6	4.9	6.5
9	5.0	5.7
12	4.7	4.5
15	4.5	4.5
18	4.3	3.9
21	4.3	4.3
24	4.3	4.5
27	4.2	4.2
30	4.1	3.9
33	4.1	4.5
36	3.9	3.7
39	3.8	3.4
42	3.9	4.1
45	3.9	4.1

48
51
54
57
60
63
66
69
72

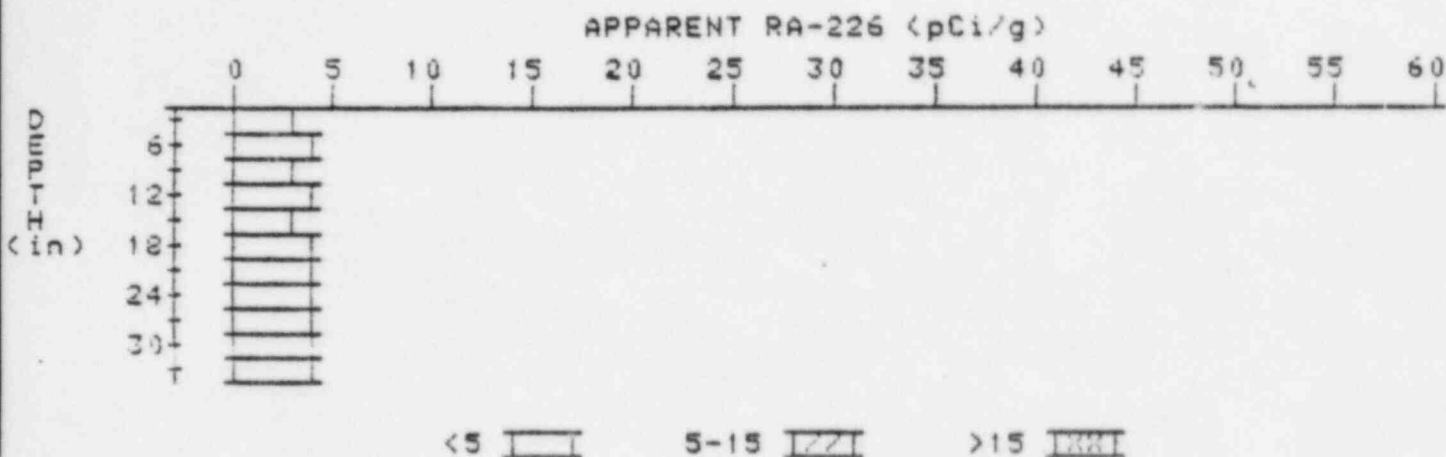
3.3
3.3
3.6
3.6
3.8
3.4
3.6
3.5
3.5

3.6
4.2
3.2
3.3
3.5
2.9
4.1
3.5
3.5

APPARENT RADIUM-226 CONCENTRATION 20

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00237-MR
HOLE NUMBER: 20
LOCATION: 217260



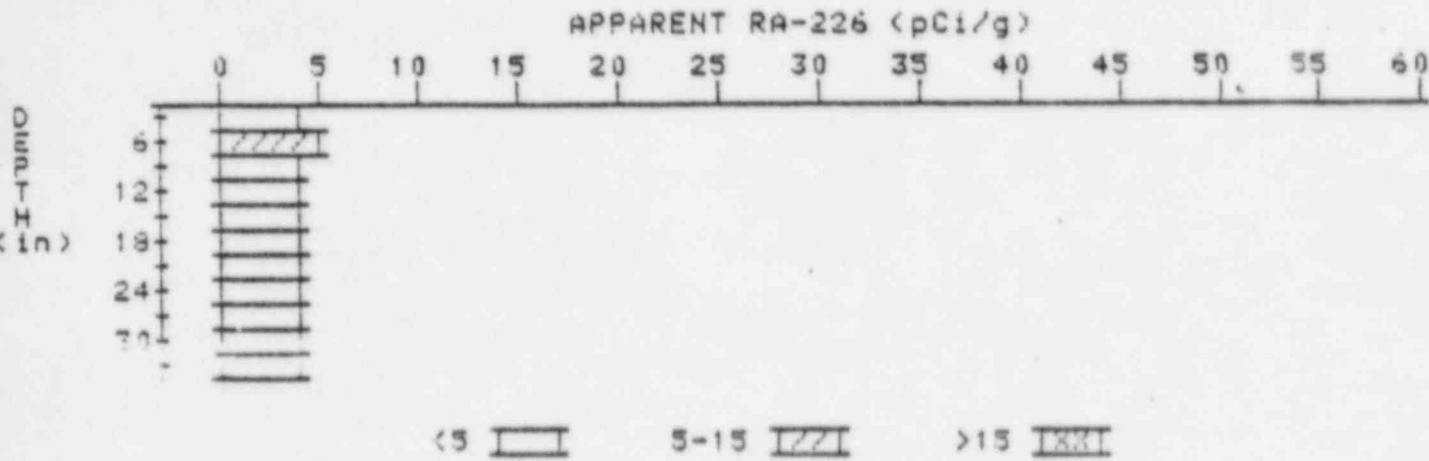
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.9	2.9
6	3.2	3.6
9	3.3	2.9
12	3.6	4.3
15	3.5	3.0
18	3.7	4.1
21	3.7	3.5
24	3.8	4.0
27	3.8	3.8
30	3.8	4.2
33	3.6	3.6

APPARENT RADIUM-226 CONCENTRATION

DECONVOLUTION GRAPH

22

PROPERTY NUMBER: GJ-00237-MR
HOLE NUMBER: 22
LOCATION: 237239



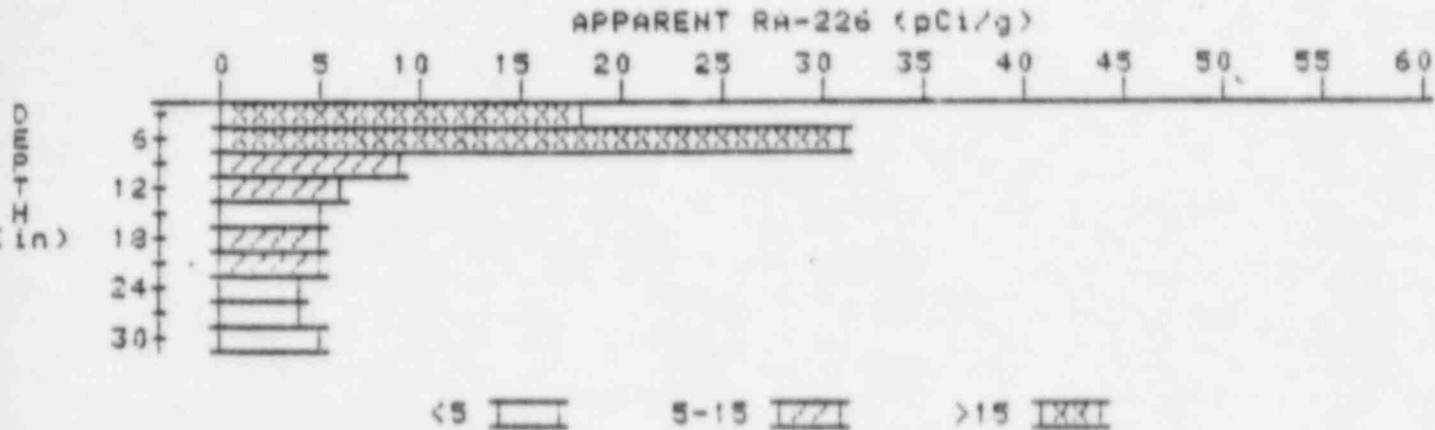
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.0	4.0
6	4.4	5.5
9	4.2	4.2
12	4.0	3.6
15	4.0	4.2
18	3.9	3.7
21	3.9	3.9
24	3.9	4.1
27	3.8	3.6
30	3.8	4.0
33	3.7	3.7

APPARENT RADIUM-226 CONCENTRATION

DECONVOLUTION GRAPH

23

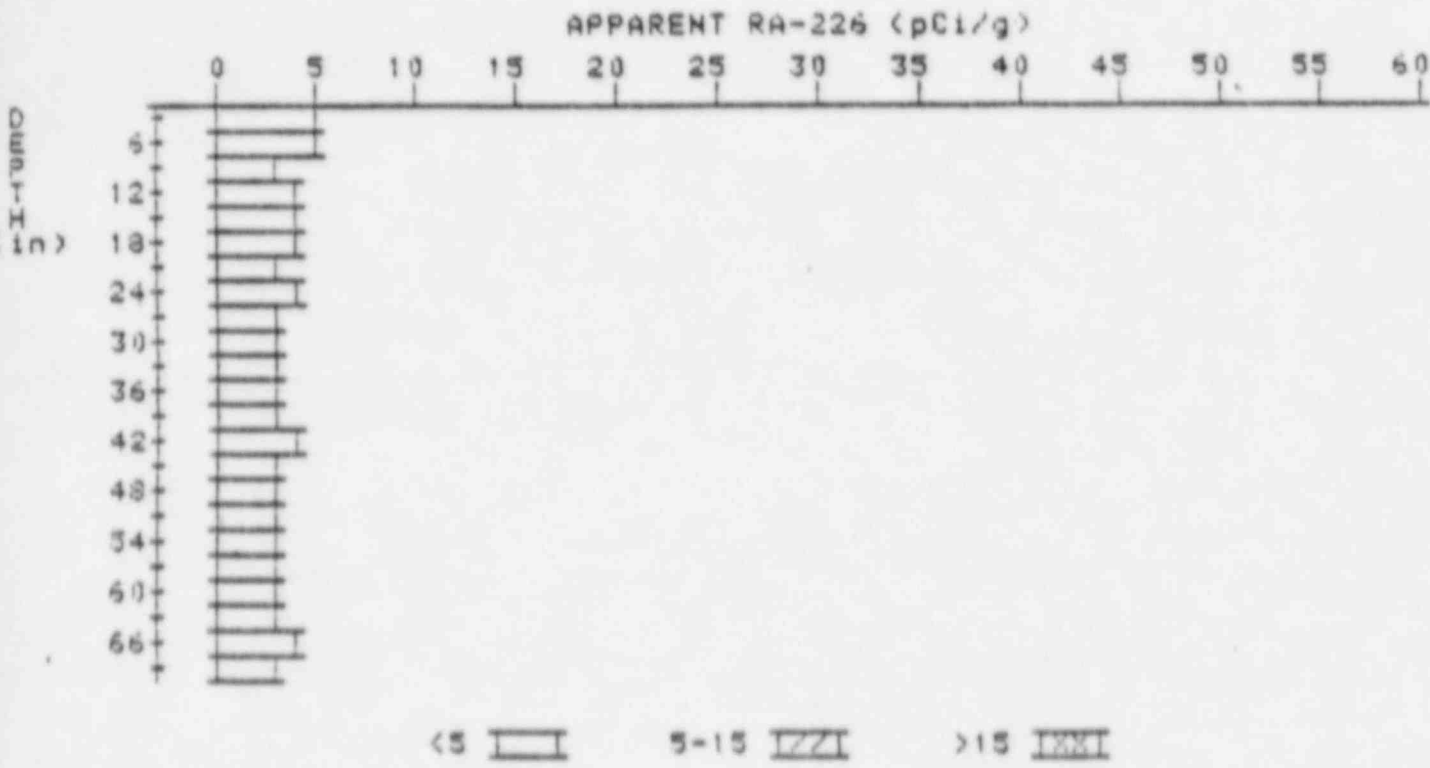
PROPERTY NUMBER: GJ-00237-MR
HOLE NUMBER: 23
LOCATION: 241232



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	18.3	18.3
6	19.0	31.3
9	12.8	8.5
12	9.0	6.2
15	6.8	4.7
18	5.8	5.1
21	5.2	5.0
24	4.7	4.2
27	4.5	4.1
30	4.5	4.5

APPARENT RADIUM-226 CONCENTRATION 25
DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00237-MR
HOLE NUMBER: 25
LOCATION: 263284



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.5	4.5
6	4.4	4.9
9	4.0	3.5
12	3.9	3.9
15	3.8	3.8
18	3.7	3.9
21	3.5	3.1
24	3.5	3.7
27	3.4	3.2
30	3.4	3.4
33	3.4	3.4
36	3.4	3.4
39	3.4	3.2
42	3.5	3.9
45	3.4	3.4

48
51
54
57
60
63
66
69

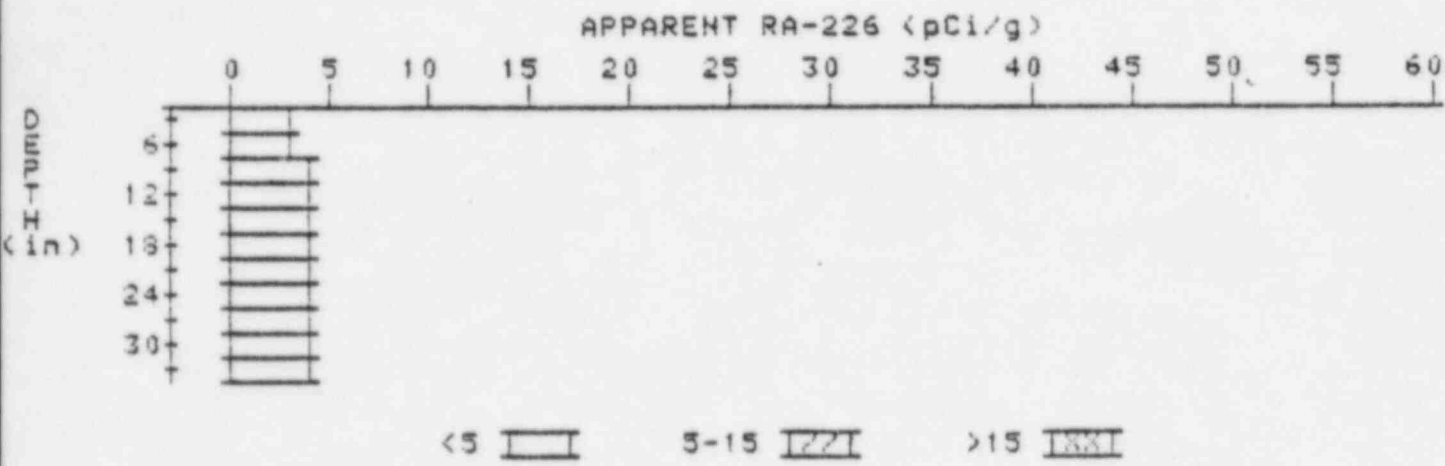
3.3
3.3
3.3
3.2
3.2
3.1
3.2
3.1

3.1
3.3
3.5
3.0
3.4
2.7
3.6
3.1

APPARENT RADIUM-226 CONCENTRATION 27

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00237-MR
HOLE NUMBER: 27
LOCATION: 270255

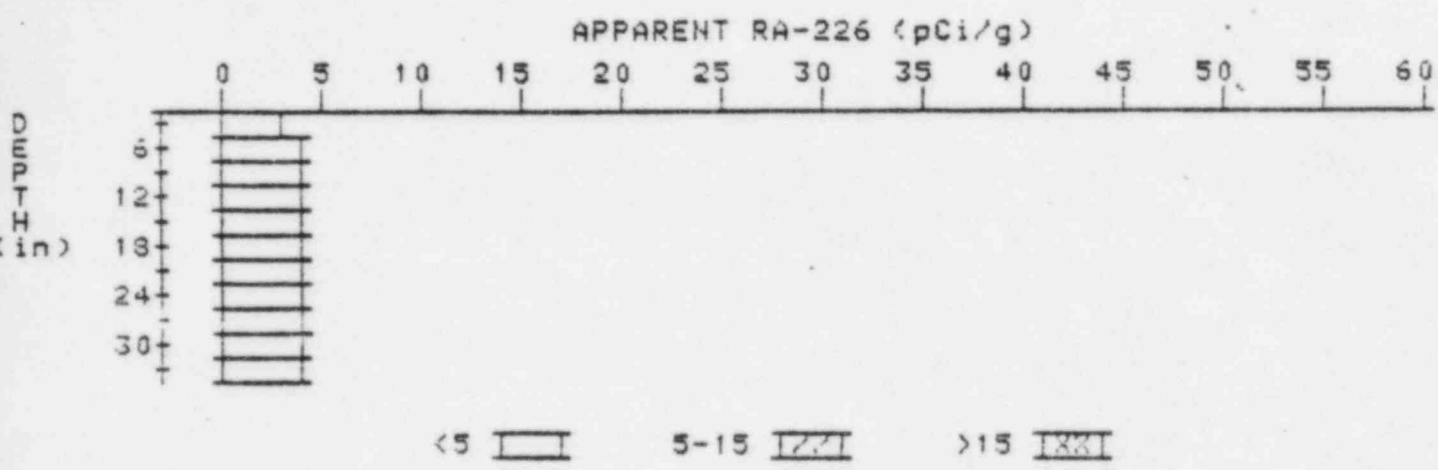


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.0	3.0
6	3.3	3.5
9	3.5	3.7
12	3.6	3.6
15	3.7	3.5
18	3.9	4.4
21	3.8	3.6
24	3.8	3.6
27	3.9	4.3
30	3.8	3.6
33	3.8	3.8

APPARENT RADIUM-226 CONCENTRATION 28

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00237-MR
HOLE NUMBER: 29
LOCATION: 275265

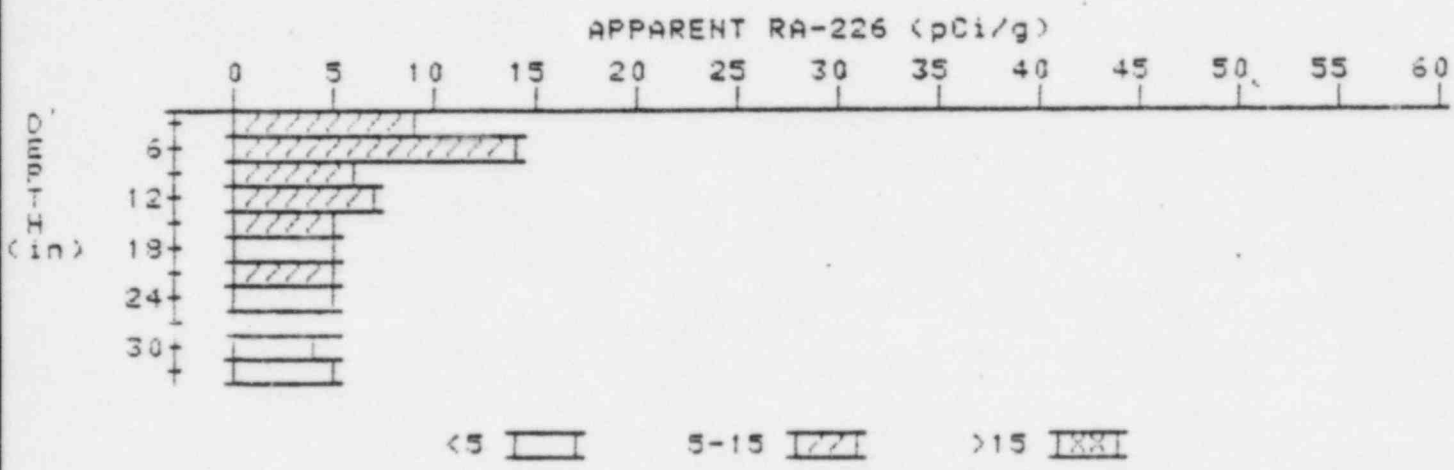


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.1	3.1
6	3.5	3.7
9	3.8	4.2
12	3.9	3.9
15	4.0	4.2
18	4.0	4.0
21	4.0	4.0
24	4.0	4.2
27	3.9	3.9
30	3.8	3.8
33	3.7	3.7

APPARENT RADIUM-226 CONCENTRATION 29

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00237-MR
HOLE NUMBER: 29
LOCATION: 303260



Depth (in)	Apparent Radium-226 (pCi/g)	Apparent Radium-226 (pCi/g)
	Undeconvolved	Deconvolved
3	9.0	9.0
6	9.7	14.1
9	7.9	6.3
12	7.0	7.2
15	6.0	5.1
18	5.5	5.0
21	5.3	5.5
24	5.0	4.6
27	4.9	5.3
30	4.6	4.2
33	4.5	4.5