

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-01362-RS  
ADDRESS: 1318 NORTH 16TH STREET

AUGUST 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

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

APPROVED BY

*Michael K. Tucker*  
M. TUCKER  
DOE PROJECT ENGINEER

DATE

*September 3, 1985*

REA01362:REA-711

8509300103 850903  
PDR WASTE PDR  
WM-54

## 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 . . . . .	4
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-01362-RS, is a single-family residence located at 1318 North 16th Street, Grand Junction, Colorado.

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

### 1.2 Evaluation and Recommendation

The action recommended is the removal of contaminated material and restoration of the property to its original condition. The identified residual radioactive material found on this property is tailings; the estimated volume is: exterior, 33 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action is \$2,271. Remedial action on this property will take approximately 14 days to complete.

## 2.0 PROPERTY DESCRIPTION

### 2.1 General Description

Address: 1318 North 16th Street, Grand Junction, Colorado

Zoning: Residential (RMF-32)

Lot Size: Approximately 8,540 sf (0.20 acres)

Legal Description: Lot 21, Block 1, Parkplace Heights Subdivision, City of Grand Junction, County of Mesa, State of Colorado.

Point of Reference: This property is located approximately 2 mile(s) north of the State of Colorado Tailings Repository. Appendix Figure 2.1 shows the property location relative to its surroundings.

Utilities: Utility locations are shown in Appendix Figure 2.2.

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

Bordering Properties:

North:	Single-family residence
South:	Single-family residence
East:	Alley
West:	North 16th Street

### 2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-story residence
Size:	Approximately 900 sf
Construction Date:	1946
Construction:	Wood-frame
Foundation:	Concrete wall on spread footing
Footing Depth:	Not determined
Basement:	Yes - partial
Crawl Space:	Yes - partial
Condition:	Good



Other Structures:

Type:	Garage
Size:	Approximately 384 sf
Construction:	Wood-frame
Foundation:	Monolithic concrete slab-on-grade
Condition:	Good

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-01362-RS on July 25, 1985. Data collection methods were performed in accordance with procedures fully described in the Radiologic Support Operations Procedures Manual GJ-07(84) (Bendix Field Engineering Corporation, 1984). These data were evaluated to determine the areal and vertical extent of uranium mill tailings contamination at this property as well as any other contaminated material that may have originated from the millsite.

A review of historical information was conducted to determine areas of potential contamination identified during previous radiologic assessments of this property.

The Bendix radiologic survey was designed to investigate the entire property, with emphasis on previously identified areas of contamination. Conclusions based upon data analyses are discussed in Section 3.5, Extent of Contamination. Photocopies of the Official Survey Report, 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 17 uR/h  
Highest Outside Gamma Reading (HOG): 55 uR/h

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

##### 3.2.2 Interior Findings

Background Readings: 13 to 16 uR/h  
Highest Inside Gamma Reading (HIG): 16 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; the locations and types of these investigations are shown in Appendix Figure 3.2. Data from these investigations is 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: Gravel  
Direction From Primary Structure: West  
Total Depth of Contamination: 12 inches  
Other (height or thickness): 2-inch-thick gravel  
Comments: Plastic liner under gravel, 2 deposits  
Approximate Square Footage: 186
- (Area B) Surface Material: Gravel  
Direction From Primary Structure: Northwest  
Other Directions: Northwest property corner  
Total Depth of Contamination: 6 inches  
Other (height or thickness): 2-inch-thick gravel  
Comments: Plastic liner under gravel, 2 deposits  
Approximate Square Footage: 86
- (Area C) Surface Material: Gravel  
Direction From Primary Structure: Northwest  
Other Directions: Northwest property line  
Total Depth of Contamination: 9 inches  
Other (height or thickness): 2-inch-thick gravel  
Comments: Plastic liner under gravel  
Approximate Square Footage: 72
- (Area D) Surface Material: Gravel  
Direction From Primary Structure: West  
Total Depth of Contamination: 6 inches  
Other (height or thickness): 2-inch-thick gravel  
Comments: Plastic liner under gravel, 2 deposits  
Approximate Square Footage: 279
- (Area E) Surface Material: Gravel  
Direction From Primary Structure: North  
Other Directions: North property line and south of Area F  
Total Depth of Contamination: 6 inches  
Other (height or thickness): 2-inch-thick gravel  
Comments: Plastic liner under gravel  
Approximate Square Footage: 101
- (Area F) Surface Material: Gravel  
Direction From Primary Structure: North  
Other Directions: North property line  
Total Depth of Contamination: 15 inches  
Other (height or thickness): 2-inch-thick gravel  
Comments: Plastic liner under gravel  
Approximate Square Footage: 78

- (Area G) Surface Material: Soil  
Direction From Primary Structure: North  
Other Directions: North property line  
Total Depth of Contamination: 12 inches  
Approximate Square Footage: 48
- (Area H) Surface Material: Soil  
Direction From Primary Structure: North  
Other Directions: Adjacent to Area G  
Total Depth of Contamination: 6 inches  
Approximate Square Footage: 60
- (Area I) Surface Material: Soil  
Direction From Primary Structure: Northeast and east  
Total Depth of Contamination: 6 inches  
Comments: 2 deposits  
Approximate Square Footage: 74
- (Area J) Surface Material: Concrete  
Direction From Primary Structure: East  
Total Depth of Contamination: 4 inches  
Other (height or thickness): 4-inch-thick concrete  
Approximate Square Footage: 24
- (Area K) Surface Material: Soil  
Direction From Primary Structure: Northeast and East  
Other Directions: North and east property lines  
Total Depth of Contamination: 6 inches  
Comments: 4 deposits  
Approximate Square Footage: 200
- (Area L) Surface Material: Soil  
Direction From Primary Structure: Southeast  
Other Direction: South and east of garage  
Total Depth of Contamination: 6 inches  
Comments: 2 deposits  
Approximate Square Footage: 184

#### 4.0 RECOMMENDED REMEDIAL ACTION

##### 4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-01362-RS, 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 \$2,271.

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	Exterior Sample Locations
Figure 3.3	Exterior Estimated Extent of Contamination

Official Survey Report

Team Leader Notes

Deconvolution Graphs (Apparent Radium-226 Concentration)

Exterior Gamma Scan Map



## Radium Concentrations at Exterior Locations

DOE ID #GJ-01362-RS

1318 North 16th Street

Page 1 of 8

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
1	134246	00	DS	2.9		*	West of primary structure
		06	DS	2.0		*	
2	137262	00	DS	3.0		*	Northwest of primary structure
		06	DS	1.8		*	
3	140220	00	DS	12.7		*	West of primary structure DC = 12 inches Based on all available data
		03	TC	11.7		*	
		06	TC	12.4		*	
		09	TC	9.7		*	
		12	TC	6.9		*	
		15	TC	5.4		*	
		18	TC	4.6		*	
		21	TC	4.2		*	
		24	TC	4.0		*	
		27	TC	3.9		*	
		30	TC	3.9		*	
		33	TC	3.9		*	
4	140227	00	DS	7.6		*	West of primary structure
		06	DS	2.7		*	
5	145232	03	TC	18.9		*	West of primary structure DC = 12 inches Based on the deconvolution graph
		06	TC	22.3		*	
		09	TC	17.5		*	
		12	TC	12.1		*	
		15	TC	7.8		*	
		18	TC	5.7		*	
		21	TC	4.8		*	
		24	TC	4.3		*	
		27	TC	4.1		*	
		30	TC	3.9		*	
		33	TC	3.9		*	
		36	TC	3.8		*	
6	147213	00	DS	2.2		*	West of primary structure
		06	DS	1.6		*	



## Radium Concentrations at Exterior Locations

DOE ID #GJ-01362-RS

1318 North 16th Street

Page 2 of 8

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
7	150263	00	DS	6.0		*	Northwest of primary structure DC = 9 inches Based on the deconvolution graph
		03	TC	5.8		*	
		06	TC	5.5		*	
		09	TC	4.6		*	
		12	TC	4.0		*	
		15	TC	3.8		*	
		18	TC	3.7		*	
		21	TC	3.5		*	
		24	TC	3.5		*	
		27	TC	3.4		*	
		30	TC	3.3		*	
		33	TC	3.3		*	
		36	TC	3.3		*	
8	164216	00	DS	3.2		*	West of primary structure DC = 6 inches Based on all available data
		03	TC	4.3		*	
		06	TC	4.4		*	
		09	TC	4.2		*	
		12	TC	3.7		*	
		15	TC	3.5		*	
		18	TC	3.3		*	
		21	TC	3.3		*	
		24	TC	3.3		*	
		27	TC	3.3		*	
		30	TC	3.4		*	
		33	TC	3.4		*	
		36	TC	3.4		*	
9	164222	00	DS	<1.0		*	West of primary structure
		06	DS	1.1		*	
10	164257	00	DS	1.2		*	Northwest of primary structure DC = 0 inches
		03	TC	2.5		*	
		06	TC	2.8		*	
		09	TC	2.9		*	
		12	TC	3.1		*	
		15	TC	3.2		*	
		18	TC	3.2		*	
		21	TC	3.2		*	
		24	TC	3.2		*	
		27	TC	3.2		*	
		30	TC	3.2		*	
		33	TC	3.3		*	
		36	TC	3.3		*	
		39	TC	3.3		*	

## Radium Concentrations at Exterior Locations

DOE ID #GJ-01362-RS

1318 North 16th Street

Page 3 of 8

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
11	165217	00	DS	2.8		*	West of primary structure
		06	DS	1.2		*	
12	170234	00	DS	1.9		*	Gas line
		16	DS	1.4		*	On exposed gas line
13	170237	03	TC	3.0		*	Northwest corner of primary structure DC = 0 inches
		06	TC	3.1		*	
		09	TC	3.3		*	
		12	TC	3.3		*	
		15	TC	3.4		*	
		18	TC	3.5		*	
		21	TC	3.6		*	
		24	TC	3.6		*	
		27	TC	3.5		*	
		30	TC	3.6		*	
		33	TC	3.6		*	
		36	TC	3.6		*	
14	186241	00	DS	2.4		*	Background Sewer line DC = 0 inches
		03	TC	2.9		*	
		06	TC	3.0		*	
		09	TC	3.2		*	
		12	TC	3.2		*	
		15	TC	3.3		*	
		18	TC	3.3		*	
		21	TC	3.3		*	
		24	TC	3.3		*	
		27	TC	3.4		*	
		30	TC	3.4		*	
		33	TC	3.5		*	
		36	TC	3.6		*	
		39	TC	3.6		*	
		42	TC	3.7		*	
		45	TC	3.5		*	
		48	TC	3.6		*	
		51	TC	3.5		*	
		54	TC	3.5		*	
		57	TC	3.4		*	
		60	TC	3.3		*	
		63	TC	3.4		*	
		66	TC	3.4		*	
		69	TC	3.4		*	

## Radium Concentrations at Exterior Locations

DOE ID #GJ-01362-RS

1318 North 16th Street

Page 4 of 8

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
15	187206	00	DS	<1.0		*	Water line
		03	TC	2.8		*	DC = 0 inches
		06	TC	3.1		*	
		09	TC	3.2		*	
		12	TC	3.3		*	
		15	TC	3.3		*	
		18	TC	3.2		*	
		21	TC	3.1		*	
16	190255	00	DS	10.8		*	North of
		06	DS	<1.0		*	primary structure
17	190260	00	DS	19.8		*	
		03	TC	12.2		*	North of
		06	TC	17.0		*	primary structure
		09	TC	18.1		*	DC = 15 inches
		12	TC	15.2		*	Based on the
		15	TC	10.5		*	deconvolution graph
		18	TC	7.4		*	
		21	TC	5.7		*	
		24	TC	4.8		*	
		27	TC	4.3		*	
		30	TC	4.1		*	
		33	TC	3.9		*	
		36	TC	3.9		*	
		39	TC	3.9		*	
		42	TC	3.9		*	
18	199258	00	DS	20.9		*	North of
		03	TC	12.6		*	primary structure
		06	TC	13.3		*	DC = 12 inches
		09	TC	10.4		*	Based on the
		12	TC	7.2		*	deconvolution graph
		15	TC	5.4		*	
		18	TC	4.4		*	
		21	TC	3.8		*	
		24	TC	3.6		*	
		27	TC	3.4		*	
		30	TC	3.5		*	
		33	TC	3.6		*	
		36	TC	3.4		*	
		39	TC	3.5		*	

## Radium Concentrations at Exterior Locations

DOE ID #GJ-01362-RS

1318 North 16th Street

Page 5 of 8

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
19	203228	00	DS	2.6		*	
20	204213	00	DS	4.6		*	East of primary structure DC = 4 inches Based on all available data
		03	TC	2.8		*	
		06	TC	3.0		*	
		09	TC	3.2		*	
		12	TC	3.3		*	
		15	TC	3.3		*	
		18	TC	3.3		*	
		21	TC	3.2		*	
		24	TC	3.3		*	
		27	TC	3.2		*	
		30	TC	3.2		*	
		33	TC	3.1		*	
		36	TC	3.2		*	
		39	TC	3.1		*	
21	204245	00	DS	3.3		*	Northeast corner of primary structure DC = 6 inches Based on all available data
		06	DS	2.7		*	
		03	TC	2.9		*	
		06	TC	3.3		*	
		09	TC	3.4		*	
		12	TC	3.5		*	
		15	TC	3.4		*	
		18	TC	3.4		*	
		21	TC	3.4		*	
		24	TC	3.4		*	
		27	TC	3.4		*	
		30	TC	3.3		*	
		33	TC	3.4		*	
		36	TC	3.4		*	
		39	TC	3.4		*	
22	206256	00	DS	5.5		*	Northeast of primary structure
		06	DS	2.1		*	
23	226197	00	DS	2.7		*	Southwest of garage
		06	DS	2.4		*	
24	236263	00	DS	4.3		*	North boundary line
		06	DS	<1.0		*	

## Radium Concentrations at Exterior Locations

DOE ID #GJ-01362-RS

1318 North 16th Street

Page 6 of 8

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
25	237197	00	DS	4.3		*	South of garage
		06	DS	2.9		*	DC = 6 inches
		03	TC	3.6		*	Based on all
		06	TC	3.8		*	available data
		09	TC	3.7		*	
		12	TC	3.8		*	
		15	TC	3.7		*	
		18	TC	3.7		*	
		21	TC	3.7		*	
		24	TC	3.7		*	
		27	TC	3.6		*	
		30	TC	3.7		*	
26	249255	00	DS	15.3		*	Northeast of
		06	DS	1.9		*	primary structure
27	252199	00	DS	1.8		*	East of garage
		06	DS	2.0		*	
28	252204	00	DS	1.9		*	Sewer line
		03	TC	3.8		*	East of garage
		06	TC	4.1		*	DC = 0 inches
		09	TC	4.1		*	
		12	TC	3.9		*	
		15	TC	3.8		*	
		18	TC	3.6		*	
		21	TC	3.6		*	
		24	TC	3.5		*	
		27	TC	3.4		*	
		30	TC	3.4		*	
		33	TC	3.4		*	
		36	TC	3.4		*	
		39	TC	3.3		*	
		42	TC	3.3		*	
		45	TC	3.3		*	
		48	TC	3.3		*	
		51	TC	3.3		*	
		54	TC	3.3		*	
		57	TC	3.4		*	
		60	TC	3.4		*	
		63	TC	3.3		*	
		66	TC	3.2		*	
		69	TC	3.4		*	
		72	TC	3.3		*	

## Radium Concentrations at Exterior Locations

DOE ID #GJ-01362-RS

1318 North 16th Street

Page 7 of 8

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
29	258263	00	DS	3.6		*	North boundary line
		06	DS	1.6		*	
30	262230	00	DS	<1.0		*	East of primary structure
		06	DS	1.0		*	
31	263202	00	DS	1.7		*	East of garage DC = 0 inches
		03	TC	3.2		*	
		06	TC	3.5		*	
		09	TC	3.6		*	
		12	TC	3.6		*	
		15	TC	3.6		*	
		18	TC	3.6		*	
		21	TC	3.6		*	
		24	TC	3.6		*	
		27	TC	3.6		*	
		30	TC	3.5		*	
		33	TC	3.5		*	
		36	TC	3.5		*	
39	TC	3.5		*			
32	263235	00	DS	5.3		*	
		06	DS	1.7		*	
33	263245	00	DS	1.4		*	East boundary line
		06	DS	1.0		*	
34	264250	00	DS	5.4		*	Northeast of primary structure DC = 6 inches Based on all available data
		06	DS	1.3		*	
		03	TC	4.8		*	
		06	TC	4.7		*	
		09	TC	4.2		*	
		12	TC	3.9		*	
		15	TC	3.7		*	
		18	TC	3.7		*	
		21	TC	3.6		*	
		24	TC	3.7		*	
		27	TC	3.6		*	
		30	TC	3.4		*	
		33	TC	3.4		*	
36	TC	3.4		*			
39	TC	3.3		*			

## Radium Concentrations at Exterior Locations

DOE ID #GJ-01362-RS

1318 North 16th Street

Page 8 of 8

```
=====
                        In Situ Ra-226
Loc  Grid      Depth  Meas.      (pCi/g)      Chem Ra-226
#   Location  (in.)  Type  Tot. Ct  Spectr.      (pCi/g)      Comments
-----
35   265207    00     DS       6.6              *      East of garage
      06     DS       1.6              *
=====
```

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 = 07-25-85  
Team Leader = TDH

Table 3.2

## Summary of Interior Gamma Exposure Rates

DOE ID No. GJ-01362-RS 1318 North 16th Street Page 1 of 1

Location	Number of Readings Taken at Waist Level	Range at Waist Level (uR/h)	Mean at Waist Level (uR/h)	Number of Readings Taken at Surface	Range at Surface (uR/h)	Mean Surface (uR/h)
Basement	*	*	*	*	14-16	*
Crawl Space	*	*	*	*	14-16	*
Ground Floor	*	*	*	*	13-15	*
Garage	*	*	*	*	14-16	*

\* A walking gamma scan was performed to confirm the absence of interior contamination.



Table 4.1  
Area and Volume Calculations  
DOE ID No. GJ-01362-RS

Page 1 of 2

<u>AREA</u>	<u>CALCULATIONS(ft)</u>	<u>SF</u>	<u>DEPTH(ft)</u>	<u>CF</u>	<u>CUBIC YARDS</u>
EXTERIOR					
Concrete					
J	6 x 4 =	24	x 0.3 =	7	
				<hr/>	
Volume of Concrete				= 7 =	7/27 = 0.3
Contaminated Fill					
A	6 x 7 =	42			
	12 x 12 =	144			
		<hr/>			
		186	x 1.0 =	186	
B	6 x 4 =	24			
	3 x 10 =	30			
	4 x 8 =	32			
		<hr/>			
		86	x 0.5 =	43	
C	4 x 18 =	72	x 0.8 =	58	
D	18 x 5 =	90			
	15 x 25 =	375			
Minus Area A	=	(186)			
		<hr/>			
		279	x 0.5 =	140	
E	6 x 12 =	72			
	3 x 13 =	39			
		<hr/>			
		101	x 0.5 =	51	
F	6 x 13 =	78	x 1.3 =	101	
G	6 x 8 =	48	x 1.0 =	48	
H	20 x 3 =	60	x 0.5 =	30	

Table 4.1  
Area and Volume Calculations  
DOE ID No. GJ-01362-RS

<u>AREA</u>	<u>CALCULATIONS(ft)</u>	<u>SF</u>	<u>DEPTH(ft)</u>	<u>CF</u>	<u>CUBIC YARDS</u>
I	4 x 6 =	24			
	5 x 10 =	50			
		<hr/>			
		74	x 0.5 =	37	
K	4 x 5 =	20			
	2 x 30 =	60			
	5 x 15 =	75			
	3 x 15 =	45			
		<hr/>			
		200	x 0.5 =	100	
L	8 x 14 =	112			
	4 x 18 =	72			
		<hr/>			
		184	x 0.5 =	92	
				<hr/>	
TOTAL VOLUME - EXTERIOR				= 886 =	886/27 = 33

See Appendix Figure 3.3 For Areas

=====

EXTERIOR

Remove/replace section of concrete patio 24 sf @ \$3.50/sf	\$ 84
Remove identified residual radioactive material 28 cy @ \$14.50/cy (machine-open) 5 cy @ \$44/cy (manual-open)	406 220
Remove/replace decorative rock 800 sf @ \$.25/sf	200
Replace plantings Lump sum	300
	<hr/>
TOTAL EXTERIOR	\$ 1,210
TOTAL INTERIOR	0
ACCESS CONTROL	200
	<hr/>
SUBTOTAL	\$ 1,410
CONTINGENCY @ 15%	212
	<hr/>
SUBTOTAL	\$ 1,622
CONTRACTOR OVERHEAD & PROFIT @ 40%	649
	<hr/>
GRAND TOTAL	\$ 2,271

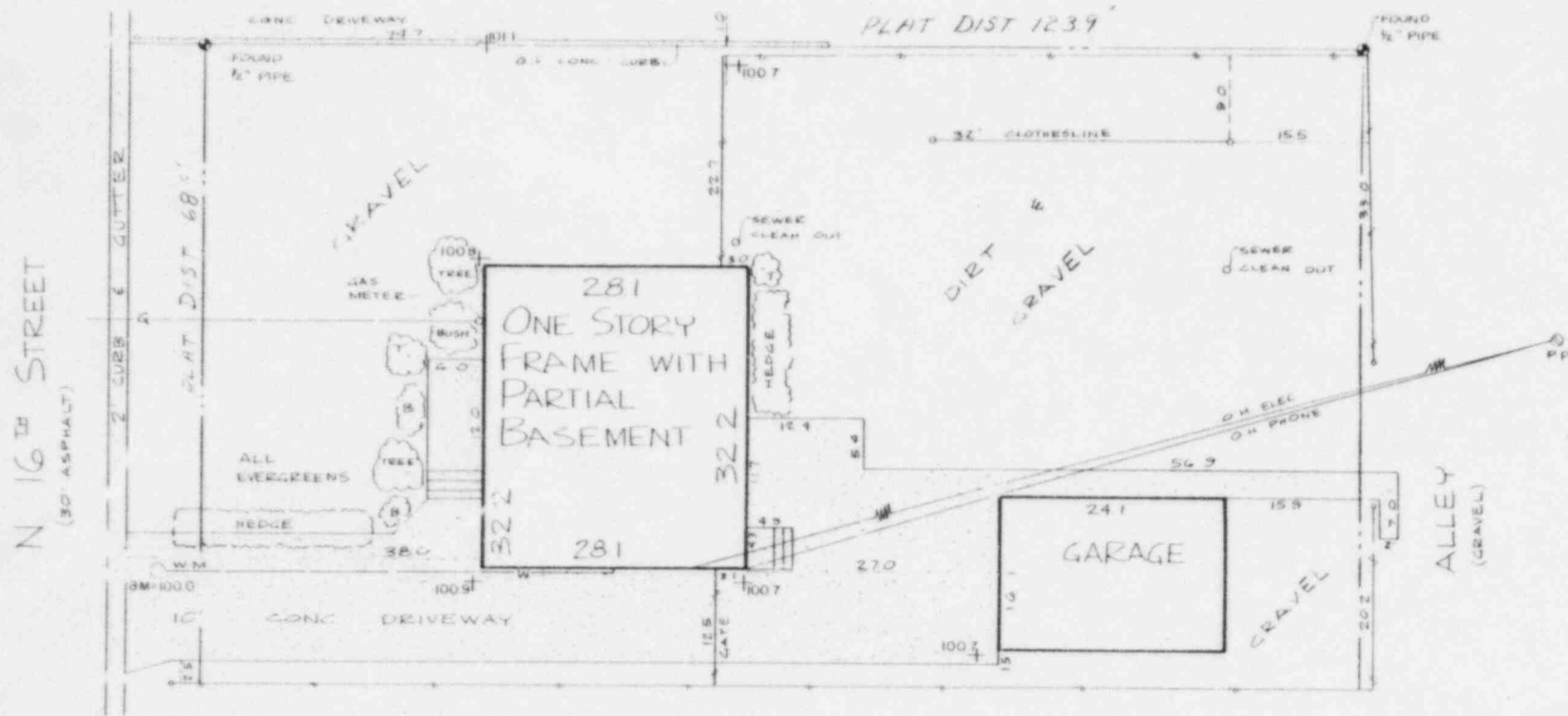
=====

RR082985  
REA01362/REA-711/AP



FIGURE 2.1  
VICINITY MAP






LOT 21 BLOCK 1 PARKPLACE HEIGHTS  
GRAND JUNCTION MESA COUNTY COLO.



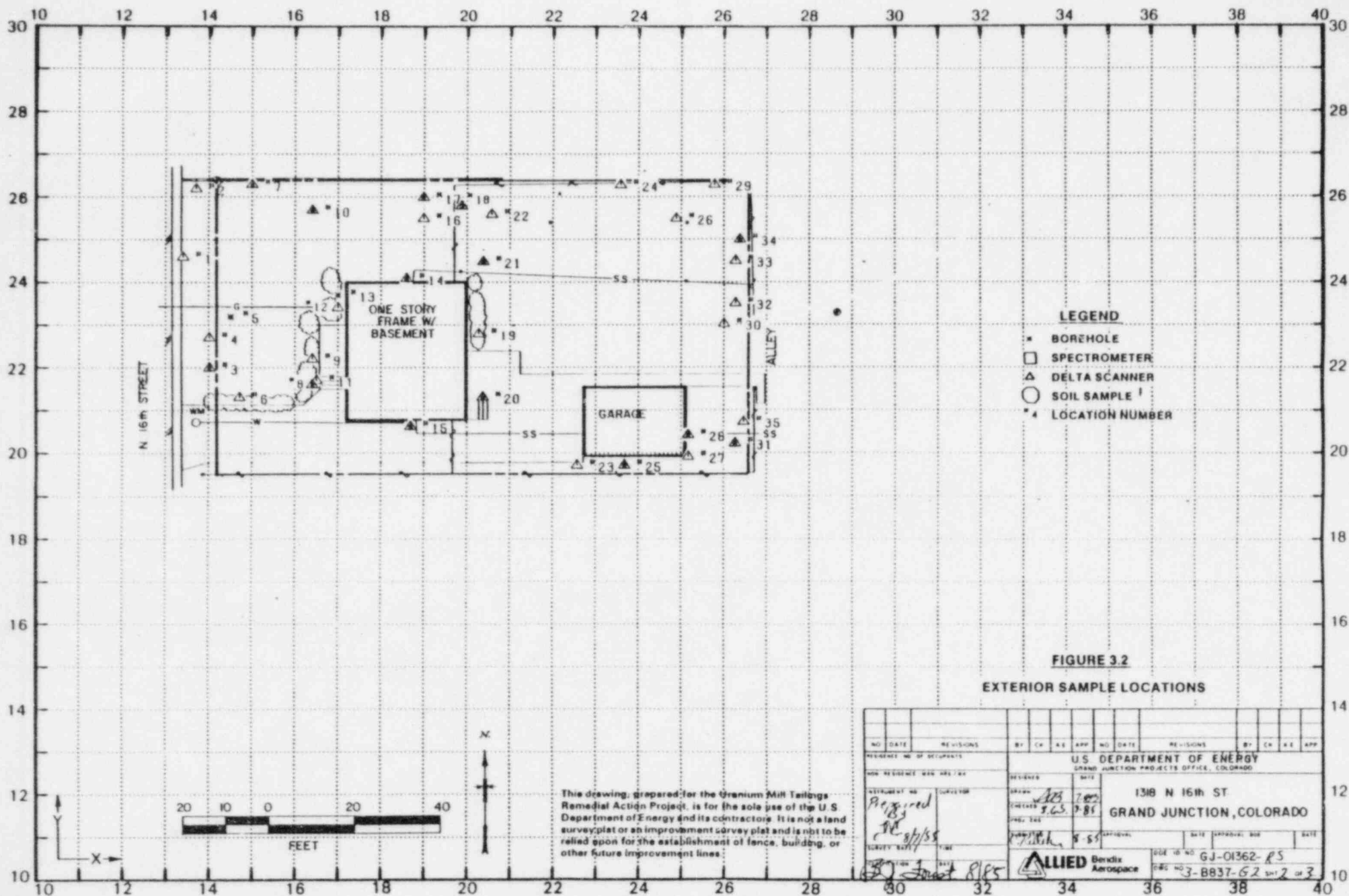
This drawing, prepared for the Uranium Mill Tailings Remedial Action Project, is for the sole use of the U.S. Department of Energy and its contractors. It is not a land survey plat or an improvement survey plat and is not to be relied upon for the establishment of fence, building, or other future improvement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

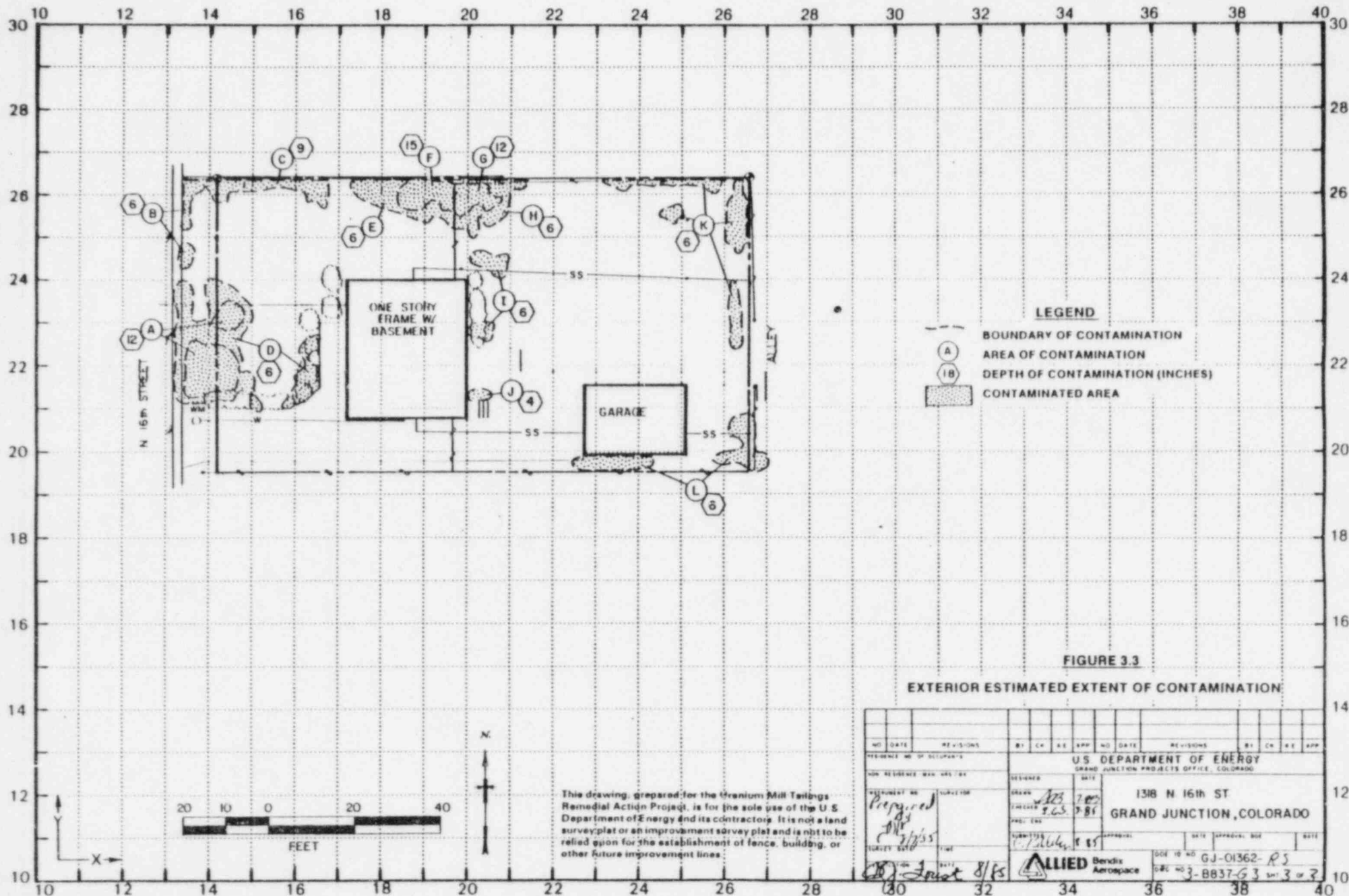
FIGURE 2.2 SITE PLAN

U.S. DEPARTMENT OF ENERGY			DOE ID NO
GRAND JUNCTION PROJECT OFFICE COLORADO			GJ01362R5
ADDRESS 1318 N 16 <sup>TH</sup> ST			 Allied Firms Engineering Corporation Grand Junction Office - 1318 N 16 <sup>TH</sup> ST GRAND JUNCTION, COLO
GRAND JUNCTION, COLO			
SURV TJ/1-17-85	DRAFT TJ/1-19-85	CK 1	SHEET 1 OF 1
DRAWING NO 30837 F-1			











3/85

DOE ID NO. GJ-01362-RS

Date 8-6-85

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

Official Survey Report

Property Address 1318 North 16th Street

Property Owner Eldion Reeves

Address of Owner (if different from above) Same

Report Prepared By T. Dean Herrera

I. PRESENCE/ABSENCE OF RESIDUAL RADIOACTIVE MATERIALS

☐ No evidence of residual radioactive material on surveyed property.

☒ Residual radioactive materials found at the following locations:

☒ In open areas.

☐ Under or around exterior improvements.

☒ Under or around a typically nonoccupied structure.

☐ Under or around a typically occupied structure.

II. RESULTS OF RADIOLOGIC ASSESSMENT

☐ Levels of radiation from residual radioactive materials, if any, do not exceed EPA Standards and no action is required under the Uranium Mill Tailings Remedial Action Project.

☒ 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 = 16 uR/h  
HOG = 55 uR/h

MEMORANDUM

ALLIED Bendix  
Aerospace

Bendix Field Engineering Corporation  
Grand Junction Operations  
Grand Junction, Colorado

Date: July 25, 1985

To: Files

From: T.D. Herrera/Vickie Hebel

Subject: Team Leader Notes - GJ-01362-RS

Address: 1318 North 16th Street

Owner: Eldion Reeves

Occupancy: Two

Year Built: 1946

Arrival Time: 7:40 AM

Team Members

V. Hebel (Team Leader)  
D. Herrera/Assistant Team Leader  
D. Dow  
S. Larsen

V. Rothman  
D. Bell  
H. Lucero  
N. Wallace

Instruments

See Equipment Summary sheet

The property was gridded.

All utility lines were investigated.

Mr. Reeves informed us that he had two sewer lines. The team members had to core the water line due to concrete surrounding the south side of the primary structure. As the water line was augered, we discovered the sewer line. This was the second line Mr. Reeves had informed us of earlier.

Team Leader Notes  
T.D. Herrera/V. Hebel  
GJ-01362-RS  
July 25, 1985  
Page 2

Team members investigated for spillover on both the north and south sides of the property, no elevated gamma readings were found.

The interior scan showed no elevated gamma readings in the crawl space, basement, or ground floors.

Colorado Department of Health (CDH) and Oak Ridge National Laboratory (ORNL) data indicates elevated gamma readings north and southwest of the primary structure in the front yard and east of the garage. Our exterior scan confirmed these findings.

The survey was completed at 2:15 PM. All team members were alpha scanned before returning to the office.

Date: August 5, 1985

#### Revisit

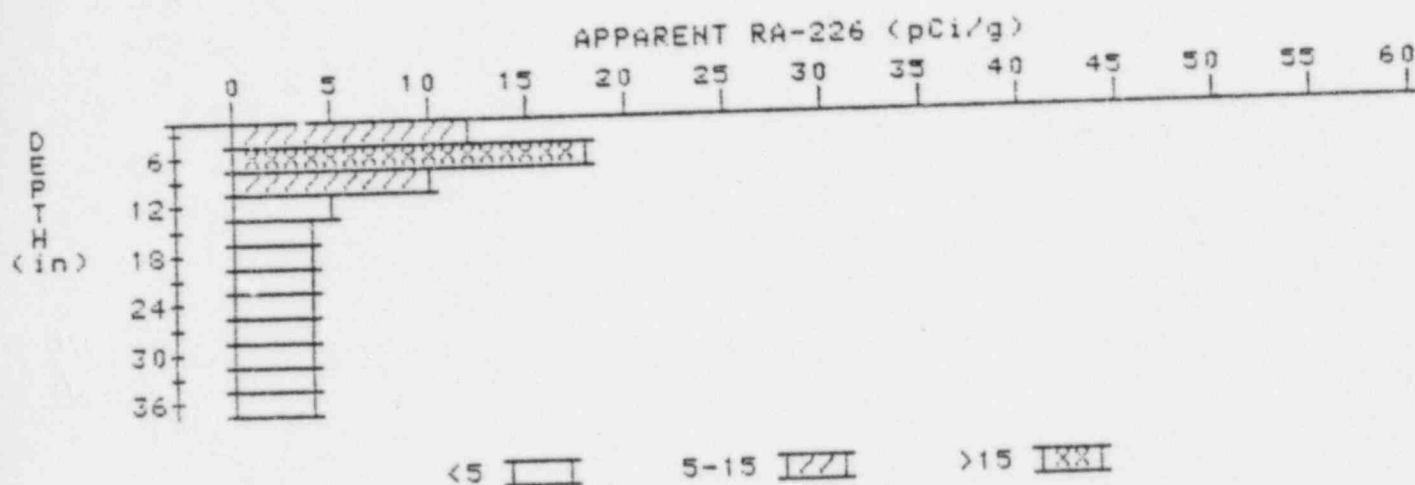
I returned to the property in order to obtain additional data. Two grid point readings were overlooked on the south side of the primary structure, no elevated gamma readings were noted.

Three delta readings were also taken in order to characterize the background hole west of the primary structure, next to the front stairway, and on the northeast side of the primary structure.

# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

3

PROPERTY NUMBER: GJ-01362-RS  
HOLE NUMBER: 3  
LOCATION: 140220



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	11.7	11.7
6	12.4	12.4
9	9.7	9.9
12	6.9	4.6
15	5.4	4.2
18	4.6	3.9
21	4.2	3.8
24	4.0	3.8
27	3.9	3.7
30	3.9	3.9
33	3.9	3.7
36	4.0	4.0

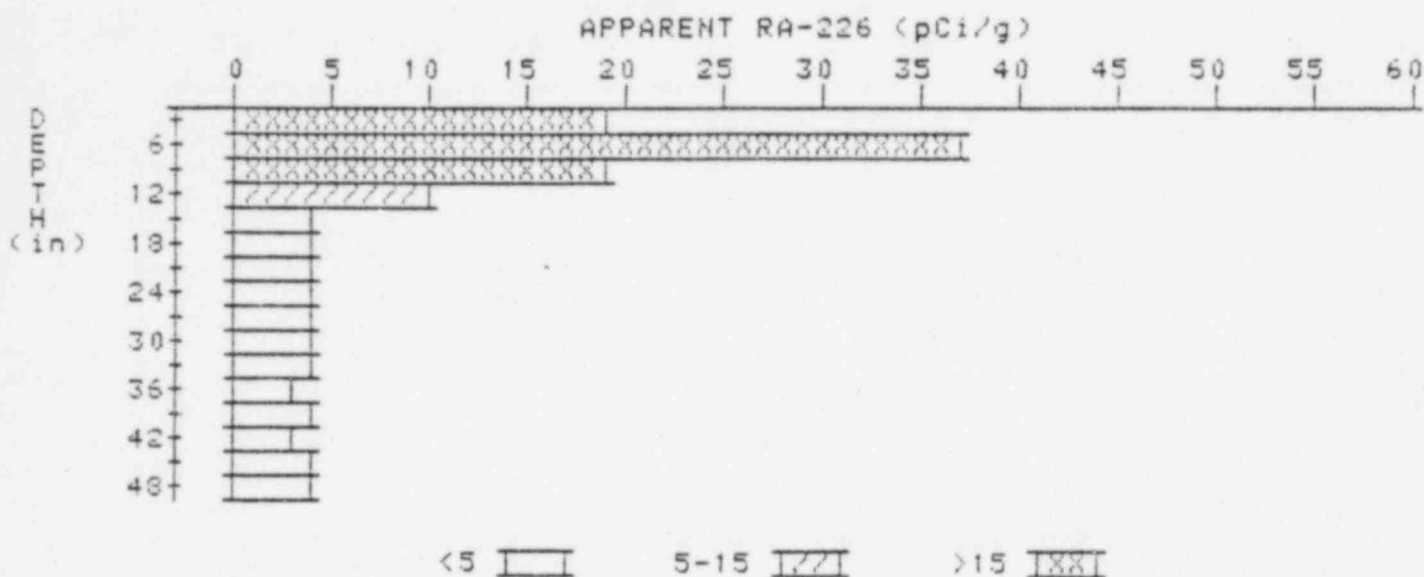
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

5

PROPERTY NUMBER: GJ-01362-RS

HOLE NUMBER: 5

LOCATION: 145232



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	18.9	18.9
6	22.3	36.9
9	17.5	18.6
12	12.1	10.1
15	7.8	3.9
18	5.7	3.6
21	4.8	4.1
24	4.3	3.8
27	4.1	4.1
30	3.9	3.5
33	3.9	4.1
36	3.8	3.4
39	3.9	4.4
42	3.7	3.2
45	3.8	3.8
48	3.9	3.9

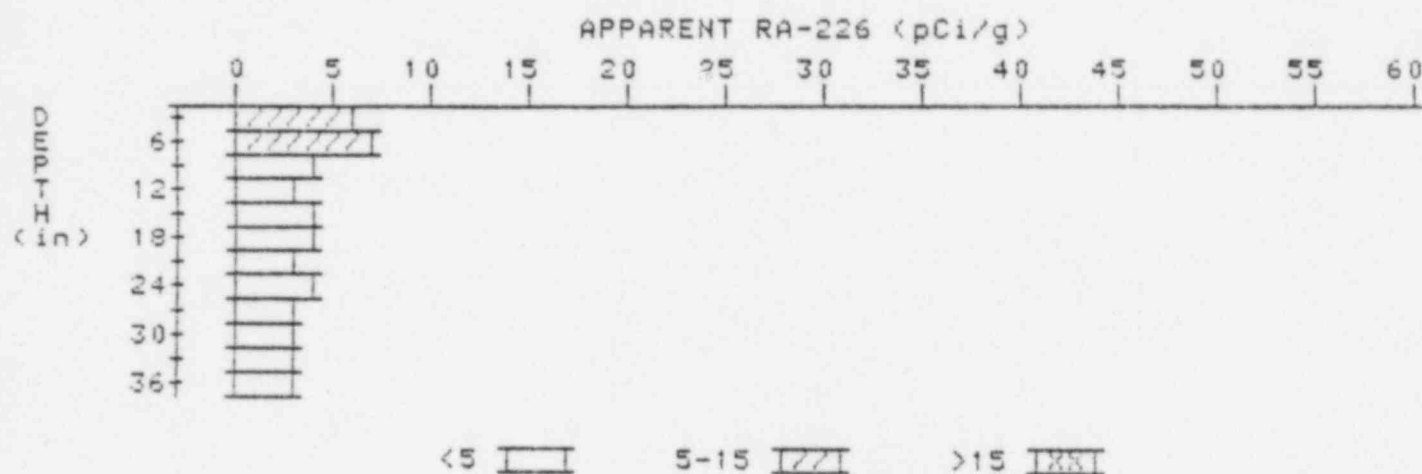
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

7

PROPERTY NUMBER: GJ-01362-RS

HOLE NUMBER: 7

LOCATION: 150263

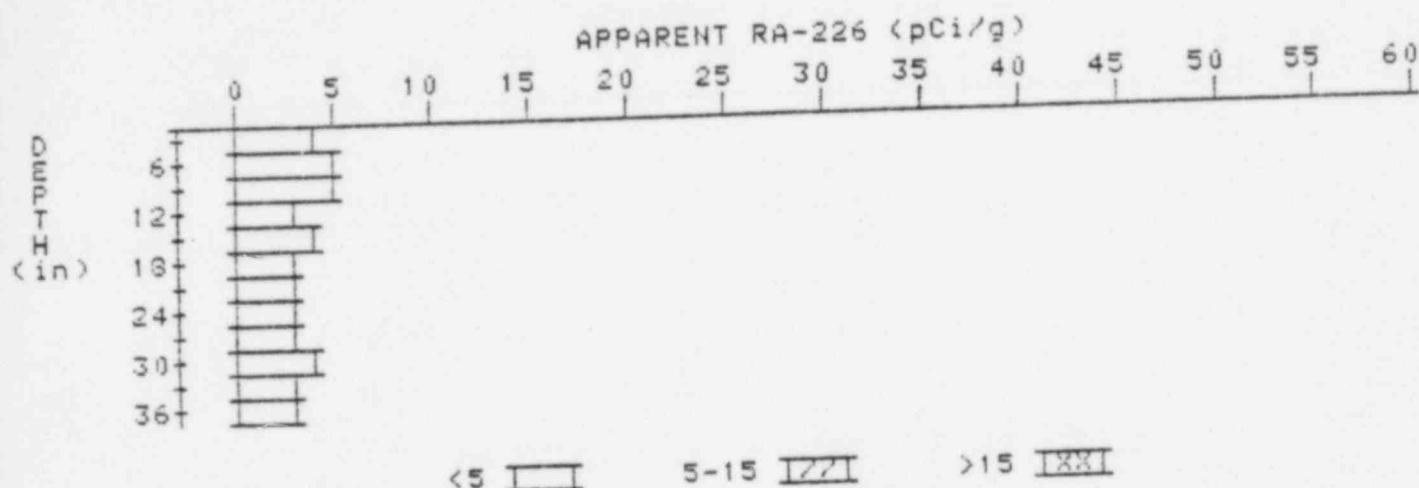


Depth (in)	Apparent Radium-226 (pCi/g)	Apparent Radium-226 (pCi/g)
	Undeconvolved	Deconvolved
3	5.3	5.3
6	5.5	6.6
9	4.6	4.1
12	4.0	3.3
15	3.8	3.6
18	3.7	3.9
21	3.5	3.1
24	3.5	3.7
27	3.4	3.4
30	3.3	3.1
33	3.3	3.3
36	3.3	3.3

# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

8

PROPERTY NUMBER: GJ-01362-RS  
HOLE NUMBER: 8  
LOCATION: 164216



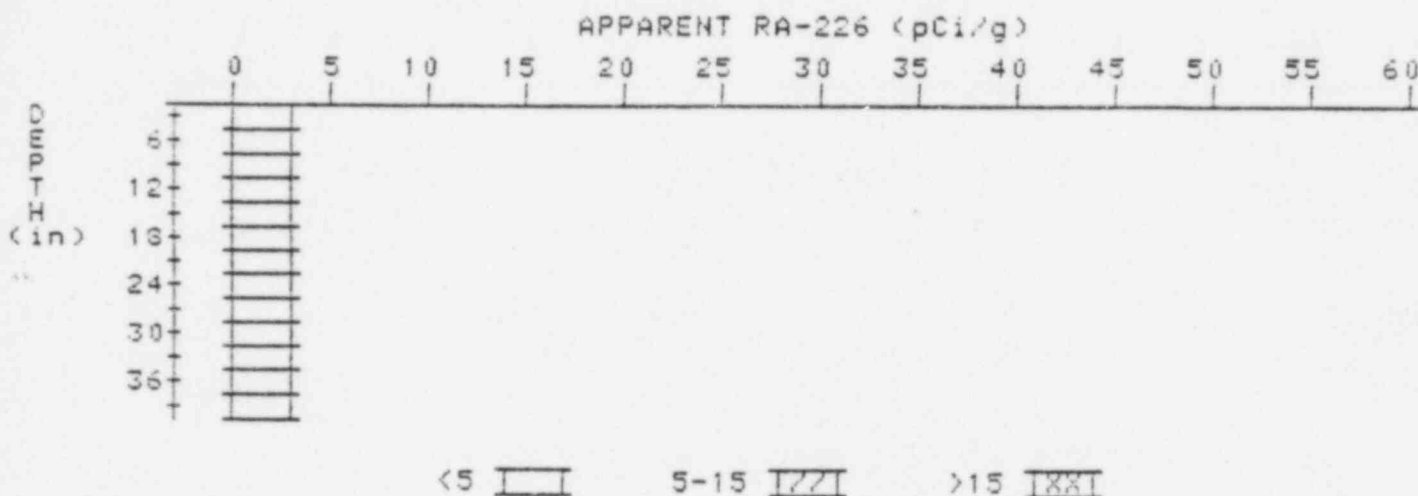
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.3	4.3
6	4.4	4.9
9	4.2	4.7
12	3.7	3.2
15	3.5	3.5
18	3.3	2.9
21	3.3	3.3
24	3.3	3.3
27	3.3	3.1
30	3.4	3.6
33	3.4	3.4
36	3.4	3.4

# APPARENT RADIUM-226 CONCENTRATION 10 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01362-RS

HOLE NUMBER: 10

LOCATION: 164257



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.5	2.5
6	2.8	3.2
9	2.9	2.7
12	3.1	3.3
15	3.2	3.4
18	3.2	3.2
21	3.2	3.2
24	3.2	3.2
27	3.2	3.2
30	3.2	3.0
33	3.3	3.5
36	3.3	3.3
39	3.3	3.3



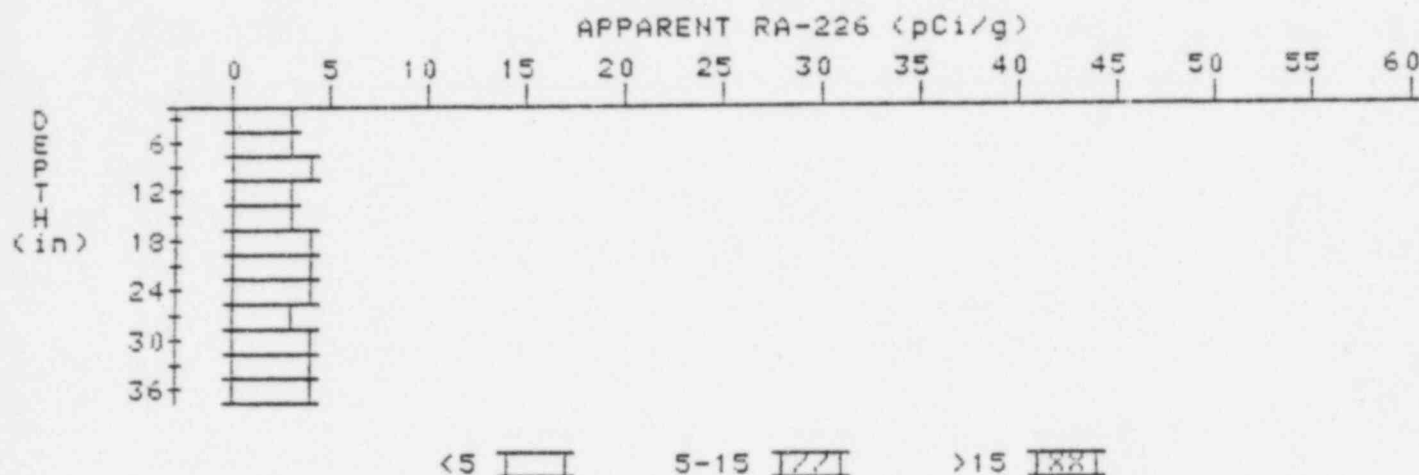
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

13

PROPERTY NUMBER: GJ-01362-RS

HOLE NUMBER: 13

LOCATION: 170237



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
=====	=====	=====
3	3.0	3.0
6	3.1	2.9
9	3.3	3.7
12	3.3	3.1
15	3.4	3.4
18	3.5	3.5
21	3.6	3.8
24	3.6	3.8
27	3.5	3.1
30	3.6	3.8
33	3.6	3.6
36	3.6	3.6

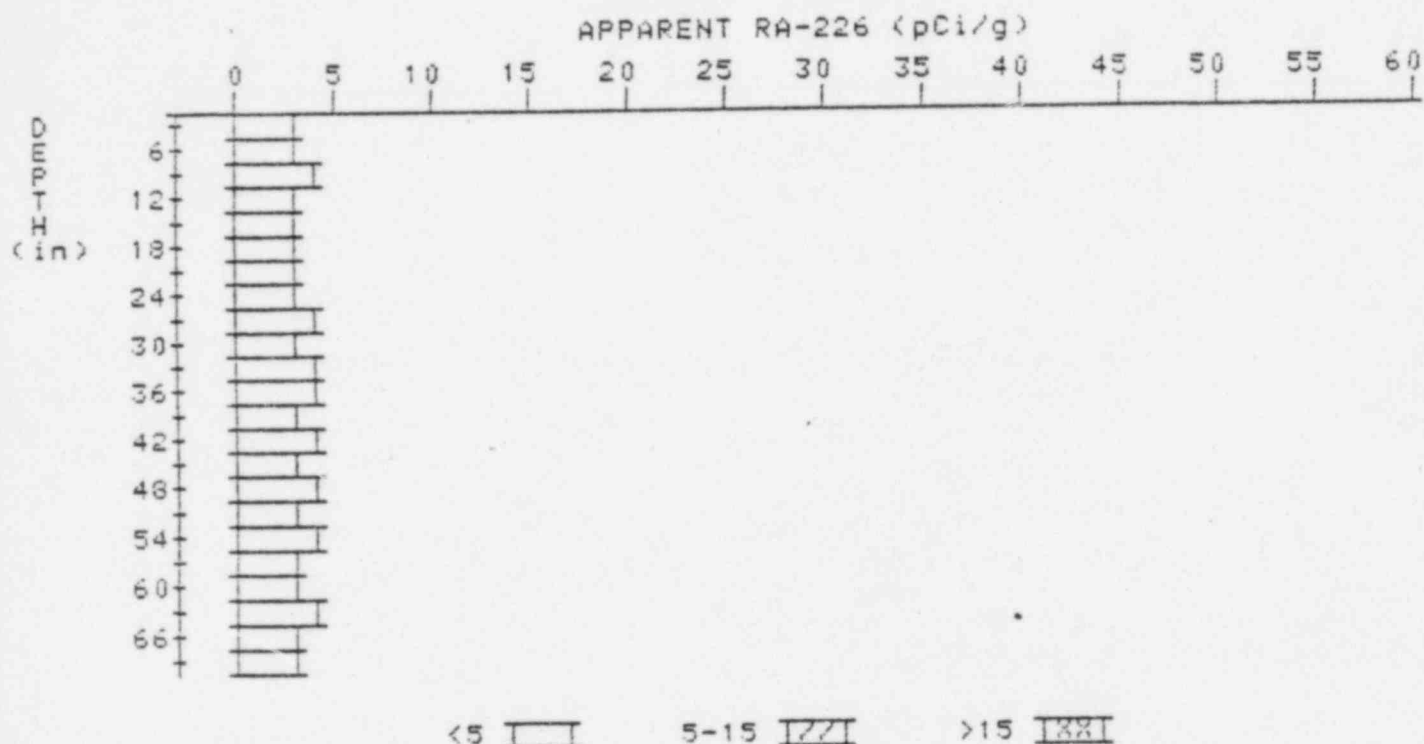
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

14

PROPERTY NUMBER: GJ-01362-RS

HOLE NUMBER: 14

LOCATION: 136241



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.9	2.9
6	3.0	2.8
9	3.2	3.6
12	3.2	3.0
15	3.3	3.5
18	3.3	3.3
21	3.3	3.3
24	3.3	3.1
27	3.4	3.6
30	3.4	3.2
33	3.5	3.5
36	3.6	3.8
39	3.6	3.4
42	3.7	4.2
45	3.5	3.0

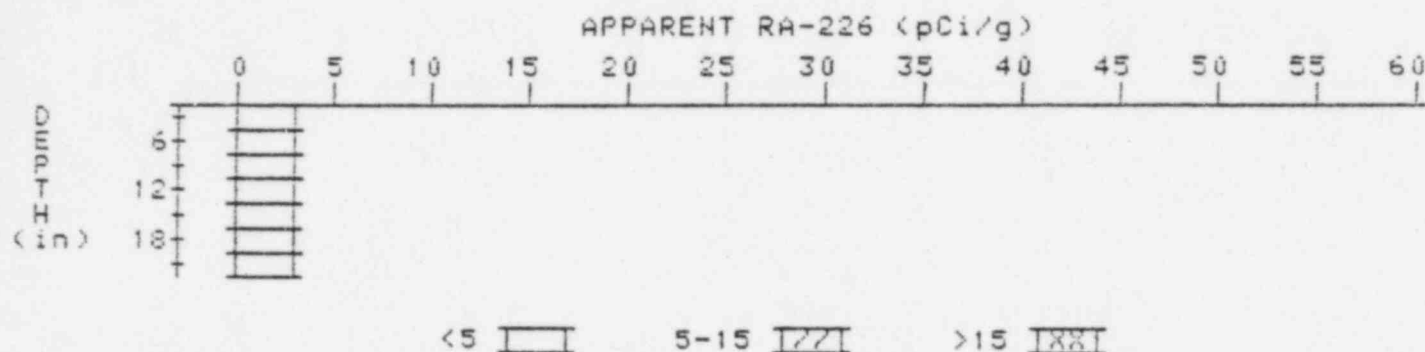
4.  
51  
54  
57  
60  
63  
66  
69

6 . 4  
6 . 4  
6 . 4  
6 . 4  
6 . 4  
6 . 4  
6 . 4

63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

# APPARENT RADIUM-226 CONCENTRATION 15 DECONVOLUTION GRAPH

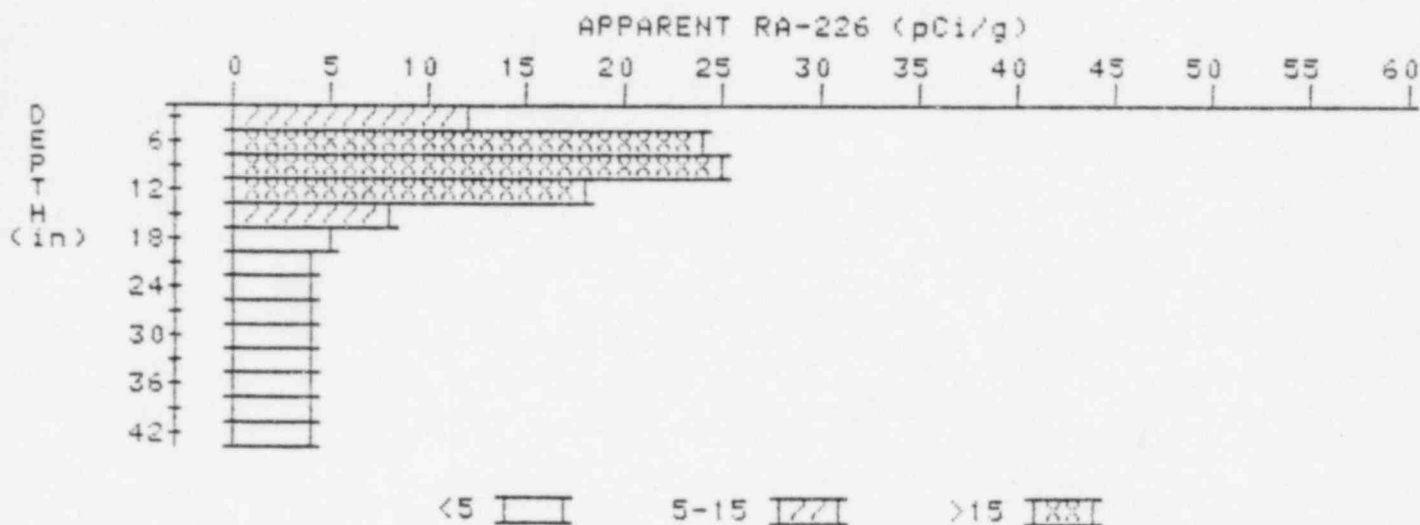
PROPERTY NUMBER: GJ-01362-RS  
HOLE NUMBER: 15  
LOCATION: 187206



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.8	2.8
6	3.1	3.5
9	3.2	3.2
12	3.3	3.5
15	3.3	3.5
18	3.2	3.2
21	3.1	3.1

# APPARENT RADIUM-226 CONCENTRATION 17 DECONVOLUTION GRAPH

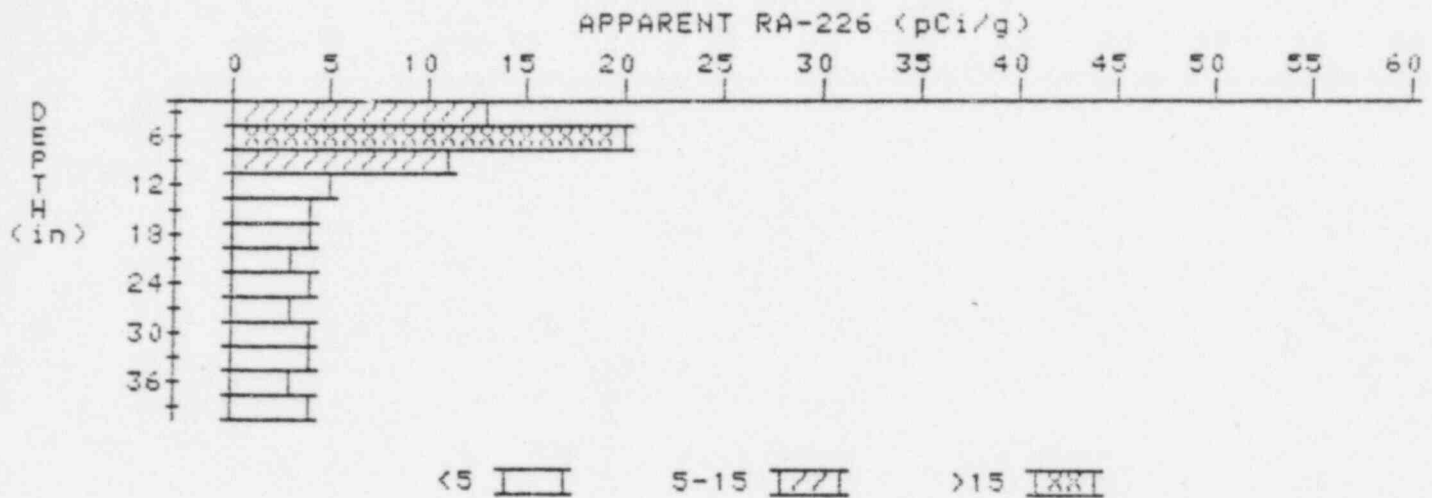
PROPERTY NUMBER: GJ-01362-RS  
HOLE NUMBER: 17  
LOCATION: 190260



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	12.2	12.2
6	17.0	23.6
9	18.1	25.2
12	15.2	18.4
15	10.5	7.7
18	7.4	4.9
21	5.7	4.3
24	4.8	4.1
27	4.3	3.8
30	4.1	4.1
33	3.9	3.5
36	3.9	3.9
39	3.9	3.9
42	3.9	3.9

# APPARENT RADIUM-226 CONCENTRATION 18 DECONVOLUTION GRAPH

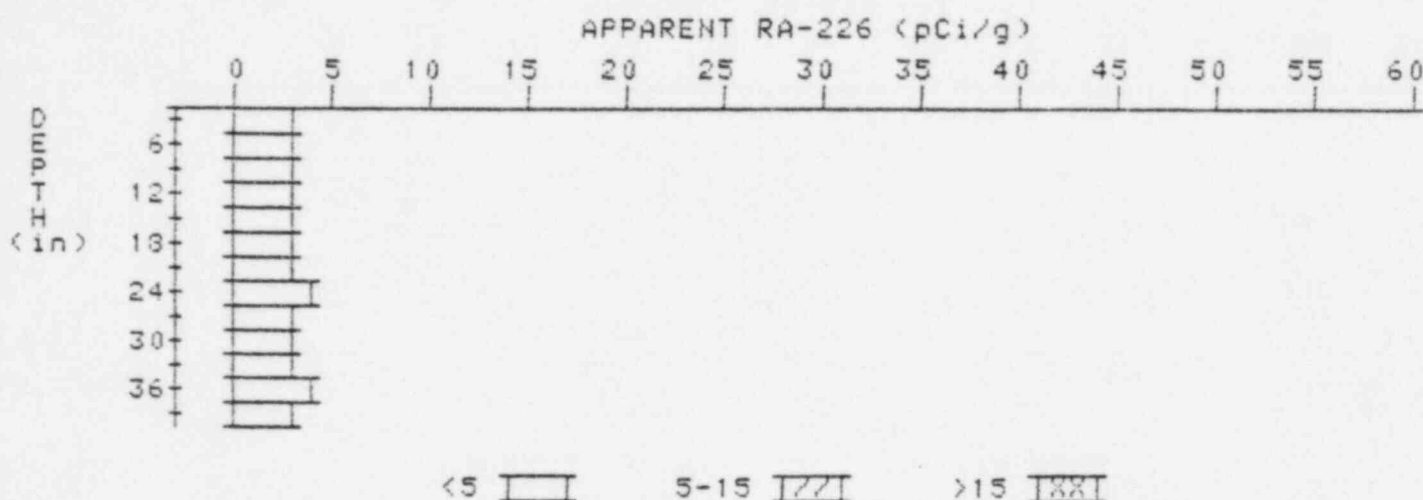
PROPERTY NUMBER: GJ-01362-RS  
HOLE NUMBER: 18  
LOCATION: 199258



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	12.6	12.6
6	13.3	19.7
9	10.4	10.9
12	7.2	4.7
15	5.4	4.0
18	4.4	3.7
21	3.8	3.1
24	3.6	3.6
27	3.4	2.9
30	3.5	3.5
33	3.6	4.1
36	3.4	2.9
39	3.5	3.5

# APPARENT RADIUM-226 CONCENTRATION 20 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01362-RS  
HOLE NUMBER: 20  
LOCATION: 204213



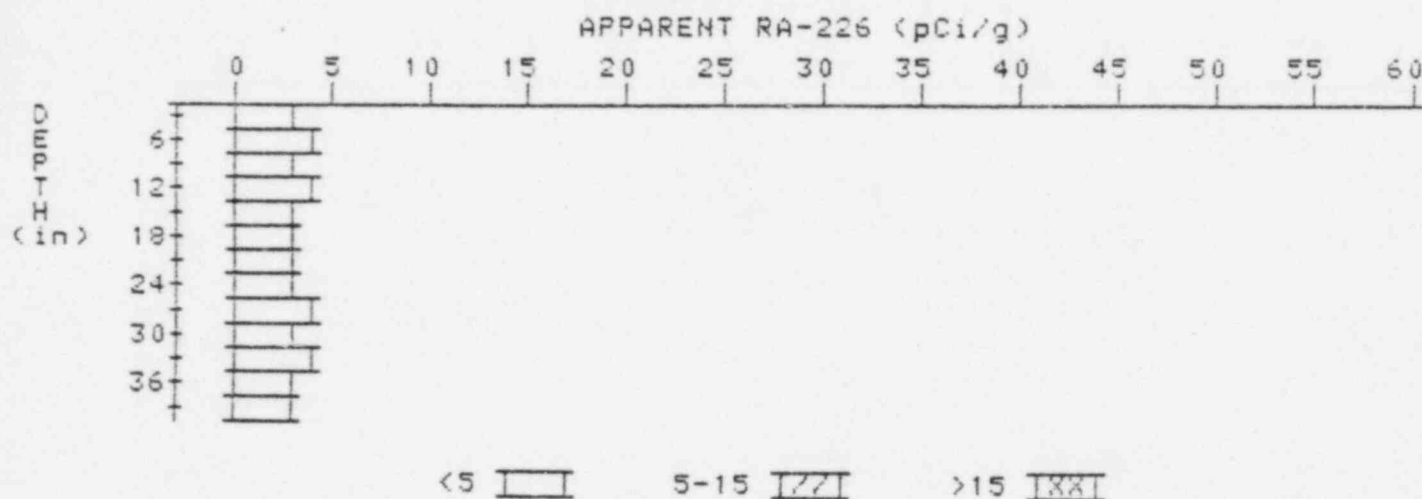
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.8	2.8
6	3.0	3.0
9	3.2	3.4
12	3.3	3.5
15	3.3	3.3
18	3.3	3.5
21	3.2	2.8
24	3.3	3.7
27	3.2	3.0
30	3.2	3.4
33	3.1	2.7
36	3.2	3.6
39	3.1	3.1

# APPARENT RADIUM-226 CONCENTRATION 21 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01362-RS

HOLE NUMBER: 21

LOCATION: 204245

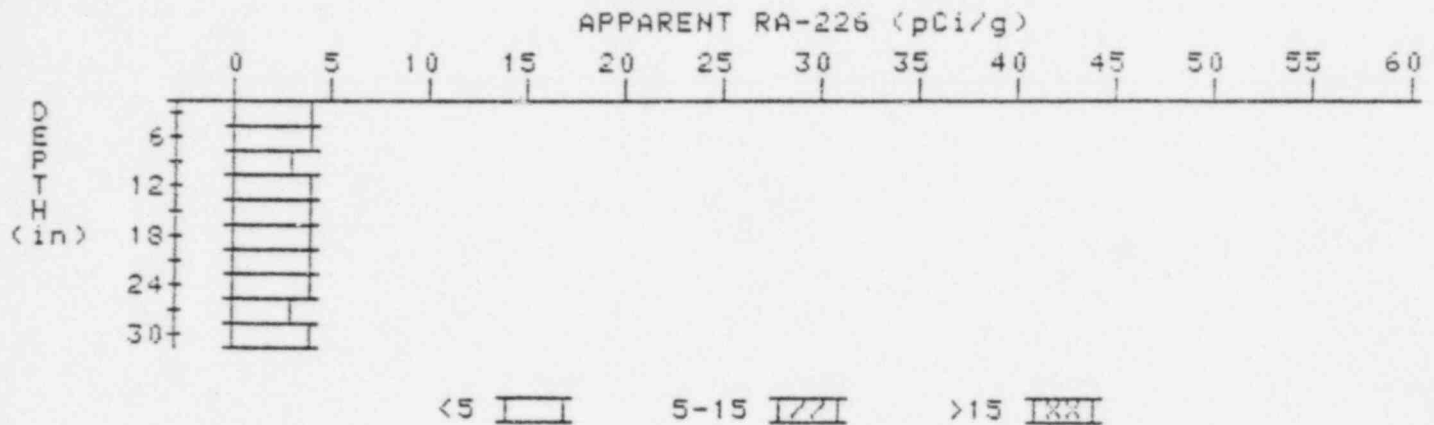


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.9	2.9
6	3.3	3.8
9	3.4	3.4
12	3.5	3.9
15	3.4	3.2
18	3.4	3.4
21	3.4	3.4
24	3.4	3.4
27	3.4	3.6
30	3.3	2.9
33	3.4	3.6
36	3.4	3.4
39	3.4	3.4



# APPARENT RADIUM-226 CONCENTRATION 25 DECONVOLUTION GRAPH

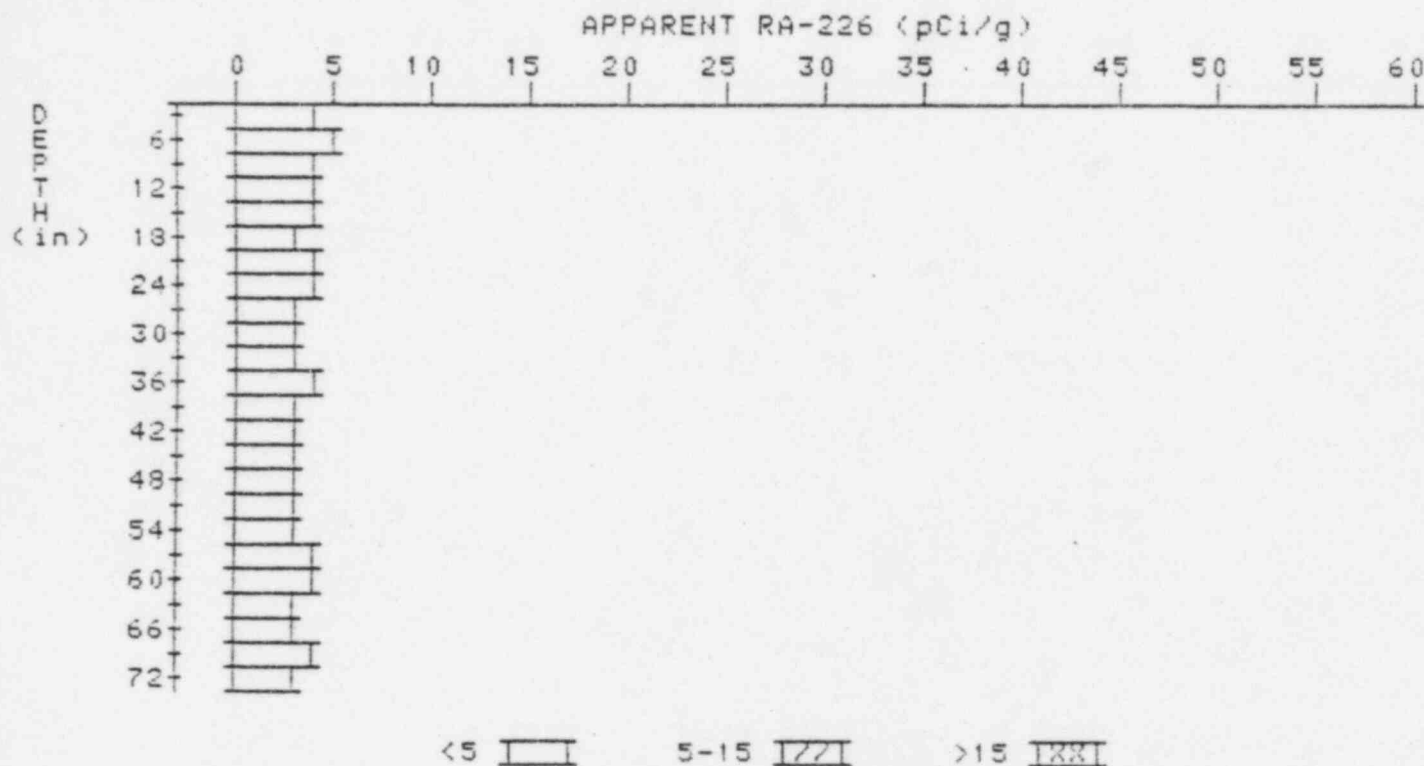
PROPERTY NUMBER: GJ-01362-RS  
HOLE NUMBER: 25  
LOCATION: 237197



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.6	3.6
6	3.8	4.3
9	3.7	3.3
12	3.8	4.2
15	3.7	3.5
18	3.7	3.7
21	3.7	3.7
24	3.7	3.9
27	3.6	3.2
30	3.7	3.7

# APPARENT RADIUM-226 CONCENTRATION 28 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01362-RS  
HOLE NUMBER: 28  
LOCATION: 252204



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.8	3.8
6	4.1	4.6
9	4.1	4.5
12	3.9	3.7
15	3.8	4.0
18	3.6	3.2
21	3.6	3.8
24	3.5	3.5
27	3.4	3.2
30	3.4	3.4
33	3.4	3.4
36	3.4	3.6
39	3.3	3.1
42	3.3	3.3
45	3.3	3.3

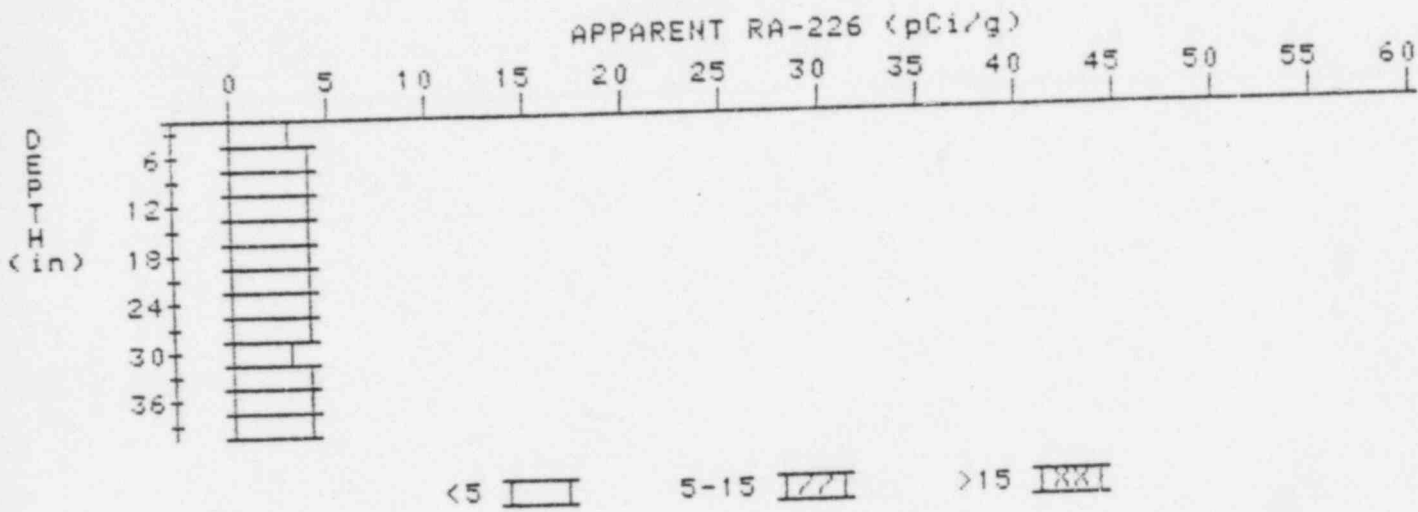
48  
51  
54  
57  
60  
63  
66  
69  
72

3.3  
3.3  
3.3  
3.4  
3.4  
3.3  
3.2  
3.4  
3.3

3.3  
3.3  
3.1  
3.6  
3.6  
3.3  
2.7  
3.9  
3.3

# APPARENT RADIUM-226 CONCENTRATION 31 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01362-RS  
HOLE NUMBER: 31  
LOCATION: 263202



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

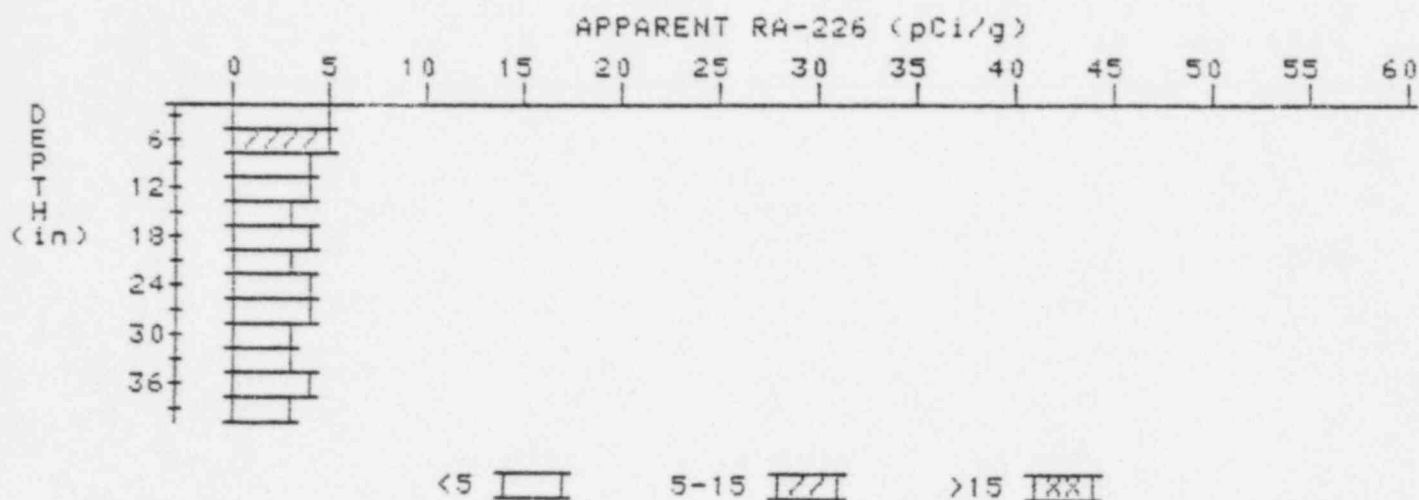
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

34

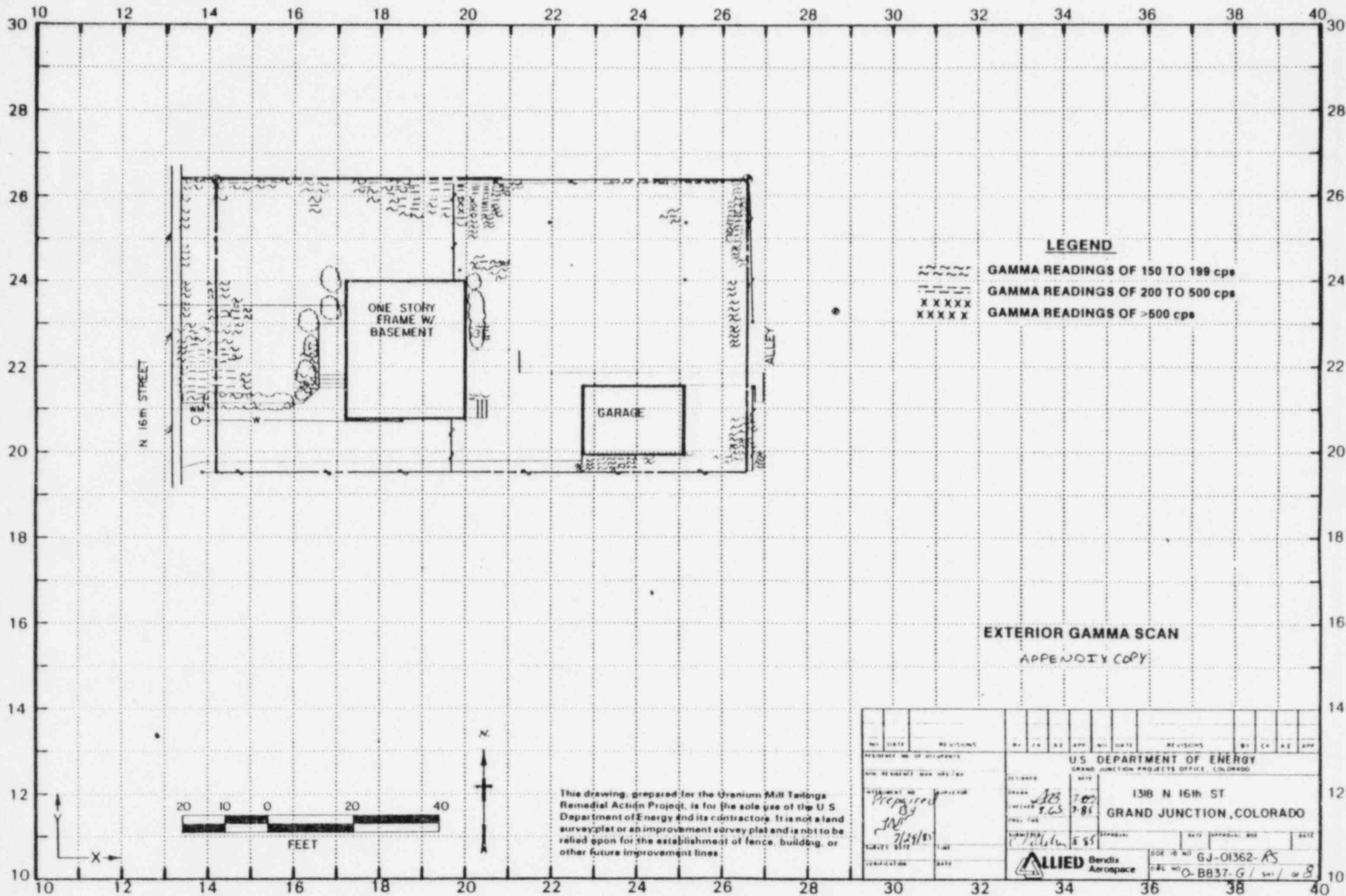
PROPERTY NUMBER: GJ-01362-RS

HOLE NUMBER: 34

LOCATION: 264250



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.8	4.8
6	4.7	5.4
9	4.2	3.8
12	3.9	3.7
15	3.7	3.3
18	3.7	3.9
21	3.6	3.2
24	3.7	4.1
27	3.6	3.8
30	3.4	3.0
33	3.4	3.4
36	3.4	3.6
39	3.3	3.3



NO.	DATE	REVISIONS	BY	DATE	NO.	DATE	REVISIONS	BY	DATE	NO.	DATE	REVISIONS	BY	DATE
U.S. DEPARTMENT OF ENERGY GRAND JUNCTION PROJECTS OFFICE, COLORADO														
1318 N 16th ST GRAND JUNCTION, COLORADO														
DRAWN: JES CHECKED: T.G.S. DATE: 7/29/85														
APPROVED: [Signature] DATE: 8/5/85														
ALLIED Bendix Aerospace														
GJC NO. GJ-01362-A5 GJC NO. 0-BB37-G / SH / W 8														