

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-12020-RS  
ADDRESS: 1308 WELLINGTON AVENUE

AUGUST 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

BENDIX FIELD ENGINEERING CORPORATION  
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*August 26, 1985*

REA12020:REA-710

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## 1.0 EXECUTIVE SUMMARY

### 1.1 Introduction

The location, DOE ID No. GJ-12020-RS, is a single-family residence located at 1308 Wellington 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, 250 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is \$9,775. Remedial action on this property will take approximately 21 days to complete.

## 2.0 PROPERTY DESCRIPTION

### 2.1 General Description

Address: 1308 Wellington Avenue, Grand Junction, Colorado

Zoning: Residential (RSF-8)

Lot Size: Approximately 21,780 sf (0.5 acres)

Legal Description: Beginning southwest corner of Lot 40, Block 11, Fairmont Subdivision, Section 12, T1S, R1W, Ute Meridian, thence East 100.0 feet, North 217.8 feet, West 100.0 feet, South 217.8 feet to beginning, City of Grand Junction, County of Mesa, State of Colorado.

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

### 2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-story residence
Size:	Approximately 1,740 sf
Construction Date:	1936
Construction:	Wood-frame
Foundation:	Concrete stemwall
Footing Depth:	Approximately from 36" to 55" to bottom of footing from grade
Basement:	Yes - partial
Crawl Space:	Yes - partial
Condition:	Good

Other Structures:

Type:	Garage/Carport
Size:	Approximately 483 sf
Construction:	Wood-frame
Foundation:	Concrete slab-on-grade in the garage
Condition:	Good

Type:	Shed
Size:	Approximately 132 sf
Construction:	Prefabricated metal
Foundation:	None
Condition:	Good

General Remarks:

There is an "Above Ground" swimming pool and wood deck north of the main structure. 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-12020-RS on July 19, 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 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, Memo of Understanding, 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): 47 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: 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; the locations and types of these investigations are shown in Appendix Figures 3.2 and 3.3. Data from these investigations is 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) Surface Material: Wood  
 Direction From Primary Structure: North  
 Other Directions: Under metal storage shed  
 Total Depth of Contamination: Estimated at 6 inches  
 Comments: The depth of contamination is based on data collected in Area C, measured from soil surface.  
 Approximate Square Footage: 130
- (Area B) Surface Material: Soil  
 Direction From Primary Structure: Northeast  
 Other Directions: In orchard  
 Total Depth of Contamination: 12 inches  
 Comments: This area contains several mature fruit trees. It is likely the contamination will be deeper around their roots.  
 Approximate Square Footage: 2,905
- (Area C) Surface Material: Soil  
 Direction From Primary Structure: North  
 Other Directions: Northwest corner of property  
 Total Depth of Contamination: 6 inches  
 Comments: This area is split by Area D.  
 Approximate Square Footage: 3,186
- (Area D) Surface Material: Soil  
 Direction From Primary Structure: North  
 Other Directions: Underneath deck adjacent to pool  
 Total Depth of Contamination: Estimated at 6 inches  
 Comments: The deck is 54 inches high, and built of wood. The depth of contamination is based on data collected in Area C, measured from the soil surface.  
 Approximate Square Footage: 110

- (Area E) Surface Material: Soil  
Direction From Primary Structure: North  
Other Directions: Flower bed  
Total Depth of Contamination: 9 inches  
Comments: This area contains several mature rose bushes.  
There is a rock border around the bed, which is  
underlaid by contamination.  
Approximate Square Footage: 126
- (Area F) Surface Material: Sod  
Direction From Primary Structure: North  
Other Directions: Between pool and primary structure  
Total Depth of Contamination: 12 inches  
Approximate Square Footage: 654
- (Area G) Surface Material: Soil  
Direction From Primary Structure: North  
Other Directions: Adjacent to the east side of the garage  
Total Depth of Contamination: 12 inches  
Comment: This area includes two small deposits.  
Approximate Square Footage: 18
- (Area H) Surface Material: Soil  
Direction From Primary Structure: Northwest  
Other Directions: Southwest of garage  
Total Depth of Contamination: 6 inches  
Comments: There was no spillover onto the adjacent property.  
Approximate Square Footage: 39
- (Area I) Surface Material: Soil  
Direction From Primary Structure: North and east  
Other Directions: Adjacent to the primary structure  
Total Depth of Contamination: 9 inches  
Comments: A portion of the flower bed is beneath a bay  
window which projects out from the house.  
Approximate Square Footage: 160
- (Area J) Surface Material: Soil  
Direction From Primary Structure: West  
Other Directions: Adjacent to the primary structure  
Total Depth of Contamination: 6 inches  
Comments: This area contains several mature junipers.  
It is likely that the contamination will be deeper  
around their roots.  
Approximate Square Footage: 54
- (Area K) Surface Material: Sod  
Direction From Primary Structure: West  
Other Directions: Between primary structure and driveway  
Total Depth of Contamination: 6 inches  
Comments: This area contains 4 deposits.  
Approximate Square Footage: 79

- (Area L) Surface Material: Soil  
Direction From Primary Structure: South  
Other Directions: Along south property line  
Total Depth of Contamination: Estimated at 15 inches  
Comments: This area is under a hedge, and it is likely the depth of contamination will be deeper around roots. The depth of contamination is estimated, based on discussion with the construction/verification group.  
Approximate Square Footage: 20
- (Area M) Surface Material: Soil  
Direction From Primary Structure: South  
Other Directions: Along south property line  
Total Depth of Contamination: Estimated at 15 inches  
Comments: This area is located under a hedge. It is likely the contamination will be deeper around the roots. The depth of contamination is estimated, based on Area N.  
Approximate Square Footage: 21
- (Area N) Surface Material: Sod  
Direction From Primary Structure: South  
Other Directions: South of water meter pit  
Total Depth of Contamination: 15 inches  
Comments: This deposit is located over the water line, but does not include the trench.  
Approximate Square Footage: 30
- (Area O) Surface Material: Sod  
Direction From Primary Structure: South  
Total Depth of Contamination: 6 inches  
Comments: This area is located over the sprinkler line.  
Approximate Square Footage: 40
- (Area P) Surface Material: Soil  
Direction From Primary Structure: South and east  
Other Directions: Adjacent to the primary structure  
Total Depth of Contamination: 12 inches  
Comments: This area contains mature shrubs. It is likely that the contamination will be deeper around the roots.  
Approximate Square Footage: 108
- (Area Q) Surface Material: Sod  
Direction From Primary Structure: East and south  
Total Depth of Contamination: 12 inches  
Comments: This area includes two deposits.  
Approximate Square Footage: 108
- (Area R) Surface Material: Sod  
Direction From Primary Structure: Southeast  
Total Depth of Contamination: 15 inches  
Approximate Square Footage: 375

- (Area S) Surface Material: Sod  
Direction From Primary Structure: East  
Total Depth of Contamination: 12 inches  
Approximate Square Footage: 272
- (Area T) Surface Material: Sod  
Direction From Primary Structure: East  
Total Depth of Contamination: 9 inches  
Comment: This area contains two deposits.  
Approximate Square Footage: 29
- (Area U) Surface Material: Wood  
Direction From Primary Structure: North  
Total Depth of Contamination: 6 inches  
Other: 3/8-inch-thick plywood over 2-inch x 4-inch supports  
Comment: This area is covered by a wood platform on which  
the metal storage shed sits. The depth of contamination is estimated, based on data collected in Area C,  
measured from the soil surface.  
Approximate Square Footage: 62

(Areas Requiring Further Investigation During Remedial Action)

It was not possible to obtain data underneath the swimming pool. If the pool is drained during remedial action, it should be investigated for possible contamination.

#### 4.0 RECOMMENDED REMEDIAL ACTION

##### 4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-12020-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 \$9,775.

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 Mill Site, (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

Memo of Understanding

Team Leader Notes

Deconvolution Graphs (Apparent Radium-226 Concentration)

Exterior Gamma Scan Map

## Radium Concentrations at Exterior Locations

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
7	130220	00	DS	3.3		*	Soil
		03	TC	4.1		*	North end of property
		06	TC	4.1		*	
		09	TC	3.9		*	
		12	TC	3.8		*	
		15	TC	3.6		*	DC = 6 inches Based on all available data
		18	TC	3.6		*	
		21	TC	3.7		*	
		24	TC	3.6		*	
		27	TC	3.7		*	
		30	TC	3.6		*	
		33	TC	3.6		*	
		36	TC	3.6		*	
8	133270	00	DS	2.4		*	Northeast corner of property in orchard
		03	TC	4.6		*	
		06	TC	4.6		*	
		09	TC	4.2		*	
		12	TC	3.9		*	DC = 0 inches
		15	TC	3.7		*	
		18	TC	3.7		*	
		21	TC	3.7		*	
		24	TC	3.7		*	
		27	TC	3.6		*	
		30	TC	3.6		*	
		33	TC	3.5		*	
		36	TC	3.5		*	
9	140200	00	DS	3.9		*	North end of dog run
		03	TC	4.4		*	
		06	TC	4.2		*	
		09	TC	4.0		*	DC = 6 inches Based on all available data
		12	TC	3.8		*	
		15	TC	3.7		*	
		18	TC	3.6		*	
		21	TC	3.6		*	
		24	TC	3.7		*	
		27	TC	3.7		*	
		30	TC	3.7		*	
		33	TC	3.8		*	
10	140250	00	DS	3.9		*	

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
11	160220	00	DS	4.5		*	North of shed  DC = 6 inches Based on all available data
		03	TC	4.5		*	
		06	TC	5.0		*	
		09	TC	4.7		*	
		12	TC	4.4		*	
		15	TC	4.1		*	
		18	TC	3.9		*	
		21	TC	3.9		*	
		24	TC	3.7		*	
		27	TC	3.6		*	
		30	TC	3.7		*	
12	160250	00	DS	6.9		*	In orchard  DC = 12 inches Based on the deconvolution graph
		03	TC	5.8		*	
		06	TC	6.0		*	
		09	TC	5.4		*	
		12	TC	4.7		*	
		15	TC	4.2		*	
		18	TC	4.0		*	
		21	TC	3.9		*	
		24	TC	3.8		*	
		27	TC	3.7		*	
		30	TC	3.6		*	
		33	TC	3.5		*	
		36	TC	3.5		*	
13	170240	00	DS	2.4		*	In orchard  DC = 0 inches
		03	TC	3.3		*	
		06	TC	3.7		*	
		09	TC	3.7		*	
		12	TC	3.6		*	
		15	TC	3.5		*	
		18	TC	3.5		*	
		21	TC	3.5		*	
		24	TC	3.5		*	
		27	TC	3.4		*	
		30	TC	3.5		*	
		33	TC	3.5		*	
		36	TC	3.4		*	
14	170270	00	DS	7.5		*	In orchard  DC = 9 inches Based on the deconvolution graph
		03	TC	7.0		*	
		06	TC	7.6		*	
		09	TC	5.4		*	
		12	TC	4.8		*	

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
14	170270	15	TC	4.3		*	
		18	TC	4.1		*	
		21	TC	3.9		*	
		24	TC	4.0		*	
		27	TC	3.9		*	
		30	TC	3.7		*	
		33	TC	3.7		*	
15	176213	00	DS	2.3		*	North of shed
16	180190	00	DS	4.1		*	In dog run
		06	DS	<1.0		*	
17	185207	00	DS	2.7		*	2-inch raised wood platform for shed
18	185218	00	DS	2.3		*	2-inch raised wood platform for shed
19	190240	00	DS	2.1		*	In orchard
		03	TC	3.3		*	
		06	TC	3.5		*	DC = 0 inches
		09	TC	3.6		*	
		12	TC	3.7		*	
		15	TC	3.6		*	
		18	TC	3.7		*	
		21	TC	3.7		*	
		24	TC	3.7		*	
		27	TC	3.7		*	
		30	TC	3.7		*	
		33	TC	3.7		*	
		36	TC	3.6		*	
		39	TC	3.6		*	
20	194213	00	DS	1.5		*	South of shed
21	200203	00	DS	3.8		*	East of dog run
		06	DS	2.0		*	fence
22	210217	00	DS	4.3		*	Under deck on soil
23	215206	00	DS	2.0		*	On flagstone

## Radium Concentrations at Exterior Locations

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
24	221261	00	DS	3.8		*	Northeast of primary structure
		03	TC	4.3		*	
		06	TC	4.6		*	DC = 9 inches Based on the deconvolution graph
		09	TC	4.3		*	
		12	TC	4.1		*	
		15	TC	3.9		*	
		18	TC	3.8		*	
		21	TC	3.7		*	
		24	TC	3.7		*	
		27	TC	3.5		*	
		30	TC	3.6		*	
		33	TC	3.6		*	
		36	TC	3.7		*	
		39	TC	3.6		*	
25	224228	00	DS	13.3		*	South of pool
		03	TC	9.8		*	
		06	TC	9.6		*	DC = 12 inches Based on the deconvolution graph
		09	TC	7.5		*	
		12	TC	5.7		*	
		15	TC	4.6		*	
		18	TC	4.1		*	
		21	TC	4.0		*	
		24	TC	3.9		*	
		27	TC	3.9		*	
		30	TC	3.9		*	
		33	TC	3.8		*	
		36	TC	3.8		*	
		39	TC	3.7		*	
26	227204	00	DS	30.7		*	East of garage
		12	DS	1.9		*	
27	227206	00	DS	1.4		*	East of garage Flagstone
28	230216	00	DS	9.6		*	In rose garden
		03	TC	6.8		*	
		06	TC	6.2		*	DC = 9 inches Based on the deconvolution graph
		09	TC	5.0		*	
		12	TC	4.2		*	
		15	TC	3.8		*	

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
28	230216	18	TC	3.5		*	
		21	TC	3.4		*	
		24	TC	3.4		*	
		27	TC	3.4		*	
		30	TC	3.4		*	
		33	TC	3.3		*	
		36	TC	3.3		*	
		39	TC	3.3		*	
29	237184	00	DS	6.3		*	Soil beside driveway
		06	DS	2.1		*	
30	237263	00	DS	1.4		*	Northeast yard
31	245210	00	DS	13.1		*	North yard
		03	TC	8.7		*	
		06	TC	8.7		*	DC = 12 inches
		09	TC	6.9		*	Based on the
		12	TC	5.4		*	deconvolution graph
		15	TC	4.4		*	
		18	TC	4.0		*	
		21	TC	3.8		*	
		24	TC	3.8		*	
		27	TC	3.7		*	
		30	TC	3.8		*	
		33	TC	3.6		*	
32	250271	00	DS	3.1		*	Northeast yard
		03	TC	5.0		*	
		06	TC	4.9		*	
		09	TC	4.5		*	DC = 9 inches
		12	TC	4.1		*	Based on the
		15	TC	3.9		*	deconvolution graph
		18	TC	3.9		*	
		21	TC	3.8		*	
		24	TC	3.8		*	
		27	TC	3.8		*	
		30	TC	3.7		*	
		33	TC	3.7		*	
		36	TC	3.6		*	
33	258210	00	DS	10.2		*	By north foundation
		03	TC	7.3		*	

## Radium Concentrations at Exterior Locations

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
33	258210	06	TC	7.1		*	
		09	TC	5.6		*	DC = 9 inches
		12	TC	4.5		*	Based on the
		15	TC	3.9		*	deconvolution graph
		18	TC	3.6		*	
		21	TC	3.4		*	
		24	TC	3.5		*	
		27	TC	3.5		*	
		30	TC	3.3		*	
		33	TC	3.4		*	
		36	TC	3.4		*	
		39	TC	3.4		*	
		42	TC	3.4		*	
		45	TC	3.4		*	
		48	TC	3.4		*	
		51	TC	3.4		*	
		54	TC	3.5		*	
		57	TC	3.5		*	
		60	TC	3.5		*	
		63	TC	3.5		*	
		66	TC	3.5		*	
		69	TC	3.5		*	
		72	TC	3.4		*	
34	258230	00	DS	6.1		*	Northeast corner
		03	TC	5.2		*	of primary structure
		06	TC	4.8		*	
		09	TC	4.2		*	DC = 9 inches
		12	TC	3.9		*	Based on the
		15	TC	3.8		*	deconvolution graph
		18	TC	3.7		*	
		21	TC	3.7		*	
		24	TC	3.6		*	
		27	TC	3.7		*	
		30	TC	3.6		*	
		33	TC	3.5		*	
		36	TC	3.4		*	
		39	TC	3.3		*	
		42	TC	3.4		*	
		45	TC	3.5		*	
		48	TC	3.4		*	
		51	TC	3.6		*	
		54	TC	3.5		*	
		57	TC	3.6		*	

## Radium Concentrations at Exterior Locations

DOE ID #GJ-12020-RS

1308 Wellington Avenue

Page 7 of 12

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
34	258230	60	TC	3.5		*	
		63	TC	3.4		*	
		66	TC	3.5		*	
35	270260	00	DS	13.3		*	East yard
		03	TC	9.2		*	
		06	TC	10.3		*	
		09	TC	8.4		*	
		12	TC	6.2		*	DC = 12 inches
		15	TC	4.8		*	Based on the
		18	TC	4.2		*	deconvolution graph
		21	TC	3.8		*	
		24	TC	3.7		*	
		27	TC	3.6		*	
		30	TC	3.6		*	
		33	TC	3.6		*	
		36	TC	3.6		*	
36	272203	00	DS	9.2		*	By west foundation
		03	TC	6.1		*	
		06	TC	5.2		*	DC = 6 inches
		09	TC	4.5		*	Based on the
		12	TC	3.9		*	deconvolution graph
		15	TC	3.7		*	
		18	TC	3.7		*	
		21	TC	3.5		*	
		24	TC	3.4		*	
		27	TC	3.4		*	
		30	TC	3.4		*	
37	282239	00	DS	<1.0		*	Sewer clean out
		03	TC	2.9		*	near abandoned
		06	TC	3.2		*	septic tank
		09	TC	3.3		*	
		12	TC	3.4		*	DC = 0 inches
		15	TC	3.5		*	Background
		18	TC	3.4		*	
		21	TC	3.4		*	
		24	TC	3.5		*	
		27	TC	3.4		*	
		30	TC	3.3		*	

## Radium Concentrations at Exterior Locations

DOE ID #GJ-12020-RS

1308 Wellington Avenue

Page 8 of 12

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
37	282239	33	TC	3.4		*	
		36	TC	3.3		*	
		39	TC	3.4		*	
		42	TC	3.3		*	
		45	TC	3.3		*	
		48	TC	3.4		*	
		51	TC	3.4		*	
		54	TC	3.4		*	
		57	TC	3.4		*	
		60	TC	3.5		*	
		63	TC	3.4		*	
		66	TC	3.3		*	
		69	TC	3.4		*	
38	283205	00	DS	1.1		*	Gas line
		18	DS	1.2		*	
39	286195	00	DS	<1.0		*	Asphalt driveway
40	286197	00	DS	6.2		*	Lawn beside driveway
		03	TC	3.4		*	
		06	TC	3.8		*	DC = 6 inches
		09	TC	3.8		*	Based on all
		12	TC	3.7		*	available data
		15	TC	3.6		*	
		18	TC	3.5		*	
		21	TC	3.5		*	
		24	TC	3.5		*	
		27	TC	3.5		*	
		30	TC	3.4		*	
		33	TC	3.4		*	
		36	TC	3.4		*	
41	285241	00	DS	7.0		*	By abandoned septic tank
42	290231	00	DS	9.4		*	By east foundation
		03	TC	7.3		*	
		06	TC	8.3		*	
		09	TC	7.3		*	DC = 12 inches
		12	TC	5.7		*	Based on the
		15	TC	4.6		*	deconvolution graph
		18	TC	4.1		*	
		21	TC	3.9		*	

## Radium Concentrations at Exterior Locations

DOE ID #GJ-12020-RS

1308 Wellington Avenue

Page 9 of 12

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
42	290231	24	TC	3.9		*	
		27	TC	3.7		*	
		30	TC	3.7		*	
		33	TC	3.5		*	
		36	TC	3.5		*	
		39	TC	3.6		*	
		42	TC	3.4		*	
		45	TC	3.5		*	
		48	TC	3.4		*	
		51	TC	3.4		*	
		54	TC	3.4		*	
		57	TC	3.5		*	
		60	TC	3.5		*	
		63	TC	3.6		*	
		66	TC	3.6		*	
		69	TC	3.5		*	
43	304231	00	DS	16.4		*	Southeast corner of
		03	TC	9.9		*	primary structure
		06	TC	9.7		*	
		09	TC	7.2		*	DC = 12 inches
		12	TC	5.5		*	Based on the
		15	TC	4.6		*	deconvolution graph
		18	TC	4.1		*	
		21	TC	4.0		*	
		24	TC	3.8		*	
		27	TC	3.8		*	
		30	TC	3.7		*	
		33	TC	3.6		*	
		36	TC	3.6		*	
		39	TC	3.5		*	
		42	TC	3.5		*	
		45	TC	3.4		*	
		48	TC	3.4		*	
		51	TC	3.4		*	
		54	TC	3.4		*	
		57	TC	3.4		*	
		60	TC	3.5		*	
		63	TC	3.5		*	
		66	TC	3.5		*	
		69	TC	3.5		*	
44	305214	00	DS	11.9		*	South of primary
		03	TC	8.9		*	structure

## Radium Concentrations at Exterior Locations

DOE ID #GJ-12020-RS

1308 Wellington Avenue

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
44	305214	06	TC	10.5		*	
		09	TC	9.2		*	
		12	TC	6.5		*	DC = 12 inches Based on the deconvolution graph
		15	TC	5.2		*	
		18	TC	4.5		*	
		21	TC	4.2		*	
		24	TC	4.0		*	
		27	TC	3.9		*	
		30	TC	3.7		*	
		33	TC	3.6		*	
		36	TC	3.6		*	
		39	TC	3.6		*	
		42	TC	3.6		*	
		45	TC	3.5		*	
		48	TC	3.5		*	
		51	TC	3.5		*	
		54	TC	3.5		*	
		57	TC	3.4		*	
		60	TC	3.5		*	
		63	TC	3.5		*	
		66	TC	3.6		*	
45	310210	00	DS	1.8		*	East of primary structure
		03	TC	3.0		*	
		06	TC	3.2		*	DC = 0 inches
		09	TC	3.3		*	
		12	TC	3.3		*	
		15	TC	3.4		*	
		18	TC	3.4		*	
		21	TC	3.6		*	
		24	TC	3.6		*	
		27	TC	3.6		*	
		30	TC	3.5		*	
		33	TC	3.5		*	
		36	TC	3.5		*	
46	310260	00	DS	11.8		*	Southeast of primary structure
		03	TC	7.6		*	
		06	TC	8.8		*	DC = 15 inches Based on the deconvolution graph
		09	TC	7.8		*	
		12	TC	6.2		*	
		15	TC	4.9		*	
		18	TC	4.3		*	
		21	TC	4.0		*	

## Radium Concentrations at Exterior Locations

DOE ID #GJ-12020-RS

1308 Wellington Avenue

Page 11 of 12

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
46	310260	24	TC	3.8		*	
		27	TC	3.7		*	
		30	TC	3.6		*	
		33	TC	3.6		*	
		36	TC	3.5		*	
47	313194	00	DS	<1.0		*	Asphalt driveway
48	313196	00	DS	2.9		*	Lawn beside driveway
		03	TC	5.4		*	
		06	TC	4.8		*	DC = 6 inches
		09	TC	4.2		*	Based on the
		12	TC	3.9		*	deconvolution graph
		15	TC	3.7		*	
		18	TC	3.7		*	
		21	TC	3.7		*	
		24	TC	3.7		*	
		27	TC	3.6		*	
		30	TC	3.5		*	
		33	TC	3.4		*	
		36	TC	3.5		*	
49	321220	00	DS	4.1		*	Sprinkler line
		06	DS	1.2		*	
50	326227	00	DS	1.3		*	Water line
		03	TC	2.7		*	
		06	TC	3.1		*	DC = 0 inches
		09	TC	3.4		*	
		12	TC	3.6		*	
		15	TC	3.6		*	
		18	TC	3.7		*	
		21	TC	3.7		*	
		24	TC	3.7		*	
		27	TC	3.7		*	
		30	TC	3.7		*	
		33	TC	3.7		*	
		36	TC	3.7		*	
		39	TC	3.7		*	
51	334200	00	DS	6.6		*	South yard
		03	TC	3.6		*	DC = 6 inches
		06	TC	3.7		*	Based on all
		18	TC	3.8		*	available data

## Radium Concentrations at Exterior Locations

DOE ID #GJ-12020-RS

1308 Wellington Avenue

Page 12 of 12

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
51	334200	09	TC	3.6		*	
		12	TC	3.8		*	
		15	TC	3.8		*	
		21	TC	3.7		*	
		24	TC	3.6		*	
		27	TC	3.5		*	
		30	TC	3.5		*	
		33	TC	3.5		*	
52	334226	00	DS	7.1		*	Water line
		03	TC	6.1		*	
		06	TC	6.0		*	
		09	TC	5.6		*	
		12	TC	5.2		*	
		15	TC	4.7		*	DC = 15 inches
		18	TC	4.4		*	Based on the the
		21	TC	4.2		*	deconvolution graph
		24	TC	4.0		*	
		27	TC	3.9		*	
		30	TC	3.8		*	
		33	TC	3.7		*	
		36	TC	3.6		*	
		39	TC	3.6		*	
		42	TC	3.5		*	
		45	TC	3.6		*	
		48	TC	3.6		*	
		51	TC	3.6		*	
		54	TC	3.6		*	
		57	TC	3.6		*	
		60	TC	3.5		*	
		63	TC	3.5		*	
		66	TC	3.5		*	
		69	TC	3.4		*	
		72	TC	3.5		*	

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 = 07-19-85  
Team Leader = CRK

## Radium Concentrations at Interior Locations

DOE ID #GJ-12020-RS

1308 Wellington 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	2.6		*	West wall of shed
2		00	DS	1.3		*	Center of shed
3		00	DS	2.6		*	Northeast corner of shed
4		00	DS	2.8		*	Northwest corner of shed
5		00	DS	2.6		*	Southeast corner of shed
6		00	DS	2.4		*	Southwest corner of shed

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 = 07-25-85  
 Team Leader = CRK

Table 3.3

## Summary of Interior Gamma Exposure Rates

DOE ID No. GJ-12020-RS 1308 Wellington 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)
Basement	*	*	*	*	15-17	*
Garage	*	*	*	*	13-16	*
Shed	05	16-18	17	05	16-18	17

\* Walking gamma scans were performed in the primary structure and garage to confirm the absence of interior contamination.

Table 4.1  
Area and Volume Calculations  
DOE ID No. GJ-12020-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>
<u>EXTERIOR</u>					
Contaminated Fill					
A*	10 x 13	= 130	x 0.5	= 65	
B	83 x 35	= 2,905	x 1.0	= 2,905	
C	69 x 48	= 3,312			
	6 x 11	= 66			
Minus Areas A & U		(192)			
		3,186	x 0.5	= 1,593	
D	10 x 11	= 110	x 0.5	= 55	
E	18 x 7	= 126	x 0.8	= 101	
F	39 x 20	= 780			
Minus Area E		(126)			
		654	x 1.0	= 654	
G	5 x 2	= 10			
	2 x 4	= 8			
		18	x 1.0	= 18	
H	13 x 3	= 39	x 0.5	= 20	
I	4 x 30	= 120			
	20 x 2	= 40			
		160	x 0.8	= 128	
J	6 x 9	= 54	x 0.5	= 27	

\* Note: The metal shed located in Area A is portable and shall be considered as exterior involvement.

Table 4.1  
Area and Volume Calculations  
DOE ID No. GJ-12020-RS

Page 2 of 2

<u>AREA</u>	<u>CALCULATIONS(ft)</u>	<u>SF</u>	<u>DEPTH(ft)</u>	<u>CF</u>	<u>CUBIC YARDS</u>
K	3 x 3	= 9			
	2 x 4	= 8			
	22 x 2	= 44			
	3 x 6	= 18			
		<hr/>			
		79	x 0.5	= 40	
L	5 x 4	= 20	x 1.3	= 26	
M	3 x 7	= 21	x 1.3	= 27	
N	6 x 5	= 30	x 1.3	= 39	
O	2 x 20	= 40	x 0.5	= 20	
P	6 x 18	= 108	x 1.0	= 108	
Q	26 x 3	= 78			
	3 x 6	= 18			
	4 x 3	= 12			
		<hr/>			
		108	x 1.0	= 108	
R	25 x 15	= 375	x 1.3	= 488	
S	16 x 17	= 272	x 1.0	= 272	
T	3 x 3	= 9			
	4 x 5	= 20			
		<hr/>			
		29	x 0.8	= 23	
U	16 x 12	= 192			
Minus Area A		(130)			
		<hr/>			
		62	x 0.5	= 31	
		<hr/>			
TOTAL VOLUME - EXTERIOR				= 6,748	= 6,748/27 = 250

See Appendix Figures 3.4a and 3.4b For Areas

=====

Table 4.2  
Estimated Cost of Decontamination and Restoration  
DOE ID No. GJ-12020-RS

Page 1 of 1

EXTERIOR

Remove identified residual radioactive materials		
240 cy @ \$14.50/cy	\$	3,480
10 cy @ \$44/cy		440
Replace areas with compacted roadbase		
5 cy @ \$14.50/cy		73
Replace areas with topsoil		
245 cy @ \$9.50/cy		2,328
Replace areas with sod		
933 sf @ \$.35/sf		327
Replace rosebushes, trees, bushes		
Lump sum		500
Shore-up wood deck		
Lump sum		50
		<hr/>
TOTAL EXTERIOR	\$	7,198
TOTAL INTERIOR		0
ACCESS CONTROL		250
		<hr/>
SUBTOTAL	\$	7,448
CONTINGENCY @ 5%		372
		<hr/>
SUBTOTAL	\$	7,820
CONTRACTOR OVERHEAD & PROFIT @ 25%		1,955
		<hr/>
GRAND TOTAL	\$	9,775

=====

LR082285  
REAL2020/REA-710/AP

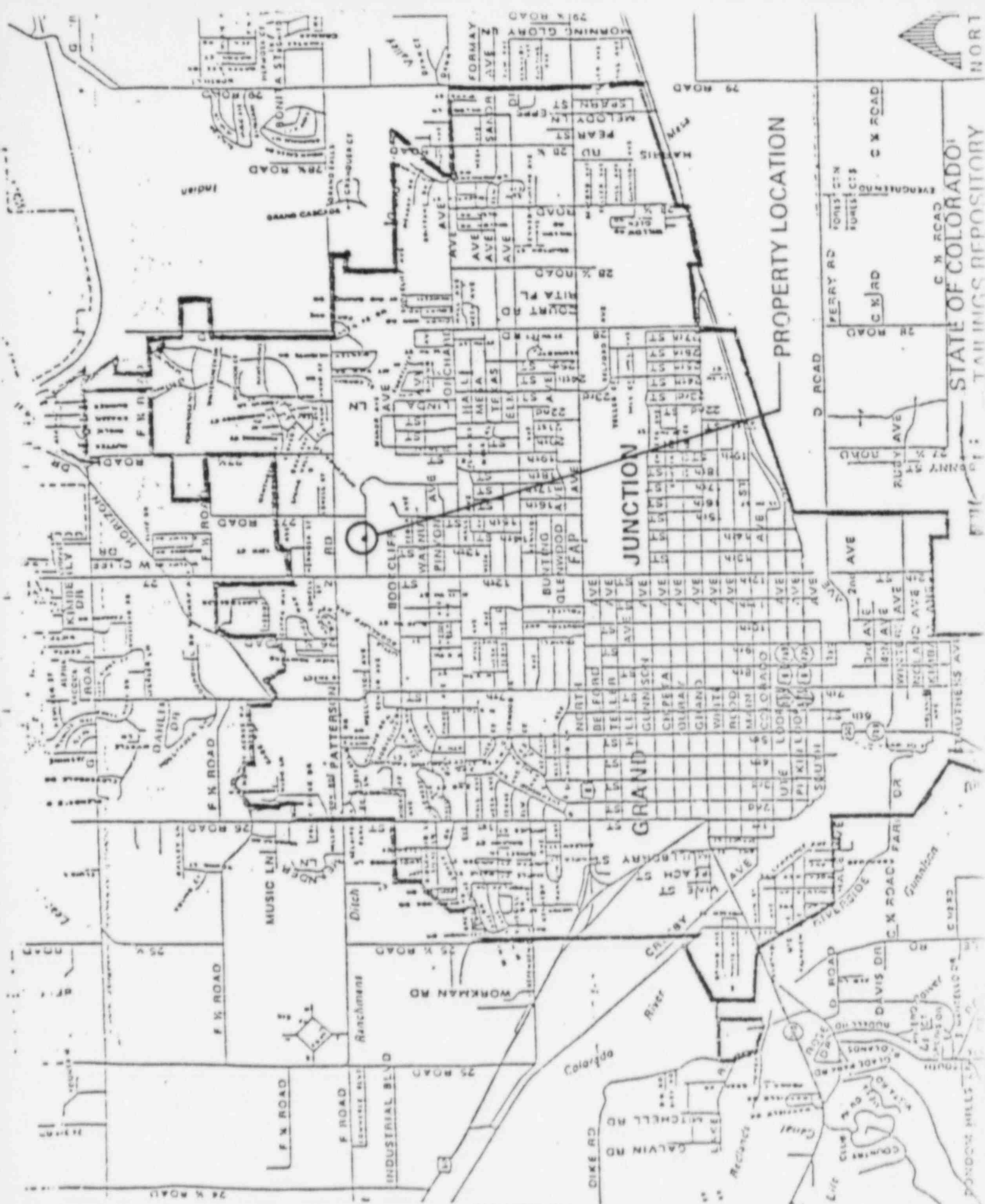
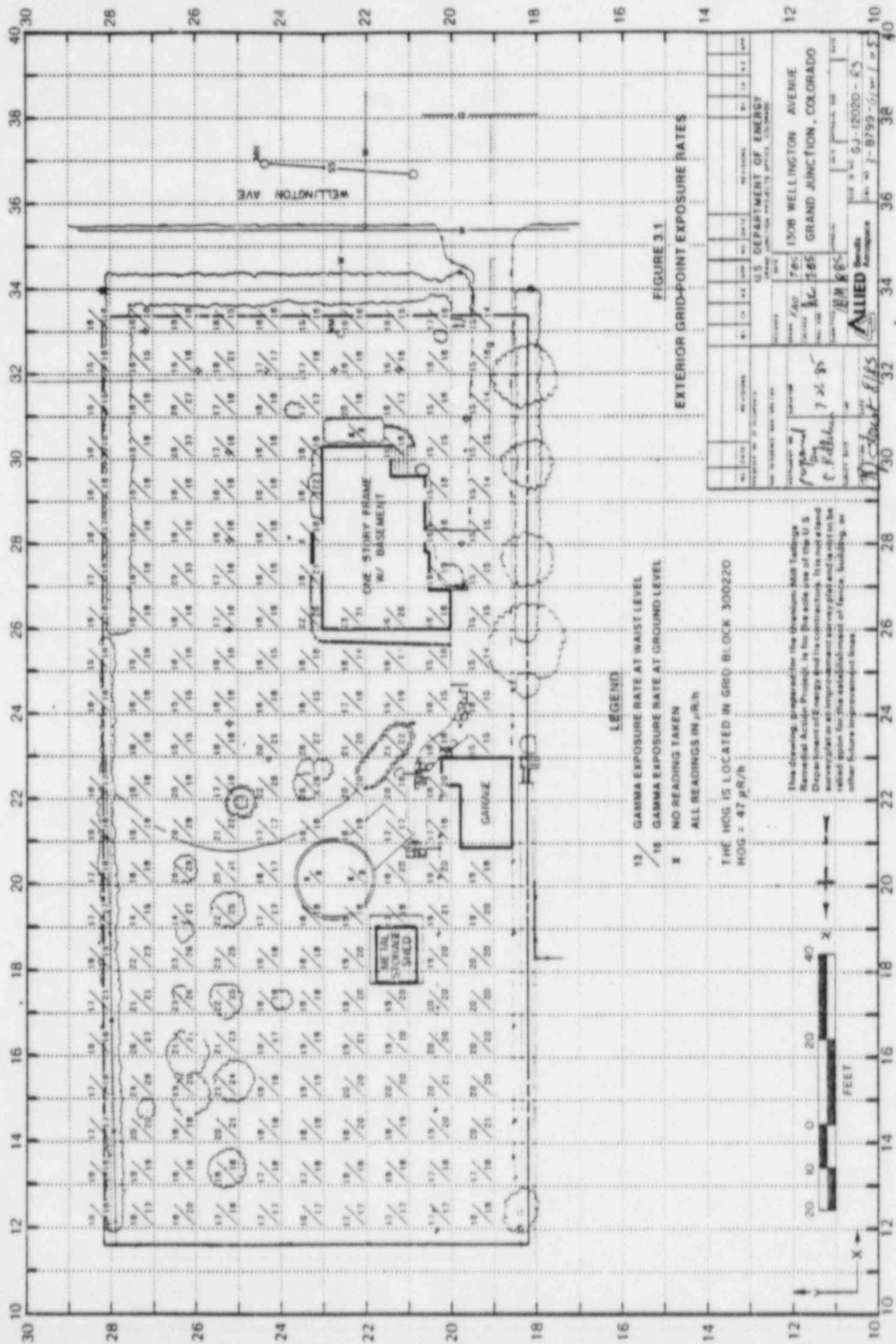
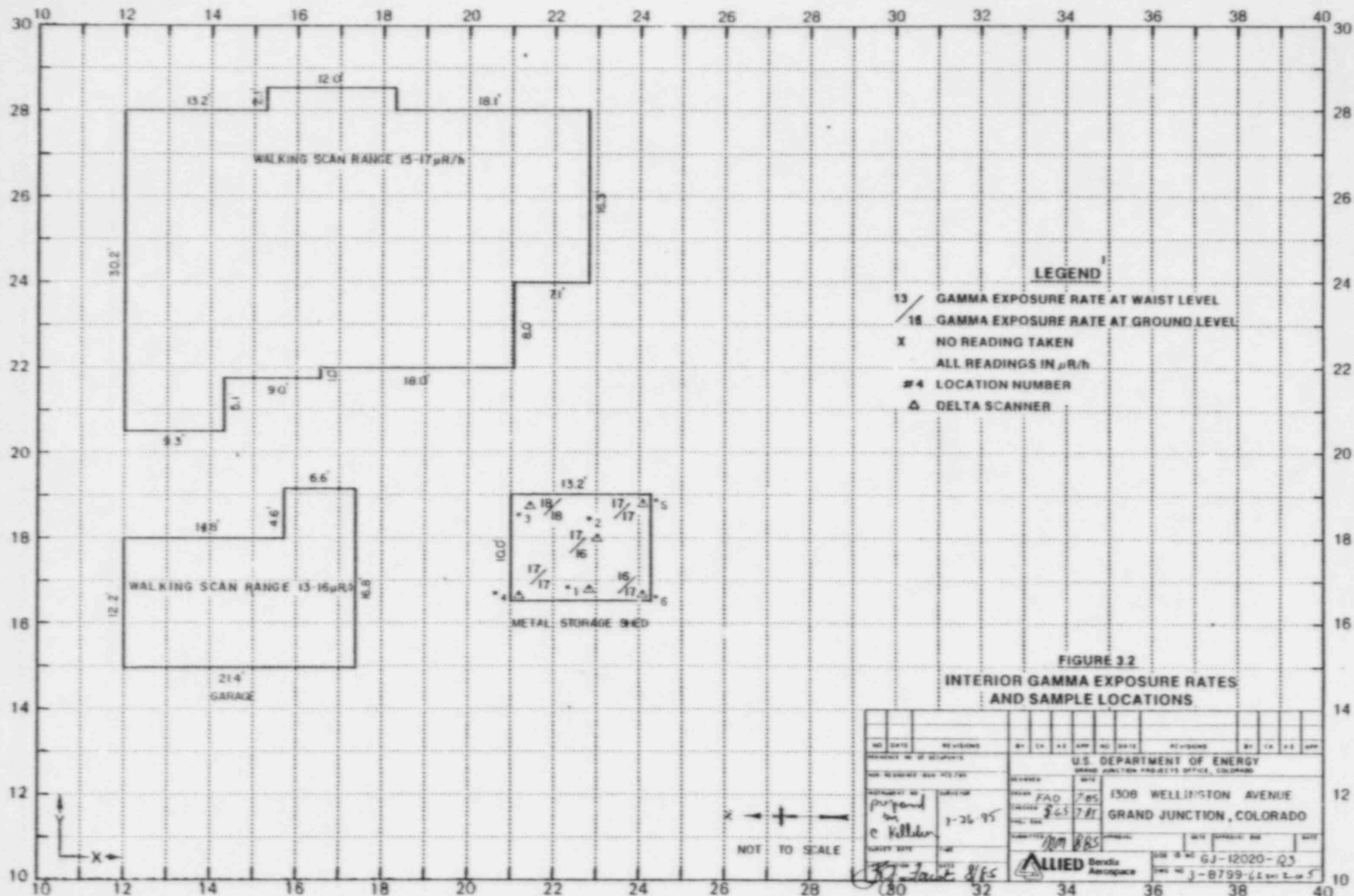


FIGURE 2.1  
VICINITY MAP

NORTH  
STATE OF COLORADO  
LANDINGS REPOSITORY











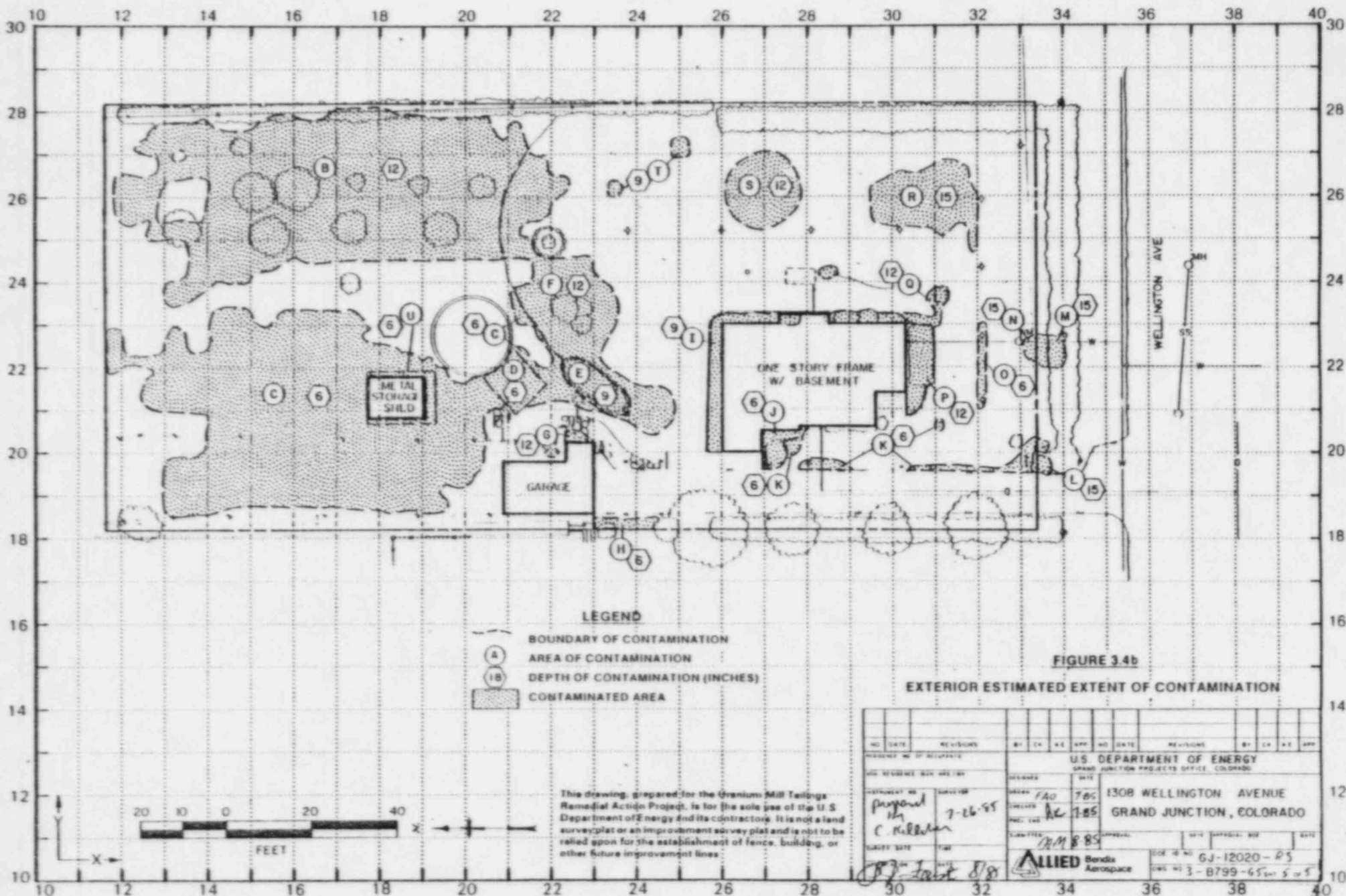


FIGURE 3.4b

## EXTERIOR ESTIMATED EXTENT OF CONTAMINATION

[illegible]

3/85

DOE ID NO. \_\_\_\_\_

65-12020 RS

Date \_\_\_\_\_

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

Official Survey Report

Property Address 1308 Wellington

Property Owner David L. McKinley

Address of Owner (if different from above) same

Report Prepared By Cathy Kelleher

I. PRESENCE/ABSENCE OF RESIDUAL RADIOACTIVE MATERIALS

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

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

1 xxxx 1 In open areas.

1 xxxx 1 Under or around exterior improvements.

1 xxxx 1 Under or around a typically nonoccupied structure.

1 xxxx 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 xxx 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/CDE

J. Themelis, Mgr. UMTRA Proj. Off.

HIG = 17 uR/h  
HOG = 47 uR/h

August 5, 1985


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

ATTN: Coleen Campbell

Dear Coleen:

"No Comments" concerning Department of Energy (DOE) Identification (ID) number GJ-12020 (1308 Wellington Avenue), has been noted.

Thank you,

  
Cathy Kelleher  
RSD Survey Team Leader

CK:pr

MEMORANDUM

ALLIED Bendix  
Aerospace

Bendix Field Engineering Corporation  
Grand Junction Operations  
Grand Junction, Colorado

Date: July 19, 1985  
To: Files  
From: Cathy Kelleher  
Subject: Team Leader Notes - GJ-12020-RS

Address: 1308 Wellington Avenue

Owner: David L. McKinley

Occupancy: Two

Team Members

C. Kelleher (Team Leader)	M. Dexter
V. Rothman	V. Young
M. Gilfillan	H. Mattison
D. Bell	H. Lucero
M. Duran	S. Garcia
D. Dow	

Background

Oak Ridge National Laboratory (ORNL) data shows contamination around the house foundation, in the south yard, southwest of the garage, in a flower bed by the swimming pool, and in the northeast corner of the property.

The ditch, which separates the east yard from the orchard, was not accurately shown on the maps - it was redrawn on the field maps.

Utilities

The gas line was checked with a delta reading over the exposed line. The sewer was investigated with a borehole next to the sewer cleanout east of the house. There was also an abandoned septic tank

Team Leader Notes  
Cathy Kelleher  
GJ-12020-RS  
July 19, 1985  
Page 2

on this side of the house adjacent to the hole. The water line was investigated by the water meter and by a hole augered between the water meter pit and the house in a linear depression that probably was the water line trench.

Holes were augered beside the foundation on all four sides. Location 272203 should have been a two auger flight but only one flight was drilled due to an oversight - the hole showed contamination at the top but was clean on the bottom.

The ground was wet from the previous night's rainstorm. Gamma readings appeared to be somewhat depressed in low-level areas.

No equipment malfunctions occurred.

The tailings involvement of the exterior appeared to be due to the use of tailings in the flower beds and orchards as a soil amendment. The tailings in the front yard are spotty and may be fill used in low areas of the yard.

There was a deposit along the north property line which appeared to spillover. Readings in this area show it was only shine.

A small deposit west of the garage was also checked, it did not spill over.

Health and Safety Department made a brief visit to the site, no problems were noted.

The survey was completed at approximately 2:00 PM. All personnel were frisked before leaving the property.

Team Leader Notes  
Cathy Kelleher  
GJ-12020-RS  
July 26, 1985  
Page 3

Revisit

Date: July 25, 1985

Instruments

Delta: C-3943  
Scintillometer: C-1113

A revisit was conducted in order to collect gamma exposure readings and delta measurements inside the storage shed. Additional delta readings were also taken adjacent to the garage on the east and west sides. The deposit on the west property boundary did not spillover. The area underneath the wooden deck was scanned, it read 170 to 200 counts per second (cps). A delta taken under the deck also showed contamination. It was not possible to take readings underneath the pool, as it was full of water. This area should be surveyed at a later date if possible to see whether the contamination adjacent to the pool extends underneath it. The pool is a raised vinyl pool and is not sunk below grade.

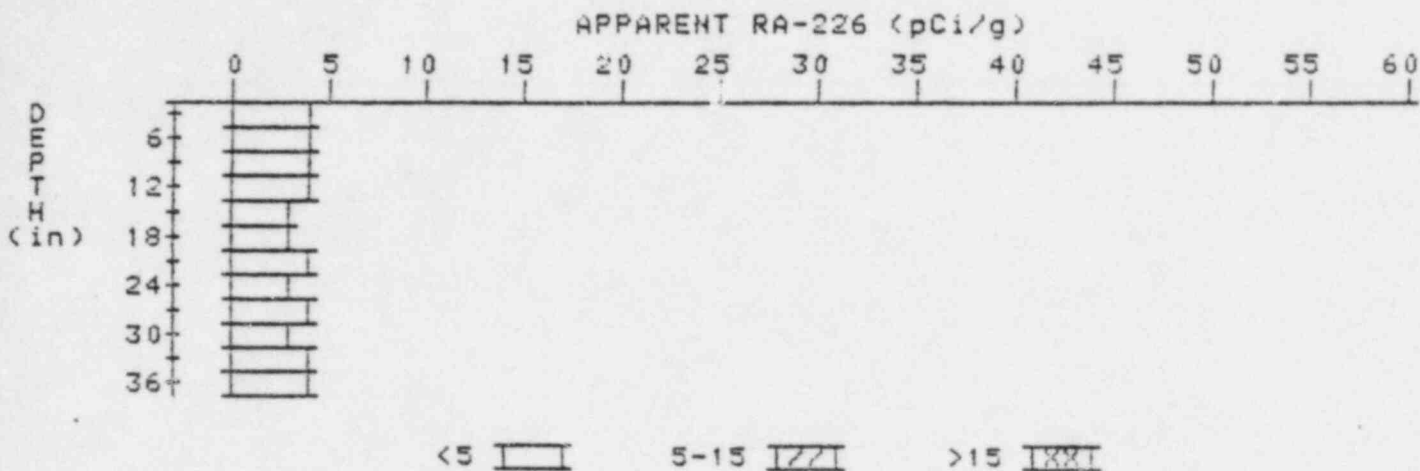
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

7

PROPERTY NUMBER: GJ-12020-R3

HOLE NUMBER: 7

LOCATION: 130220



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

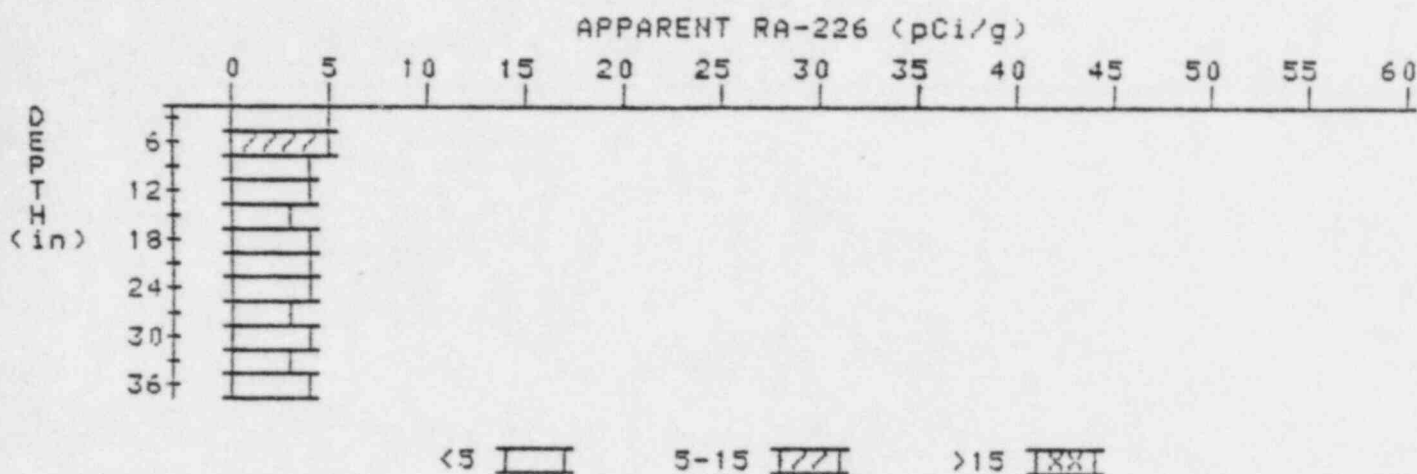
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

8

PROPERTY NUMBER: GJ-12020-RS

HOLE NUMBER: 8

LOCATION: 133270



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.6	4.6
6	4.6	5.3
9	4.2	4.0
12	3.9	3.7
15	3.7	3.3
18	3.7	3.7
21	3.7	3.7
24	3.7	3.9
27	3.6	3.4
30	3.6	3.8
33	3.5	3.3
36	3.5	3.5

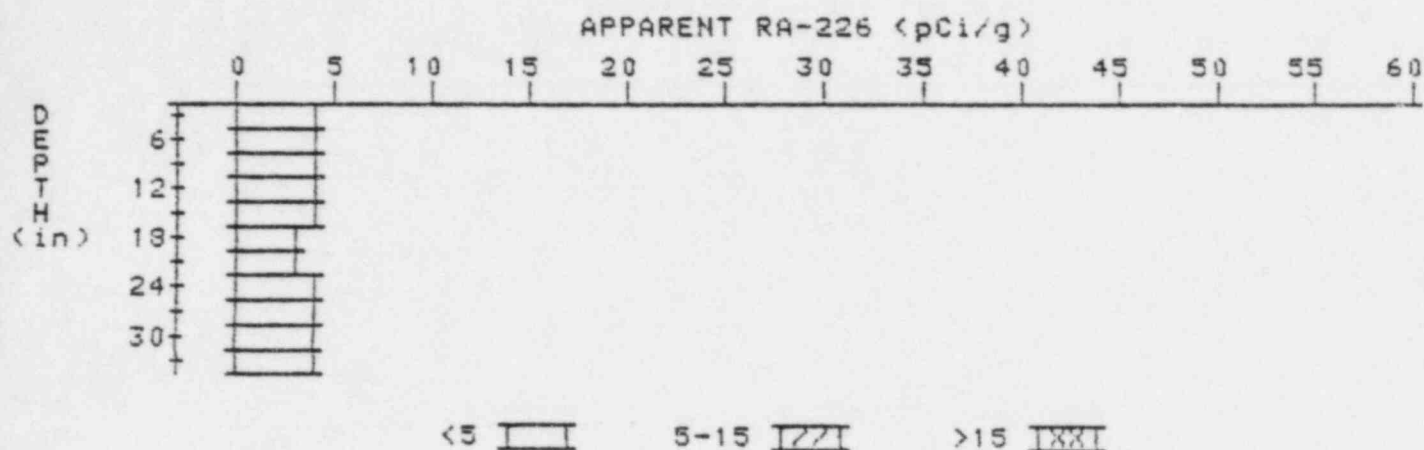
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

9

PROPERTY NUMBER: GJ-12020-RS

HOLE NUMBER: 9

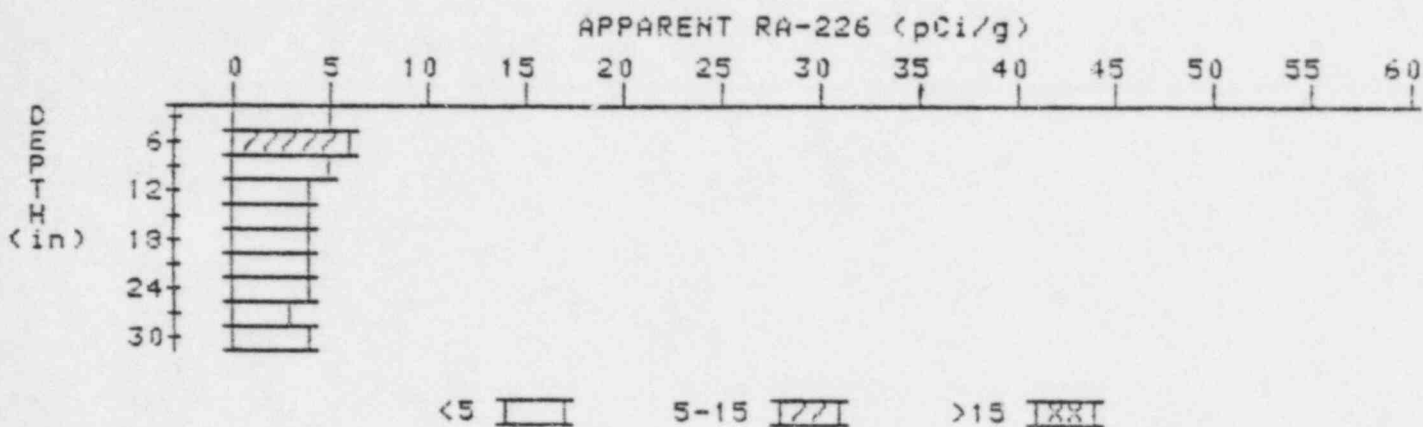
LOCATION: 140200



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.4	4.4
6	4.2	4.2
9	4.0	4.0
12	3.8	3.6
15	3.7	3.7
18	3.6	3.4
21	3.6	3.4
24	3.7	3.9
27	3.7	3.7
30	3.7	3.5
33	3.8	3.8

# APPARENT RADIUM-226 CONCENTRATION 11 DECONVOLUTION GRAPH

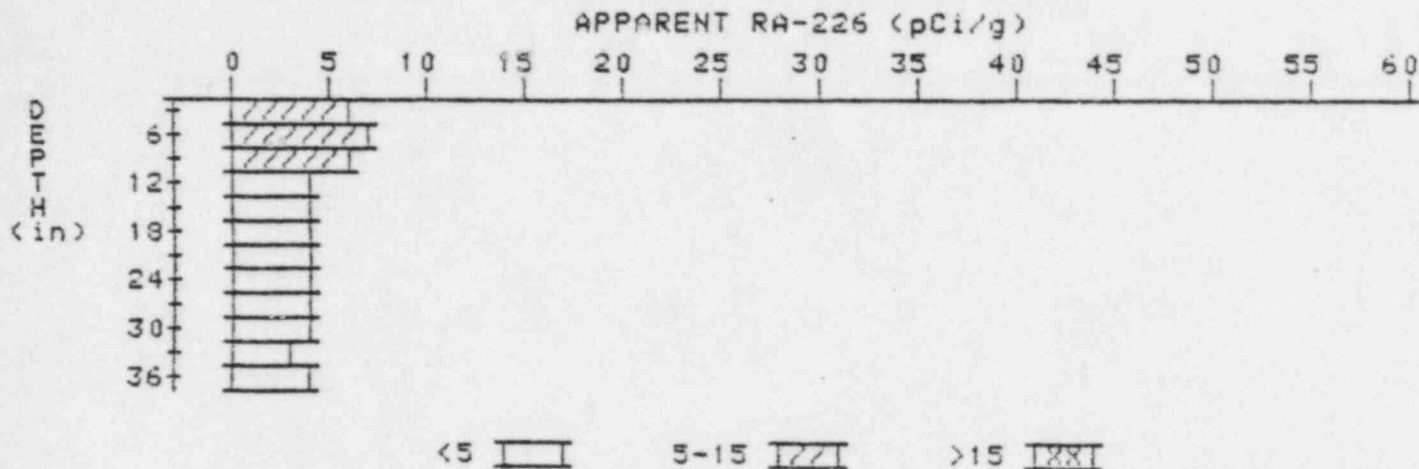
PROPERTY NUMBER: GJ-12020-RS  
HOLE NUMBER: 11  
LOCATION: 160220



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.5	4.5
6	5.0	6.4
9	4.7	4.7
12	4.4	4.4
15	4.1	3.9
18	3.9	3.5
21	3.9	4.3
24	3.7	3.5
27	3.6	3.2
30	3.7	3.7

# APPARENT RADIUM-226 CONCENTRATION 12 DECONVOLUTION GRAPH

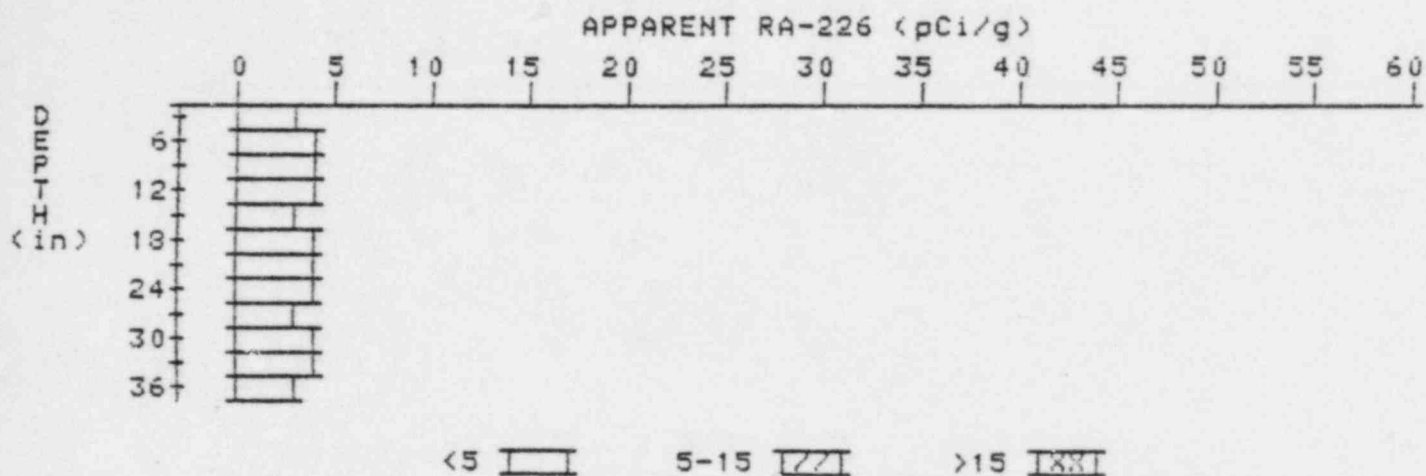
PROPERTY NUMBER: GJ-12020-RS  
HOLE NUMBER: 12  
LOCATION: 160250



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.8	5.2
6	6.0	7.4
9	5.4	5.6
12	4.7	4.3
15	4.2	3.7
18	4.0	3.8
21	3.9	3.9
24	3.8	3.8
27	3.7	3.7
30	3.6	3.6
33	3.5	3.3
36	3.5	3.5

# APPARENT RADIUM-226 CONCENTRATION 13 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS  
HOLE NUMBER: 13  
LOCATION: 170240



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.3	3.3
6	3.7	4.4
9	3.7	3.9
12	3.6	3.6
15	3.5	3.3
18	3.5	3.5
21	3.5	3.5
24	3.5	3.7
27	3.4	3.0
30	3.5	3.7
33	3.5	3.7
36	3.4	3.4

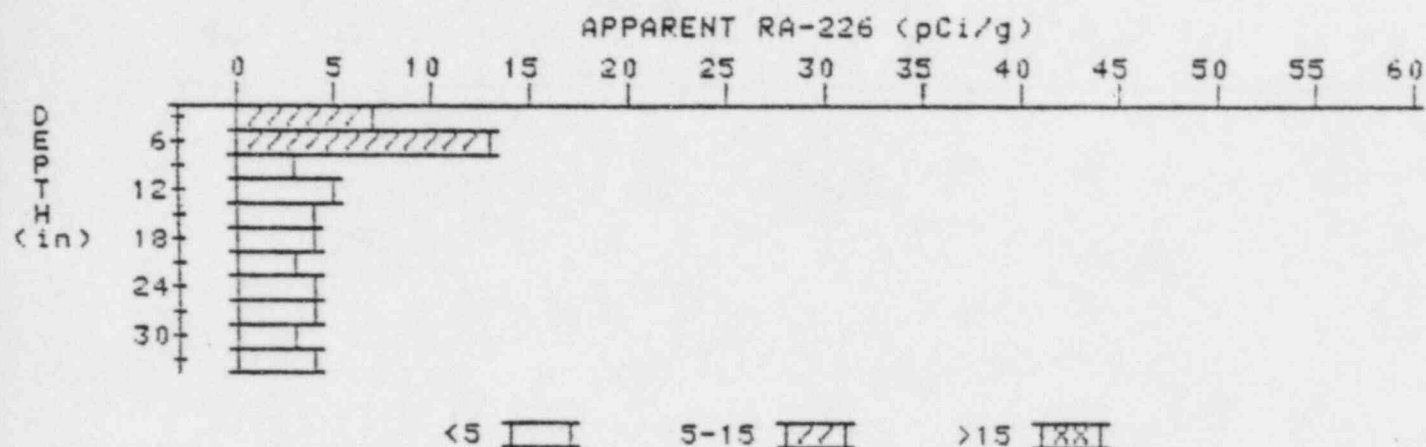
# APPARENT RADIUM-226 CONCENTRATION 14

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS

HOLE NUMBER: 14

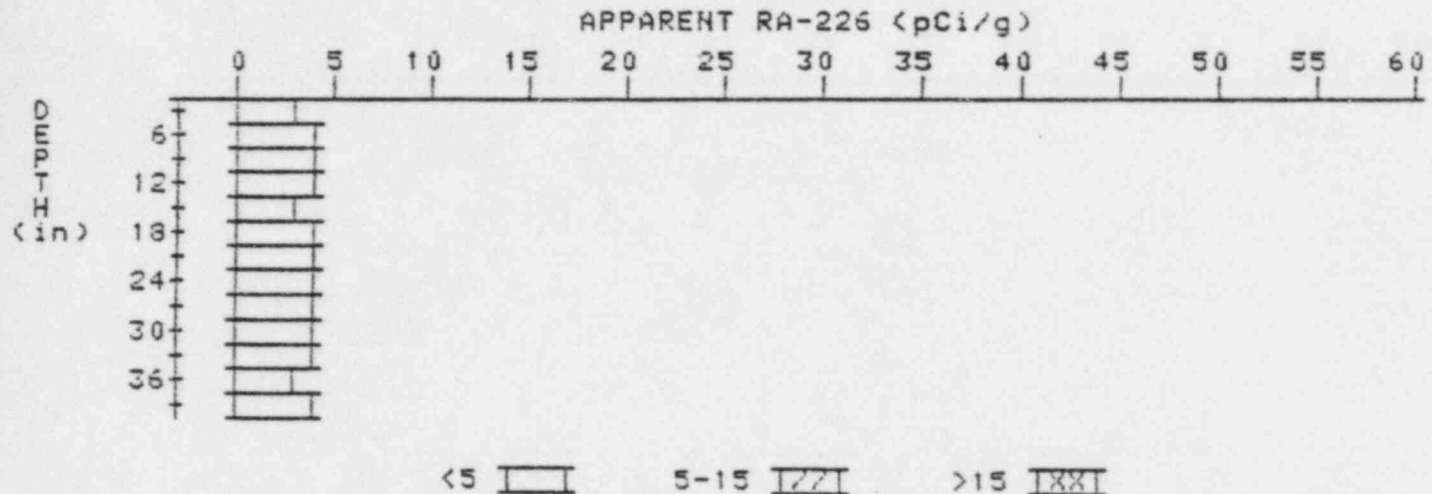
LOCATION: 170270



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	7.0	7.0
6	7.6	12.6
9	5.4	2.6
12	4.8	4.6
15	4.3	3.8
18	4.1	4.1
21	3.9	3.4
24	4.0	4.4
27	3.9	4.1
30	3.7	3.3
33	3.7	3.7

# APPARENT RADIUM-226 CONCENTRATION 19 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS  
HOLE NUMBER: 19  
LOCATION: 190240



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

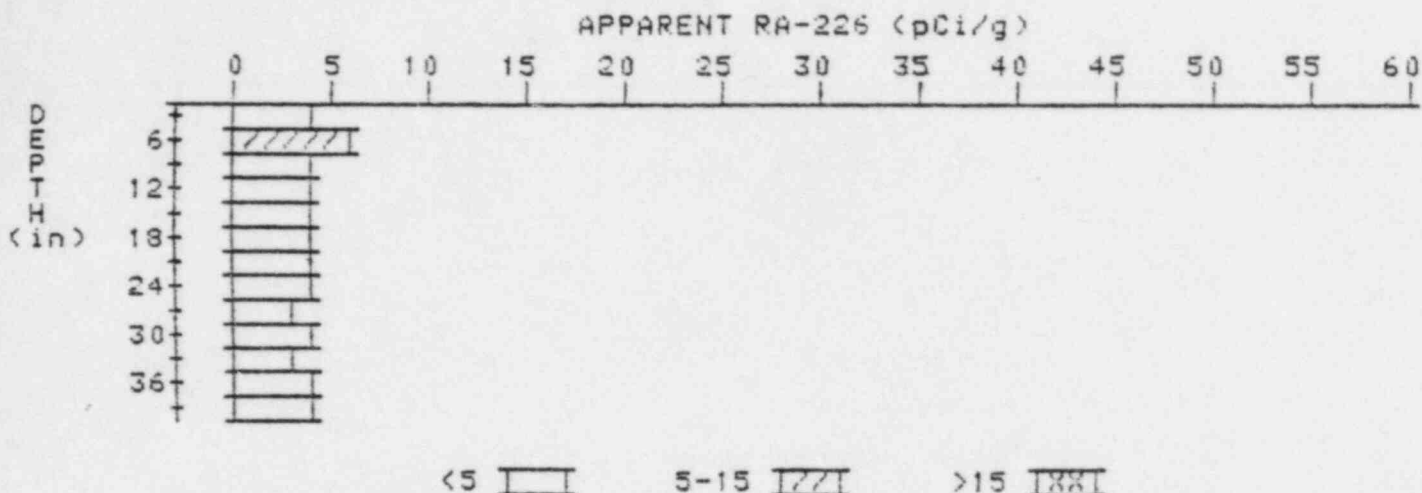
# APPARENT RADIUM-226 CONCENTRATION 24

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS

HOLE NUMBER: 24

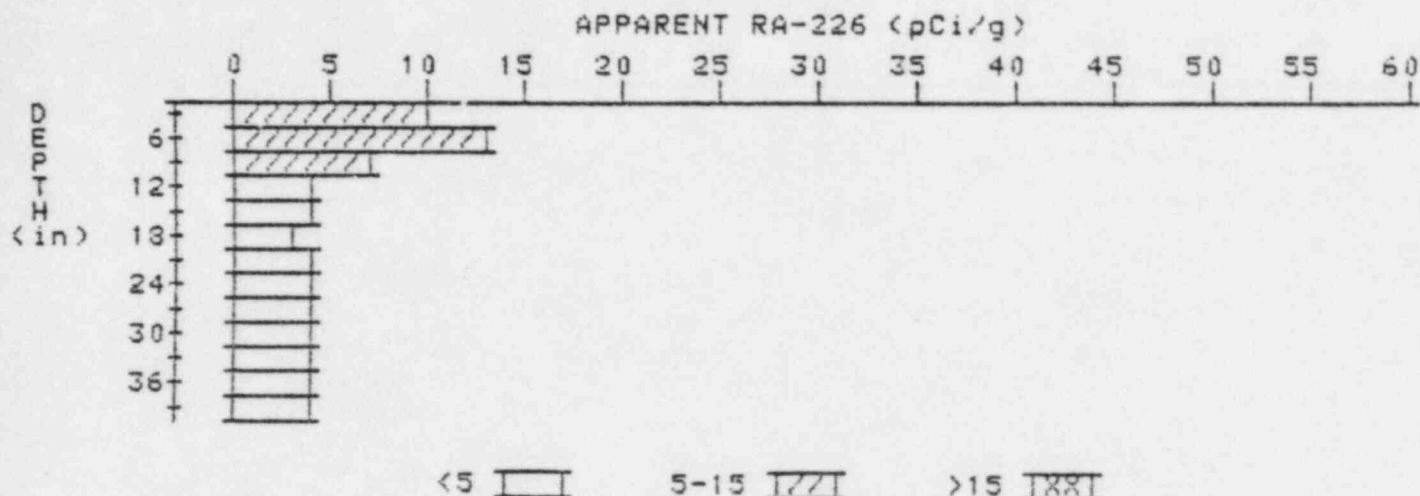
LOCATION: 221261



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.3	4.3
6	4.6	5.7
9	4.3	4.1
12	4.1	4.1
15	3.9	3.7
18	3.8	3.8
21	3.7	3.5
24	3.7	4.1
27	3.5	3.0
30	3.6	3.8
33	3.6	3.4
36	3.7	4.1
39	3.6	3.6

# APPARENT RADIUM-226 CONCENTRATION 25 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS  
HOLE NUMBER: 25  
LOCATION: 224228

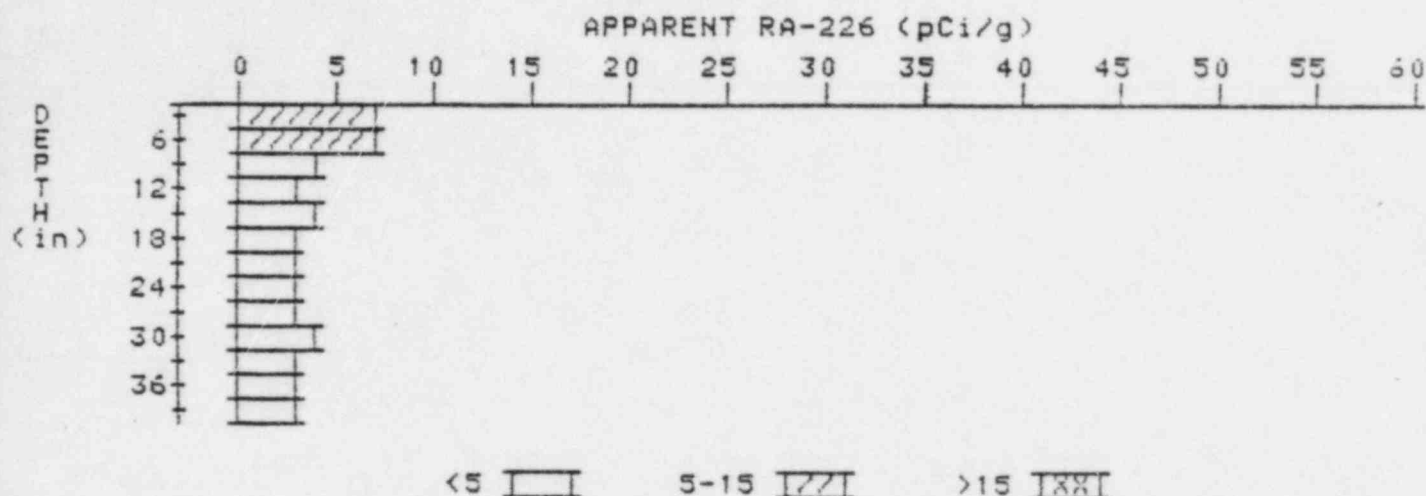


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	9.8	9.8
6	9.6	13.0
9	7.5	7.0
12	5.7	4.5
15	4.6	3.5
18	4.1	3.4
21	4.0	4.0
24	3.9	3.7
27	3.9	3.9
30	3.9	4.1
33	3.8	3.6
36	3.8	4.0
39	3.7	3.7

# APPARENT RADIUM-226 CONCENTRATION 28

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS  
HOLE NUMBER: 28  
LOCATION: 230216



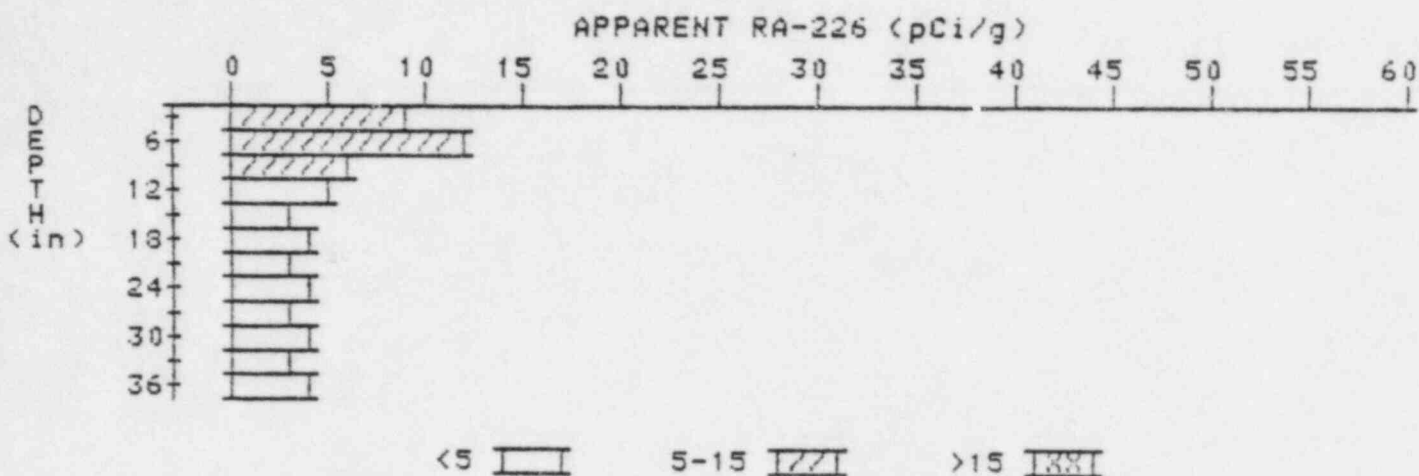
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	6.8	6.8
6	6.2	7.3
9	5.0	4.3
12	4.2	3.5
15	3.8	3.6
18	3.5	3.1
21	3.4	3.2
24	3.4	3.4
27	3.4	3.4
30	3.4	3.6
33	3.3	3.1
36	3.3	3.3
39	3.3	3.3

# APPARENT RADIUM-226 CONCENTRATION 31 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS

HOLE NUMBER: 31

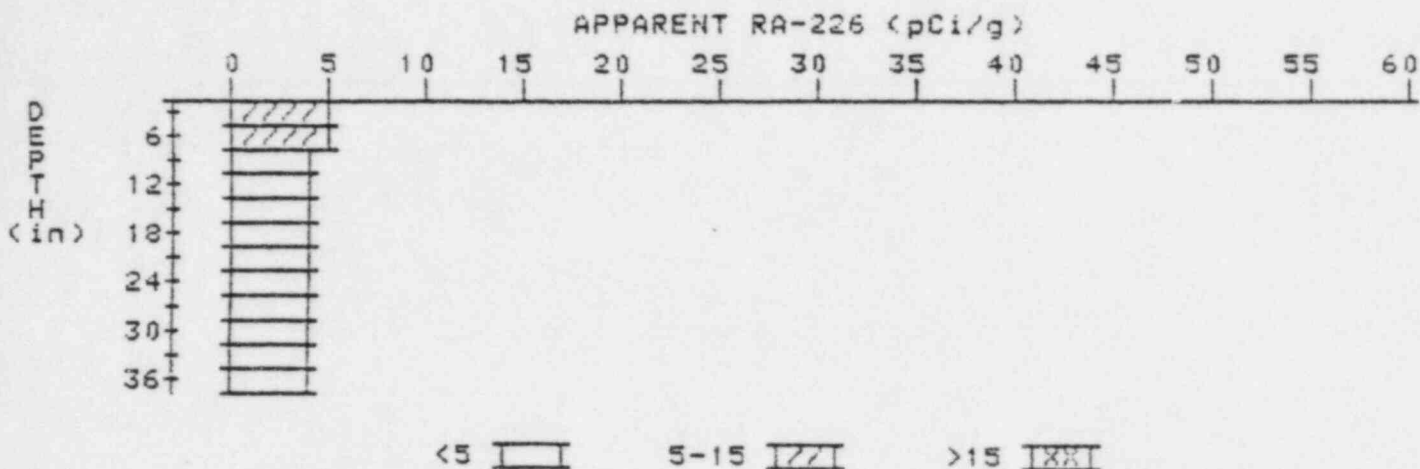
LOCATION: 245210



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	8.7	8.7
6	8.7	11.9
9	6.9	6.4
12	5.4	4.5
15	4.4	3.3
18	4.0	3.6
21	3.8	3.4
24	3.8	4.0
27	3.7	3.3
30	3.8	4.3
33	3.6	3.2
36	3.6	3.6

# APPARENT RADIUM-226 CONCENTRATION 32 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS  
HOLE NUMBER: 32  
LOCATION: 250271



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.0	5.0
6	4.9	5.4
9	4.5	4.5
12	4.1	3.7
15	3.9	3.5
18	3.9	4.1
21	3.8	3.6
24	3.8	3.8
27	3.8	4.0
30	3.7	3.5
33	3.7	3.9
36	3.6	3.6

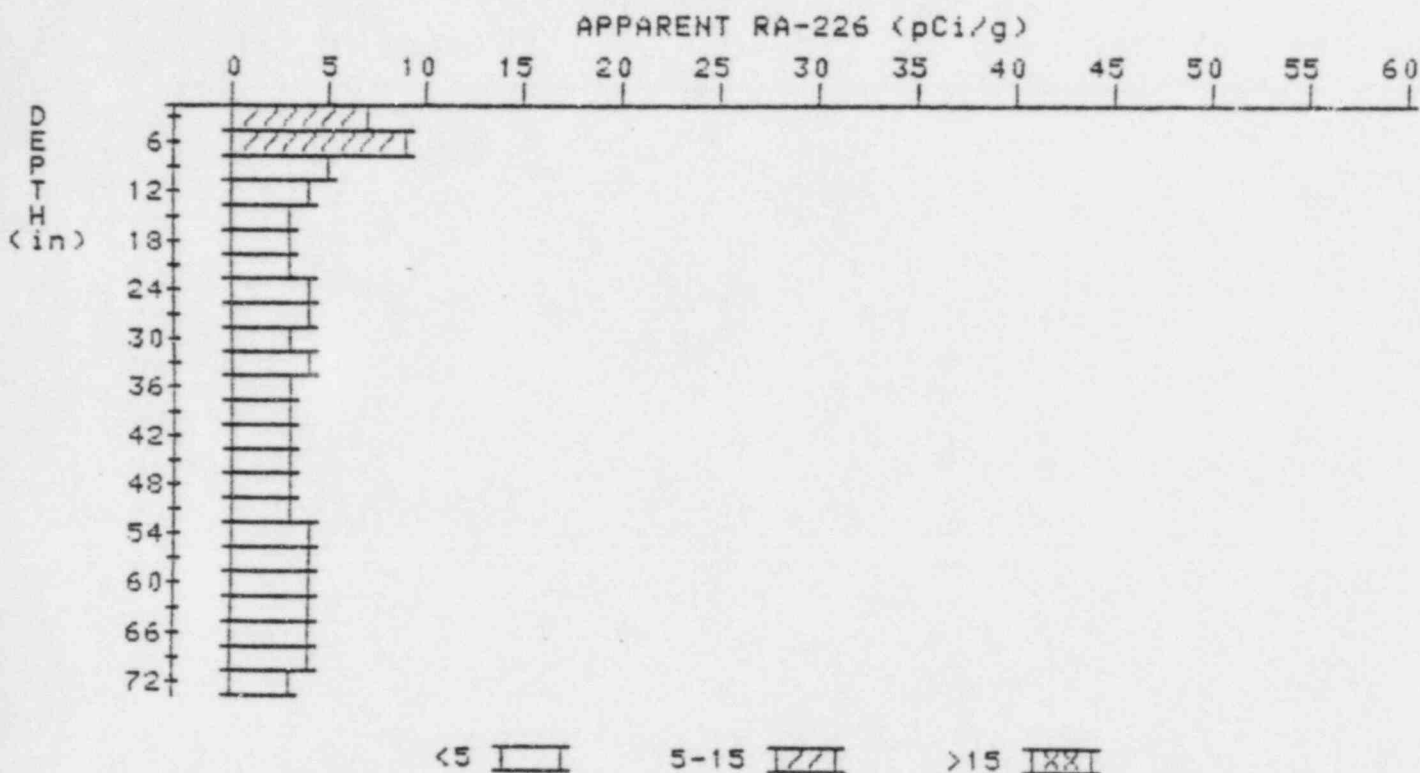
# APPARENT RADIUM-226 CONCENTRATION 33

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS

HOLE NUMBER: 33

LOCATION: 258210



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
=====	=====	=====
3	7.3	7.3
6	7.1	9.4
9	5.6	4.9
12	4.5	3.6
15	3.9	3.4
18	3.6	3.4
21	3.4	2.9
24	3.5	3.7
27	3.5	3.9
30	3.3	2.8
33	3.4	3.6
36	3.4	3.4
39	3.4	3.4
42	3.4	3.4
45	3.4	3.4

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6.5  
6.7  
6.4

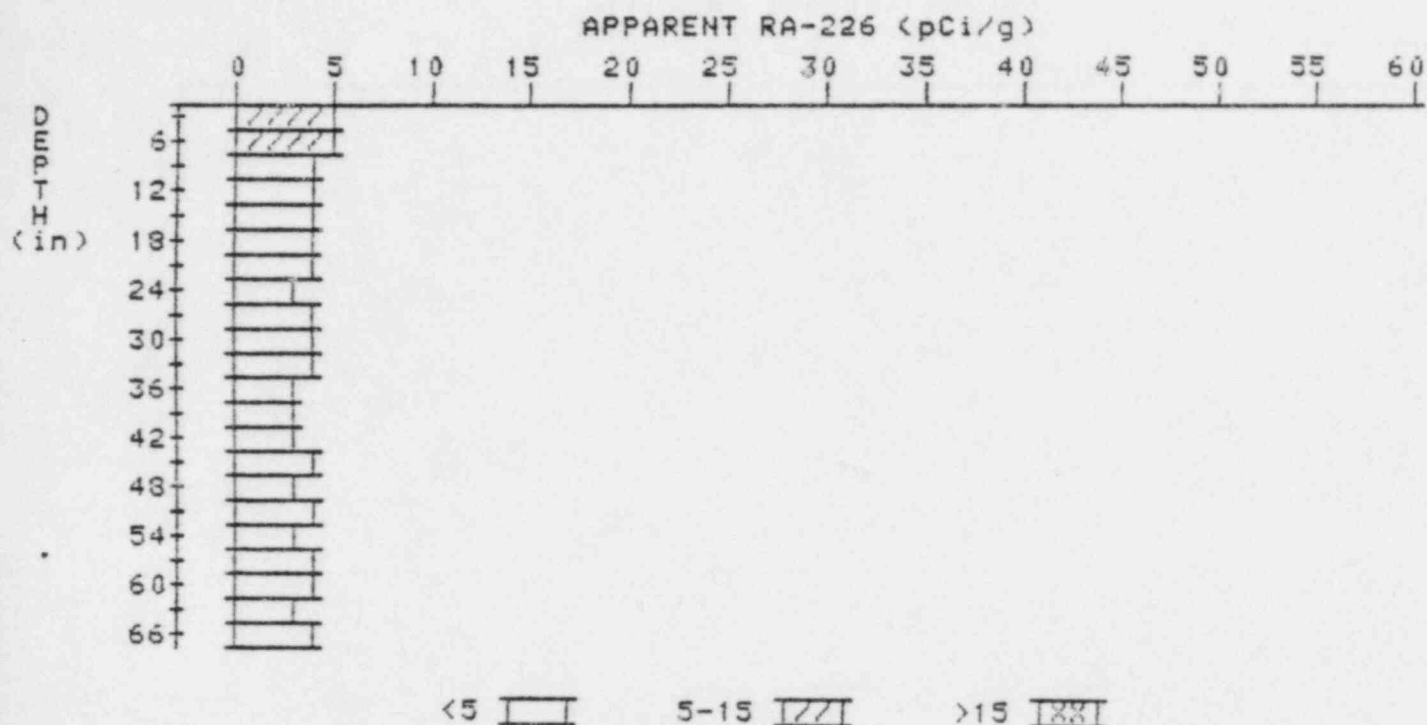
# APPARENT RADIUM-226 CONCENTRATION 34

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS

HOLE NUMBER: 34

LOCATION: 258230



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.2	5.2
6	4.8	5.2
9	4.2	3.7
12	3.9	3.5
15	3.8	3.8
18	3.7	3.5
21	3.7	3.9
24	3.6	3.2
27	3.7	4.1
30	3.5	3.6
33	3.5	3.5
36	3.4	3.4
39	3.3	2.9
42	3.4	3.4
45	3.5	3.9
48	3.4	2.9

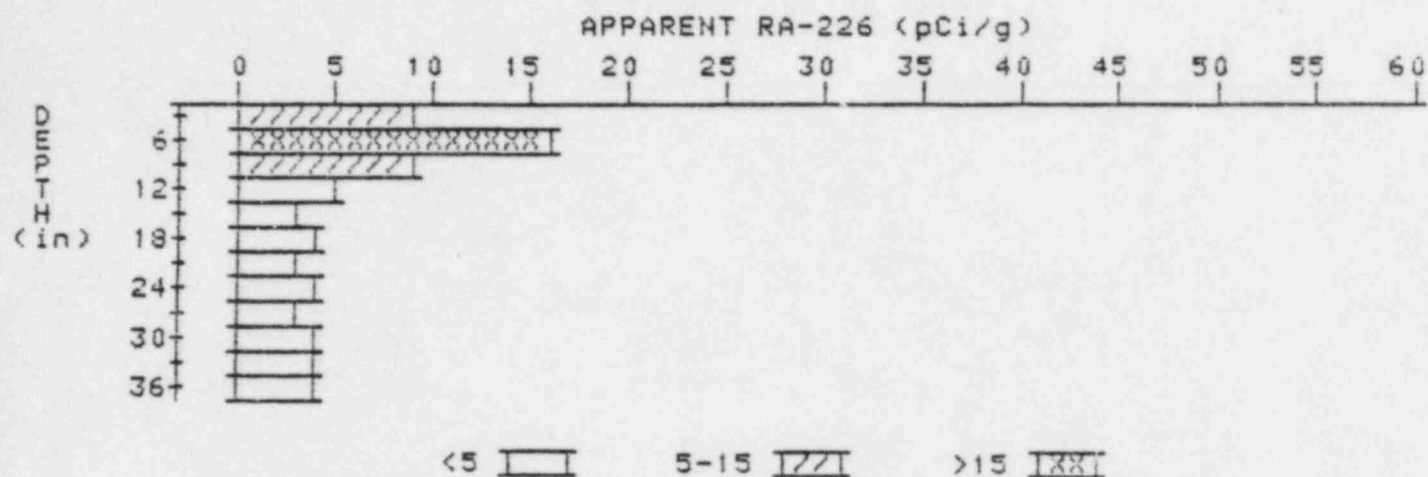
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3.5  
3.6  
3.5  
3.4  
3.5

4.1  
3.1  
4.0  
3.5  
3.0  
3.5

# APPARENT RADIUM-226 CONCENTRATION 35 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS  
HOLE NUMBER: 35  
LOCATION: 270260



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	9.2	9.2
6	10.3	15.6
9	8.4	8.9
12	6.2	4.8
15	4.8	3.4
18	4.2	3.8
21	3.8	3.3
24	3.7	3.7
27	3.6	3.4
30	3.6	3.6
33	3.6	3.6
36	3.6	3.6

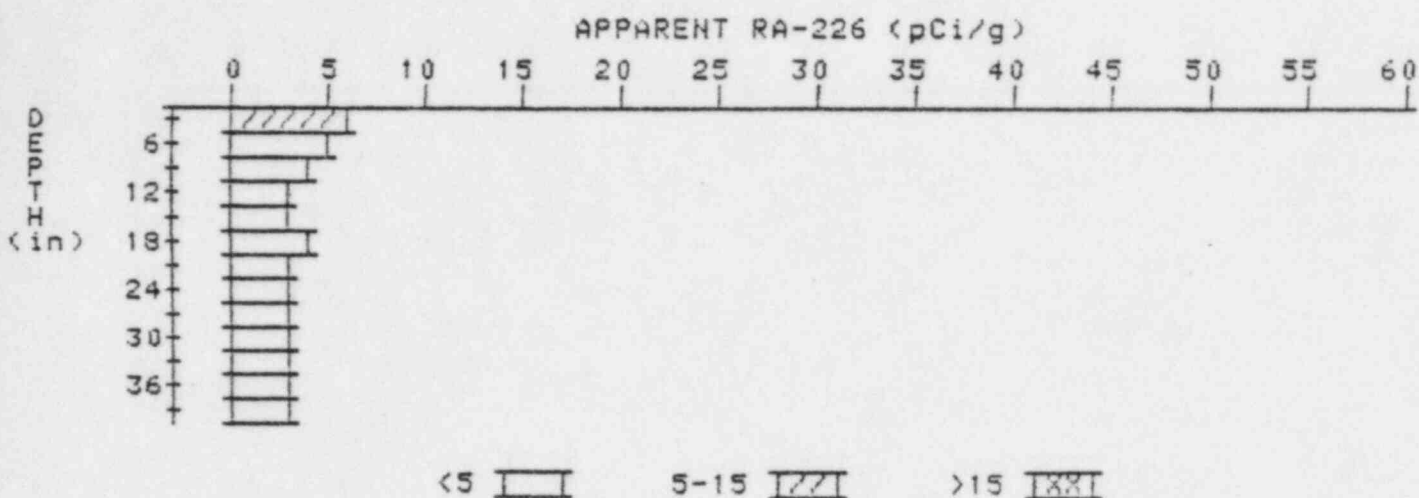
# APPARENT RADIUM-226 CONCENTRATION 36

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS

HOLE NUMBER: 36

LOCATION: 272203



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	6.1	6.1
6	5.2	4.8
9	4.5	4.3
12	3.9	3.2
15	3.7	3.3
18	3.7	4.1
21	3.5	3.3
24	3.4	3.2
27	3.4	3.4
30	3.4	3.4
33	3.4	3.4
36	3.4	3.4
39	3.4	3.4

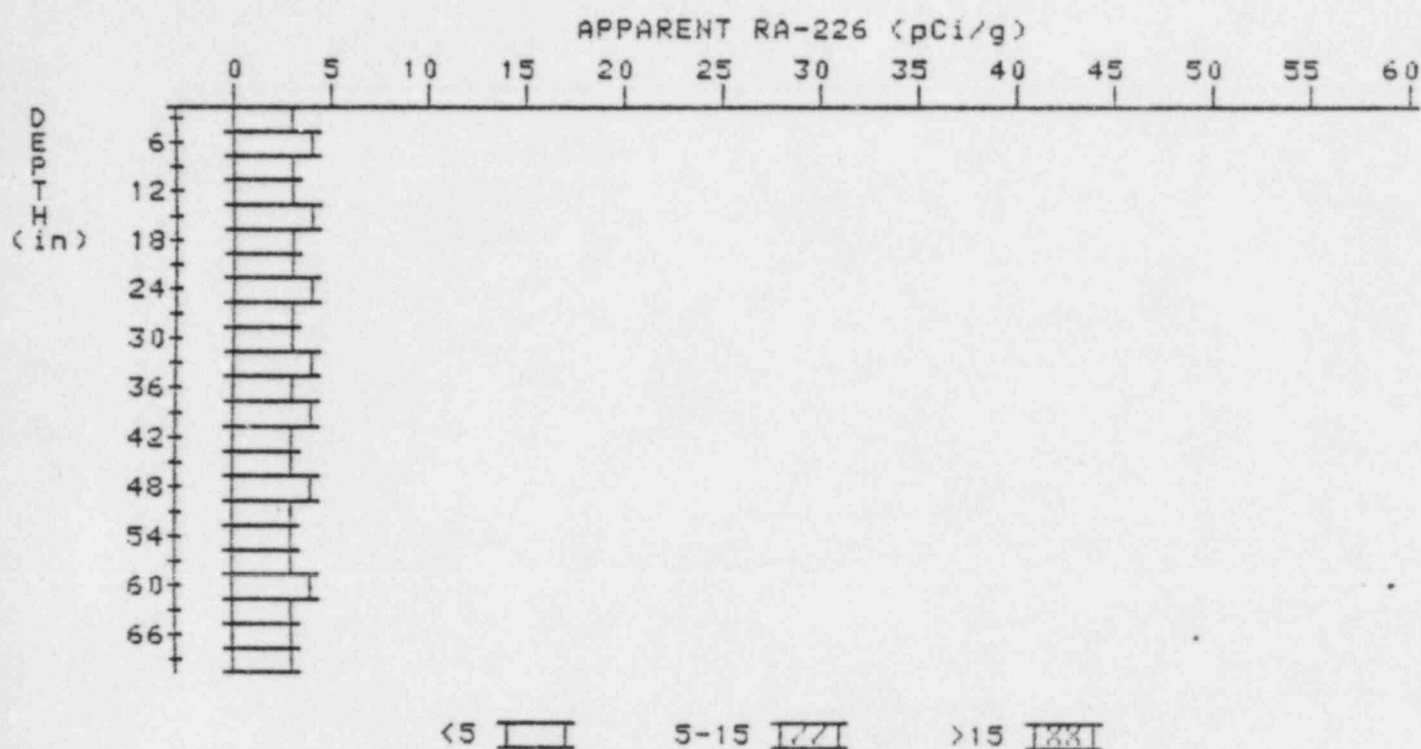
# APPARENT RADIUM-226 CONCENTRATION 37

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS

HOLE NUMBER: 37

LOCATION: 282239



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	3.3
12	3.4	3.4
15	3.5	3.9
18	3.4	3.2
21	3.4	3.2
24	3.5	3.9
27	3.4	3.4
30	3.3	2.9
33	3.4	3.3
36	3.3	2.9
39	3.4	3.3
42	3.3	3.1
45	3.3	3.1

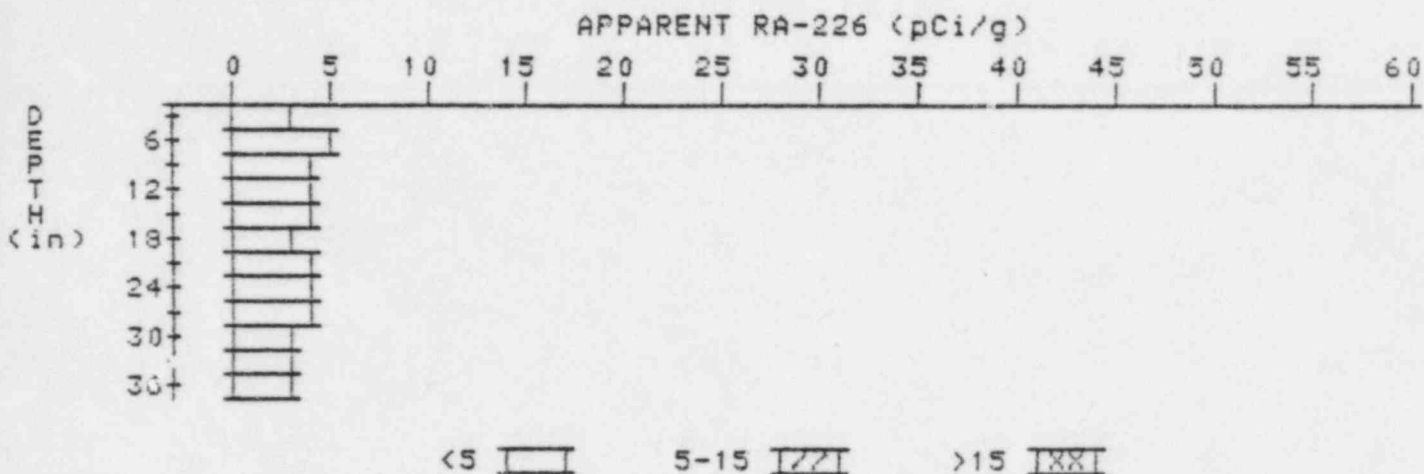
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# APPARENT RADIUM-226 CONCENTRATION 40 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS  
HOLE NUMBER: 40  
LOCATION: 286197



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

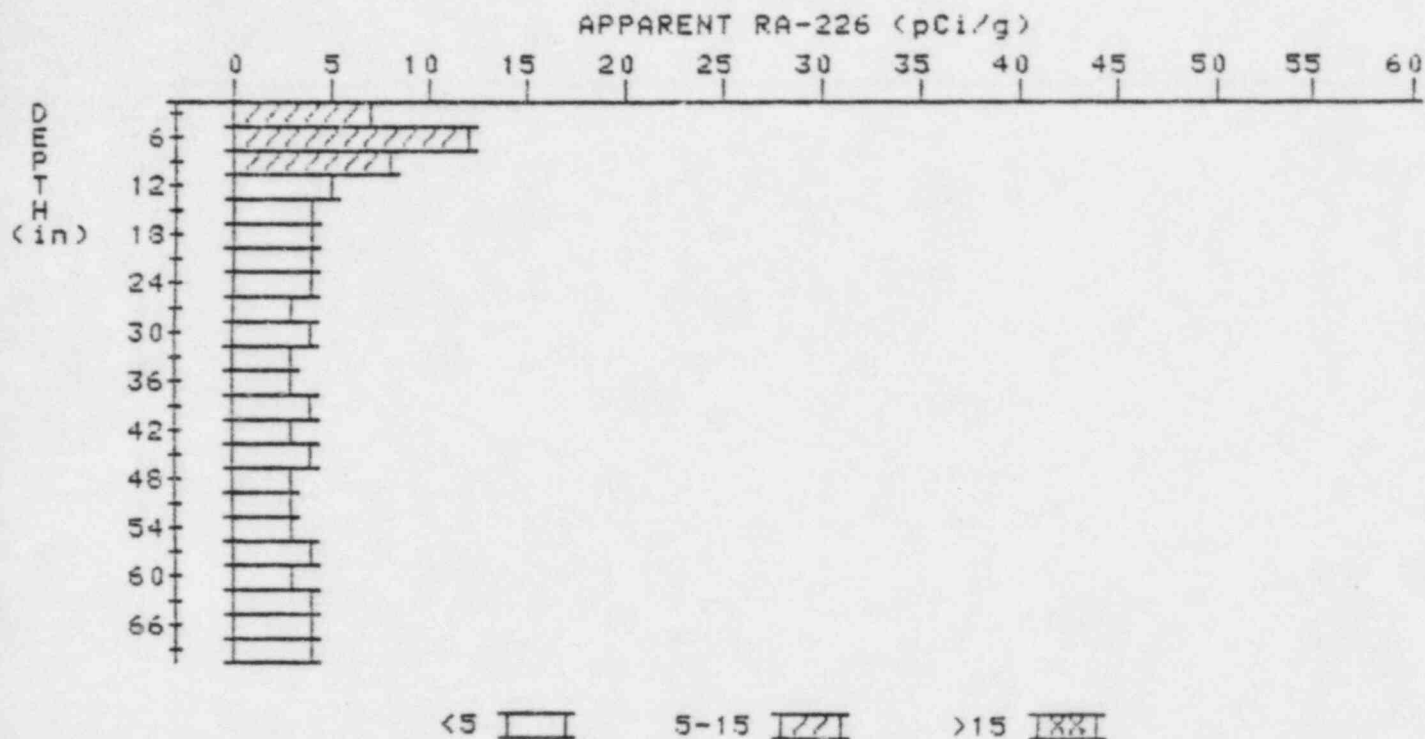
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

42

PROPERTY NUMBER: GJ-12020-RS

HOLE NUMBER: 42

LOCATION: 290231



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	7.3	7.3
6	8.3	11.9
9	7.3	8.4
12	5.7	4.8
15	4.6	3.5
18	4.1	3.6
21	3.9	3.5
24	3.9	4.3
27	3.7	3.3
30	3.7	4.1
33	3.5	3.1
36	3.5	3.3
39	3.6	4.1
42	3.4	2.9
45	3.3	3.9

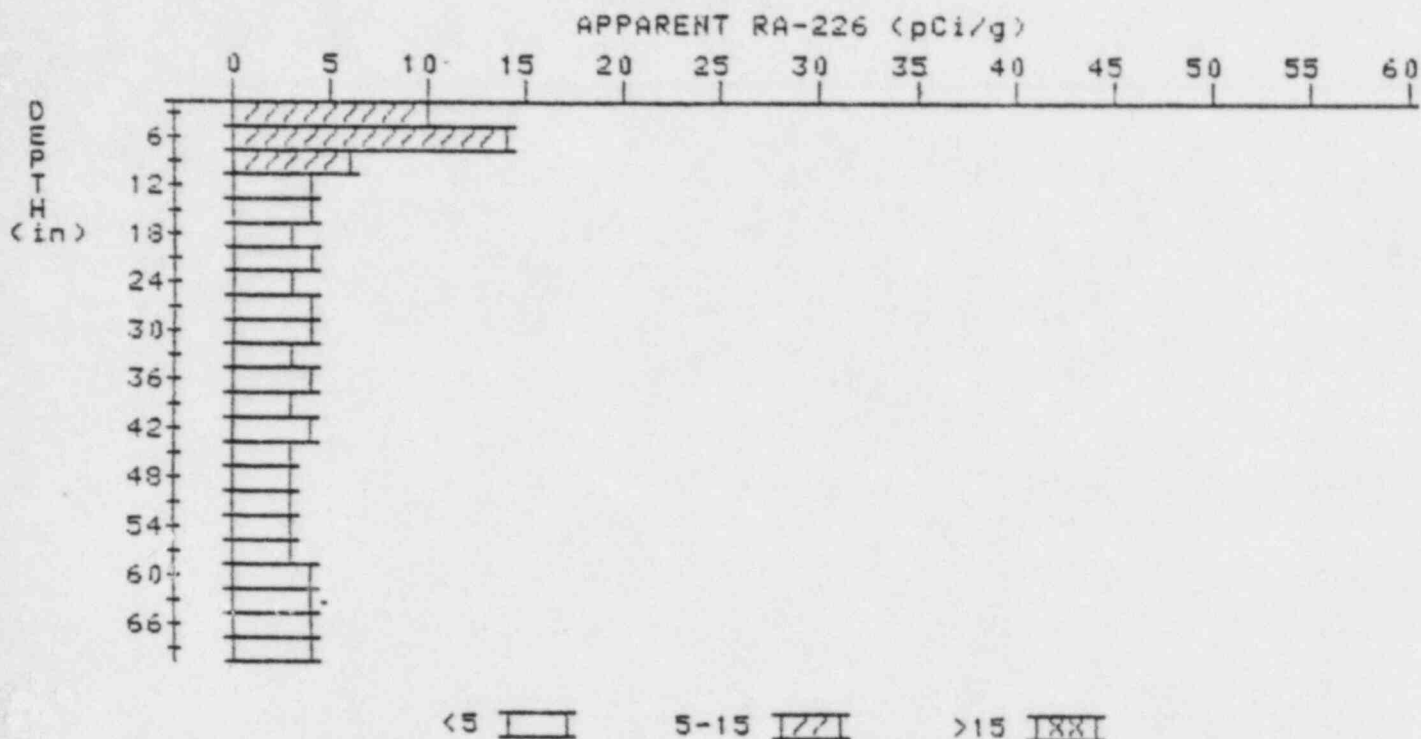
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3.5  
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3.5

3.2  
3.4  
3.2  
3.7  
3.3  
3.8  
3.8  
3.5

# APPARENT RADIUM-226 CONCENTRATION 43 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS  
HOLE NUMBER: 43  
LOCATION: 304231



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	9.9	9.9
6	9.7	13.3
9	7.2	5.8
12	5.5	4.1
15	4.6	3.9
18	4.1	3.4
21	4.0	4.2
24	3.8	3.4
27	3.8	4.0
30	3.7	3.7
33	3.6	3.4
36	3.6	3.8
39	3.5	3.3
42	3.5	3.7
45	3.4	3.2

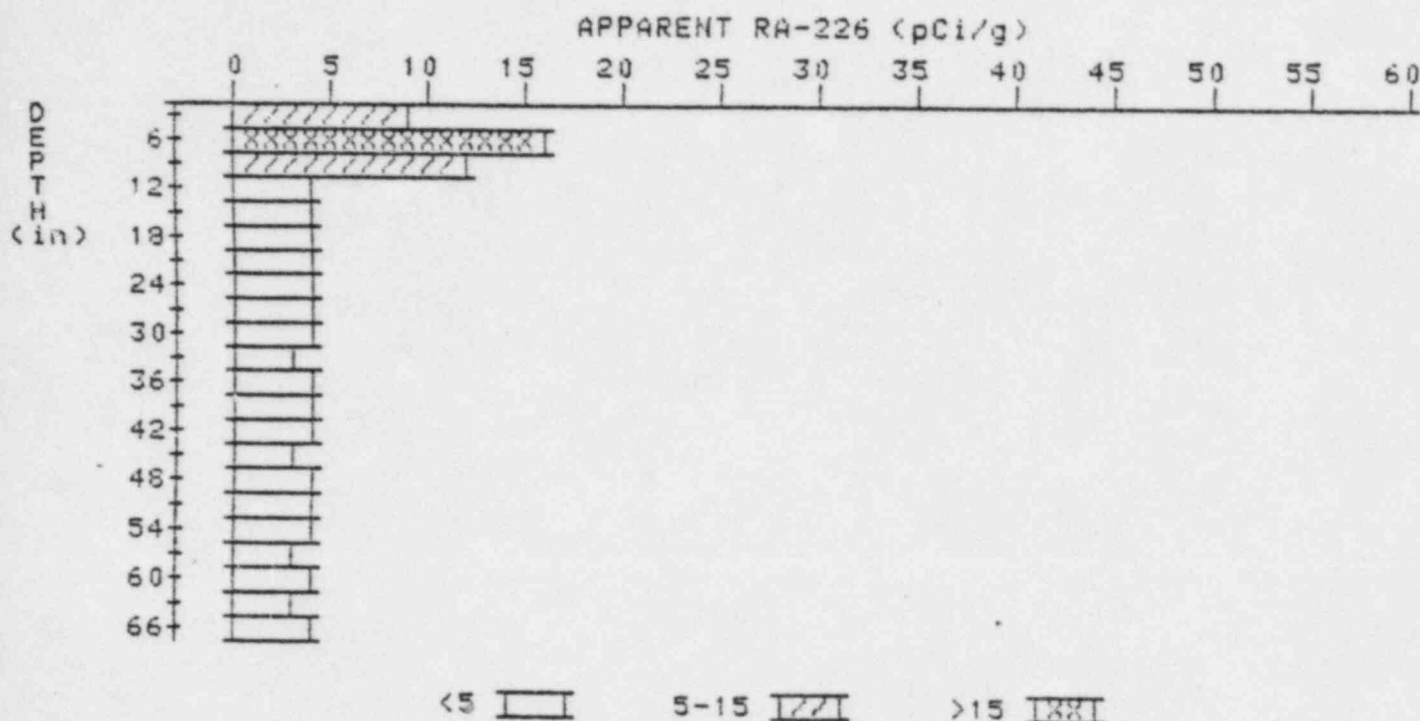
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3.4  
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3.4  
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3.5

# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 44

PROPERTY NUMBER: GJ-12020-RS  
HOLE NUMBER: 44  
LOCATION: 305214



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.9	3.9
6	10.5	15.7
9	9.2	11.7
12	6.5	4.0
15	5.2	4.1
18	4.5	3.8
21	4.2	4.0
24	4.0	3.8
27	3.9	4.1
30	3.7	3.5
33	3.6	3.4
36	3.6	3.6
39	3.6	3.6
42	3.6	3.8
45	3.5	3.3
48	3.8	3.8

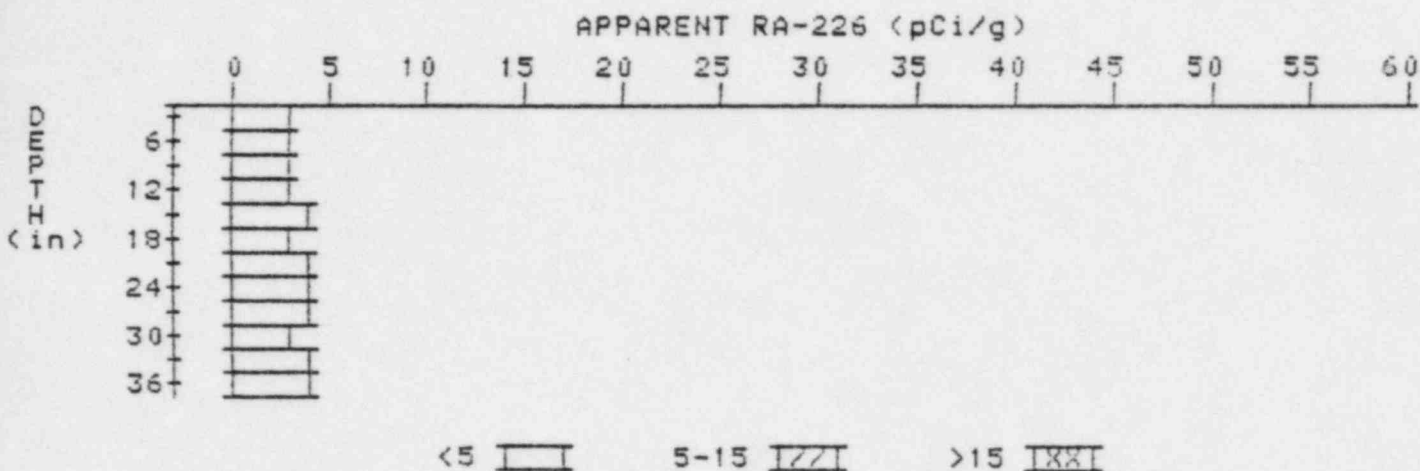
51  
54  
57  
60  
63  
66

3.5  
3.5  
3.4  
3.5  
3.5  
3.6

3.5  
3.7  
3.0  
3.7  
3.3  
3.6

# APPARENT RADIUM-226 CONCENTRATION 45 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-R3  
HOLE NUMBER: 43  
LOCATION: 310210



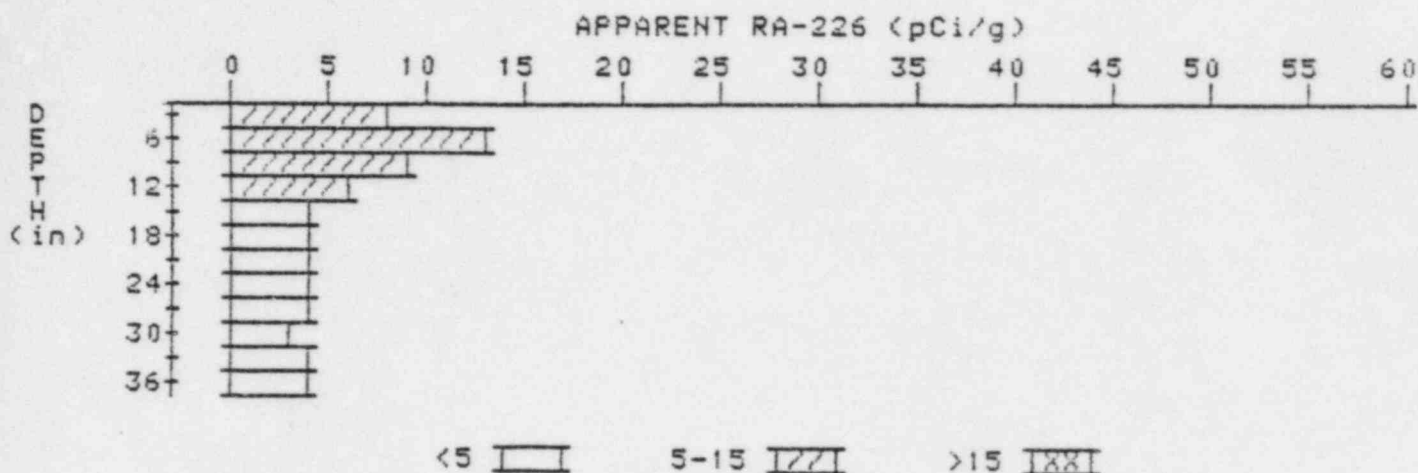
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.0	3.0
6	3.2	3.4
9	3.3	3.5
12	3.3	3.1
15	3.4	3.6
18	3.4	3.0
21	3.6	4.0
24	3.6	3.6
27	3.6	3.8
30	3.5	3.3
33	3.5	3.5
36	3.5	3.5

# APPARENT RADIUM-226 CONCENTRATION 46 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS

HOLE NUMBER: 46

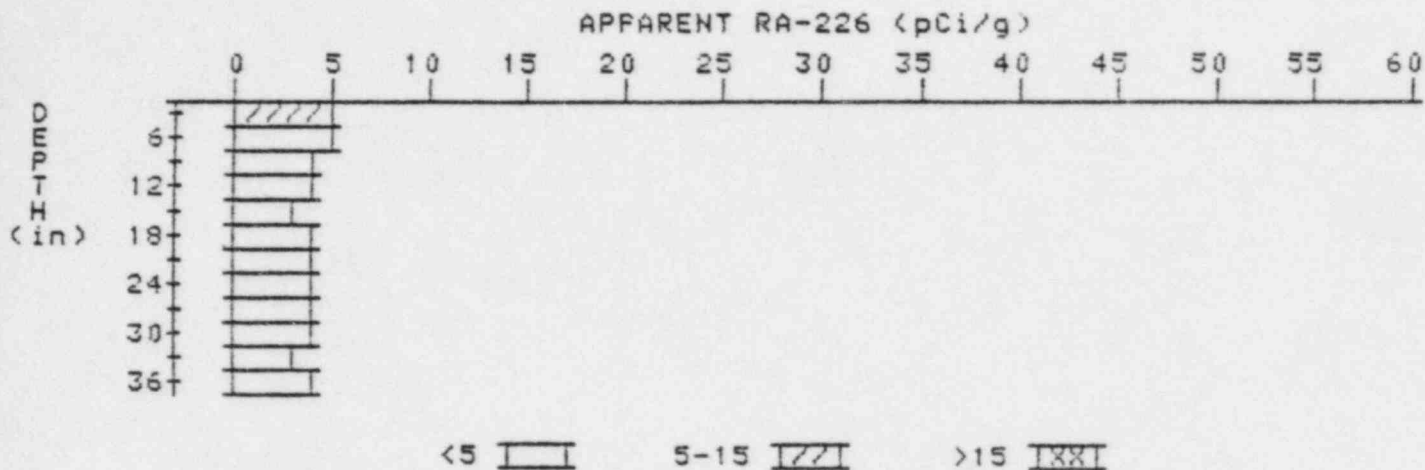
LOCATION: 310260



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	7.6	7.6
6	8.8	12.7
9	7.8	8.9
12	6.2	5.7
15	4.9	3.7
18	4.3	3.3
21	4.0	3.3
24	3.8	3.6
27	3.7	3.7
30	3.6	3.4
33	3.6	3.8
36	3.5	3.5

# APPARENT RADIUM-226 CONCENTRATION 48 DECONVOLUTION GRAPH

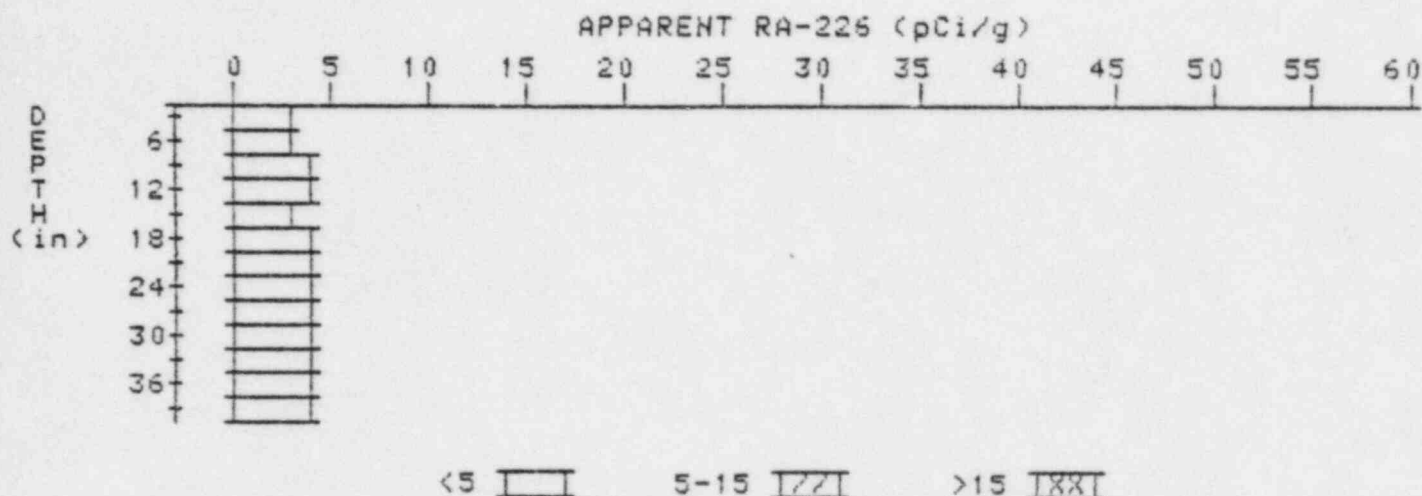
PROPERTY NUMBER: GJ-12020-RS  
HOLE NUMBER: 48  
LOCATION: 313196



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.4	5.4
6	4.8	4.8
9	4.2	3.7
12	3.9	3.7
15	3.7	3.3
18	3.7	3.7
21	3.7	3.7
24	3.7	3.9
27	3.6	3.6
30	3.5	3.5
33	3.4	3.0
36	3.5	3.5

# APPARENT RADIUM-226 CONCENTRATION 50 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS  
HOLE NUMBER: 50  
LOCATION: 326227



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.7	2.7
6	3.1	3.3
9	3.4	3.6
12	3.6	4.0
15	3.6	3.4
18	3.7	3.9
21	3.7	3.7
24	3.7	3.7
27	3.7	3.7
30	3.7	3.7
33	3.7	3.7
36	3.7	3.7
39	3.7	3.7

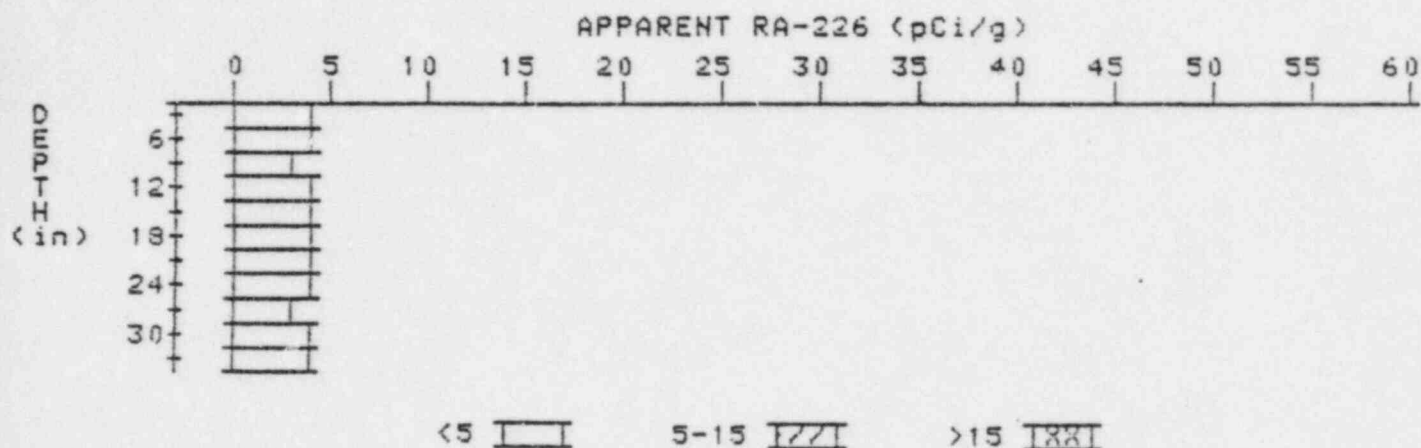
# APPARENT RADIUM-226 CONCENTRATION 51

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS

HOLE NUMBER: 51

LOCATION: 334200



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.6	3.6
6	3.7	4.1
9	3.6	3.1
12	3.8	4.2
15	3.8	3.8
18	3.8	4.0
21	3.7	3.7
24	3.6	3.6
27	3.5	3.3
30	3.5	3.5
33	3.5	3.5

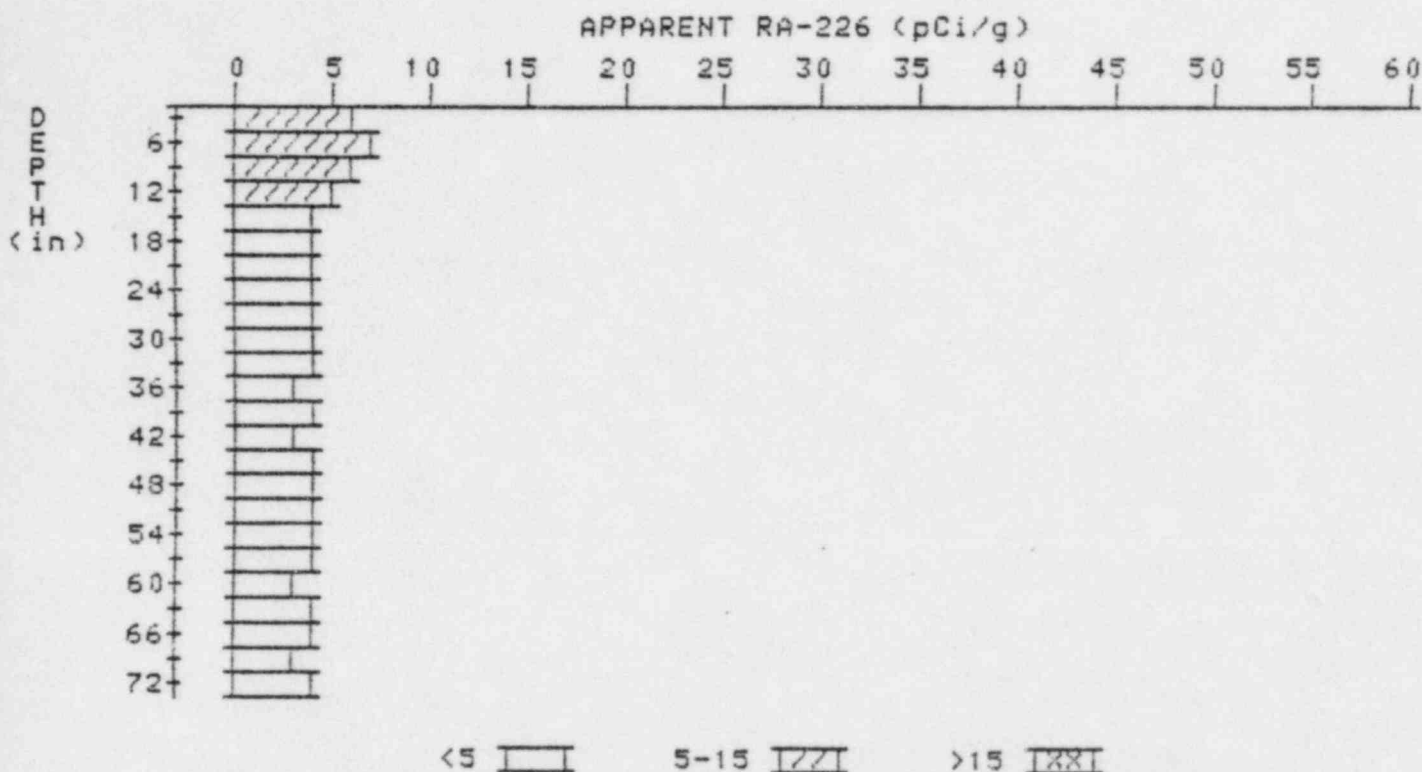
# APPARENT RADIUM-226 CONCENTRATION 52

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-12020-RS

HOLE NUMBER: 52

LOCATION: 334226

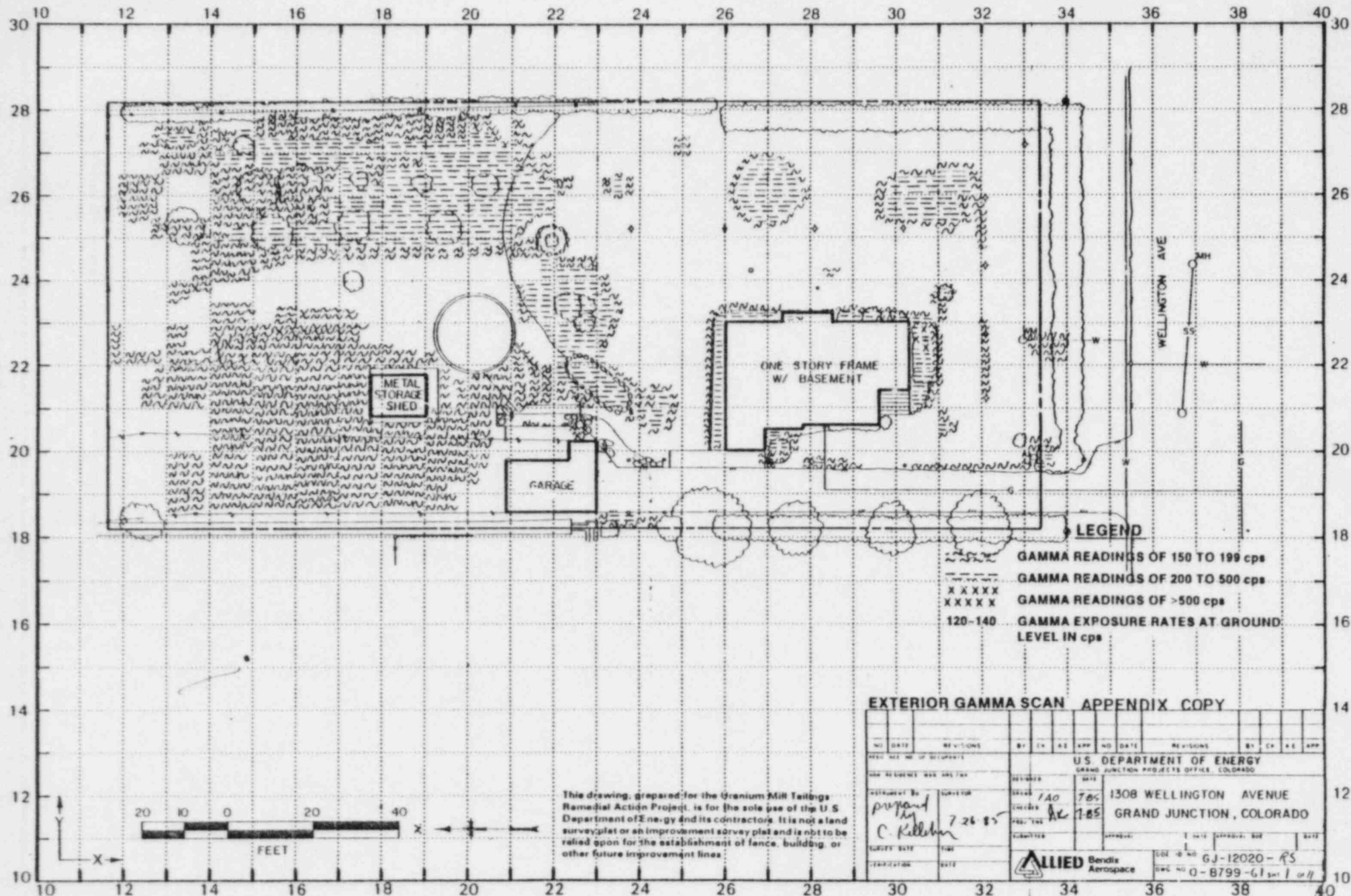


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	6.1	6.1
6	6.0	6.5
9	5.6	5.6
12	5.2	5.4
15	4.7	4.3
18	4.4	4.2
21	4.2	4.2
24	4.0	3.8
27	3.9	3.9
30	3.8	3.8
33	3.7	3.7
36	3.6	3.4
39	3.6	3.8
42	3.5	3.1
45	3.6	3.8

48  
51  
54  
57  
60  
63  
66  
69  
72

3.5  
3.5  
3.5  
3.5  
3.5  
3.5  
3.5  
3.4  
3.5

3.5  
3.5  
3.5  
3.5  
3.5  
3.5  
3.7  
3.0  
3.5



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.