

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-11243-CS
ADDRESS: 2894 NORTH AVENUE

JULY 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

BENDIX FIELD ENGINEERING CORPORATION
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APPROVED BY

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DATE

July 29 1985

REA11243:REA-704

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

The location, DOE ID No. GJ-11243-CS, is two commercial structures located at 2894 North Avenue, Grand Junction, Colorado.

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

1.2 Evaluation and Recommendation

It is recommended that no remedial action be performed on this property (as discussed in Section 4.0) and that a Property Completion Report be prepared for use in the DOE certification process. The identified residual radioactive material found on this property is tailings; the estimated volume is: exterior, 2 cu. yd.; interior, 0 cu. yd.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 2894 North Avenue, Grand Junction, Colorado

Zoning: Commercial (C-1)

Lot Size: Approximately 31,500 sf (0.72 acres)

Legal Description: The west 150 feet of the E 1/2 SE 1/4 SE 1/4 of Section 7, except the north 400 feet thereof, and also except the south 50 feet thereof for road right-of-way as described in Book 1374, Page 1000, Mesa County Clerk and Records Office. All within T.1S., R.1E, Ute Meridian, City of Grand Junction, County of Mesa, State of Colorado.

Point of Reference: This property is located approximately 4 mile(s) northeast of the State of Colorado Tailings Repository. Appendix Figure 2.1 shows the property location relative to its surroundings.

Utilities: Utility locations are shown in Appendix Figure 2.2.

Electrical:	Underground
Gas:	Underground
Telephone:	Underground
Sewer:	Underground
Water:	Underground
Cable TV:	None

Bordering Properties:

North:	Vacant land
South:	North Avenue
East:	Commercial structure
West:	Commercial structure

2.2 Existing Facilities and Structures

Primary Structure: Building 1

Type:	Single-story commercial structure
Size:	Approximately 3,850 sf
Construction Date:	1982
Construction:	Pre-engineered steel frame with masonry walls and concrete floor
Foundation:	Monolithic concrete slab-on-grade
Footing Depth:	Approximately 12" to bottom of footing from grade

Basement: None
Crawl Space: None
Condition: Good

Secondary Structure: Building 2

Type: Single-story commercial structure
Size: Approximately 3,350 sf
Construction Date: 1982
Construction: Pre-engineered steel frame with masonry walls and concrete floor
Foundation: Monolithic concrete slab-on-grade
Footing Depth: Approximately 12" to bottom of footing from grade
Basement: None
Crawl Space: None
Condition: Good

Other Structures: None

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-11243-CS on June 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 from the files of the Colorado Department of Health (CDH) and the inclusion data from Oak Ridge National Laboratory (ORNL) was conducted. These records indicate contamination adjacent to North Avenue. Tailings were removed in August of 1983 from the building site of Building 1.

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: 13 to 16 $\mu\text{R/h}$
Highest Outside Gamma Reading (HOG): 87 $\mu\text{R/h}$

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

3.2.2 Interior Findings

Background Readings: 13 to 17 $\mu\text{R/h}$
Highest Inside Gamma Reading (HIG): 18 $\mu\text{R/h}$

Interior radium-concentration measurements are presented in Appendix Table 3.2. Interior gamma exposure-rate measurements are summarized in Appendix Table 3.3.

3.3 Boreholes, Soil Samples, and Other Measurements

Areas which displayed elevated gamma levels were further investigated. Data from these investigations are included in Appendix Tables 3.1 and 3.2. Exterior locations are shown in Appendix Figure 3.2

3.4 Radon/Radon Daughter Concentration (RDC)

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

3.5 Extent of Contamination

Appendix Figure 3.3 shows identified areas and estimated depths of contamination on this property, based on assessments of all measurements taken. As noted in this figure, areas that contain identified residual radioactive materials are:

- (Area A) Surface Material: Lava rock
 Direction From Primary Structure: Southeast
 Total Depth of Contamination: 21 inches
 Comments: The lava rock is 1-inch-deep. This area is excluded from remedial action.
 Approximate Square Footage: 5 sf within the legal property boundary; 29 sf within the street right-of-way

- (Area B) Surface Material: Lava rock
 Direction From Primary Structure: South
 Other Directions: Along North Avenue
 Total Depth of Contamination: 69 inches
 Comments: The lava rock is 1-inch-deep. These four deposits involve the city water main. This area is excluded from remedial action.
 Approximate Square Footage: 490

- (Area C) Surface Material: Lava rock
 Direction From Primary Structure: South
 Total Depth of Contamination: 12 inches
 Comments: The lava rock is 1-inch-deep. This area is excluded from remedial action.
 Approximate Square Footage: 28 sf within the legal property boundary; 600 sf within the street right-of-way

- (Area D) Surface Material: Concrete
 Direction From Primary Structure: South
 Other Directions: Center and west driveways
 Estimated Total Depth of Contamination: 18 inches
 Other (height or thickness): 4-inch-thick concrete
 Comments: The depth of contamination for these two deposits is based on data collected in Area E. This area is excluded from remedial action.
 Approximate Square Footage: 100

- (Area E) Surface Material: Lava rock
Direction From Primary Structure: South
Other Directions: Between driveways
Total Depth of Contamination: 18 inches
Comments: The lava rock is 1-inch-deep. This area is excluded from remedial action.
Approximate Square Footage: 10 sf within the legal property boundary; 190 sf within the street right-of-way
- (Area F) Surface Material: Concrete
Direction From Primary Structure: South
Other Directions: East, west, and center driveways
Total Depth of Contamination: 69 inches
Other (height or thickness): 4-inch-thick concrete
Comments: These three deposits involve the city water main. This area is excluded from remedial action.
Approximate Square Footage: 330

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

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

4.2 Evaluation of Recommended Remedial Action

The recommendation that no remedial action be performed on this property is made because the levels of radioactivity on this property fall below the EPA Standards (40 CFR 192) when averaged over 100 m².

The EPA Standards are:

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

Appendix Table 4.1 presents the area and volume calculations of contamination present on the property. The average radium concentration for this property is 5.98 pCi/g which falls below the allowable EPA Standard of 7 pCi/g for this area. Appendix Table 4.2 presents the calculations for concentrations of Radium-226 in soil for this location.

Areas B, D, F, and a major portion of Areas A, C, and E are located beyond the legal property boundary in the street right-of-way. These areas are associated with a water line that is bedded in tailings.

If the DOE determines that the water line deposits should be removed, it is recommended that Areas B, D, F, and all of Areas A, C, and E (including the contiguous deposits within the legal property boundary) be removed as part of a remedial action project GJ-97001-OT. This project would be performed in cooperation with the City of Grand Junction if utility improvements are made in this area. Remedial action project GJ-97001-OT would be the most efficient and cost-effective method of tailings removal. It would allow for identification of tailings involvement of other adjacent properties along the utility and their removal under a single subcontract utilizing a utility subcontractor.

5.0 REFERENCES

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

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

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

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

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

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

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

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

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

6.0 APPENDIX

This Appendix contains the following:

Appendix Tables:

Table 3.1	Radium Concentrations at Exterior Locations
Table 3.2	Radium Concentrations at Interior Locations
Table 3.3	Summary of Interior Gamma Exposure Rates
Table 4.1	Area and Volume Calculations
Table 4.2	Calculations for Concentration of Radium-226 in Soil

Appendix Figures:

Figure 2.1	Vicinity Map
Figure 2.2	Site Plan
Figure 3.1	Exterior Grid-Point Exposure Rates
Figure 3.2	Exterior Sample Locations
Figure 3.3	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.		
3	150230	03	TC	3.0		*	South of Building 2 DC = 0 inches
		06	TC	3.5		*	
		09	TC	4.0		*	
		12	TC	4.3		*	
		15	TC	4.6		*	
		18	TC	4.7		*	
		21	TC	4.7		*	
		24	TC	4.5		*	
		27	TC	4.6		*	
		30	TC	4.5		*	
		33	TC	4.5		*	
		36	TC	4.4		*	
		39	TC	4.4		*	
4	204215	00	DS	1.0		*	North of Building 1 DC = 0 inches
		03	TC	3.4		*	
		06	TC	3.8		*	
		09	TC	4.3		*	
		12	TC	4.4		*	
		15	TC	4.6		*	
		18	TC	4.6		*	
		21	TC	4.6		*	
		24	TC	4.5		*	
		27	TC	4.4		*	
		30	TC	4.2		*	
		33	TC	4.1		*	
		36	TC	4.1		*	
5	205280	00	DS	<1.0		*	Northeast of Building 1 Background DC = 0 inches
		03	TC	2.8		*	
		06	TC	3.3		*	
		09	TC	3.8		*	
		12	TC	4.1		*	
		15	TC	4.2		*	
		18	TC	4.3		*	
		21	TC	4.1		*	
		24	TC	3.9		*	
		27	TC	3.8		*	
		30	TC	3.7		*	
		33	TC	3.7		*	
		36	TC	3.7		*	
		39	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.		
5	205280	42	TC	3.8		*	
6	235271	00	DS	<1.0		*	Gas line
		22	DS	1.6		*	
7	279271	00	DS	<1.0		*	By water line
		03	TC	2.7		*	
		06	TC	3.2		*	Southeast of Building 1
		09	TC	3.5		*	
		12	TC	3.8		*	DC = 0 inches
		15	TC	4.2		*	
		18	TC	4.3		*	
		21	TC	4.3		*	
		24	TC	4.2		*	
		27	TC	4.1		*	
		30	TC	3.9		*	
		33	TC	3.8		*	
		36	TC	3.7		*	
		39	TC	3.7		*	
		42	TC	3.7		*	
		45	TC	3.7		*	
		48	TC	3.8		*	
		51	TC	3.9		*	
		54	TC	4.1		*	
		57	TC	4.2		*	
		60	TC	4.2		*	
		63	TC	4.2		*	
		66	TC	4.0		*	
		69	TC	3.9		*	
		72	TC	3.9		*	
		75	TC	3.9		*	
8	305225	00	DS	1.6		*	South of Building 1
		03	TC	3.6		*	
		06	TC	4.4		*	In asphalt parking lot
		09	TC	4.7		*	
		12	TC	4.4		*	DC = 0 inches
		15	TC	4.3		*	
		18	TC	4.3		*	
		21	TC	4.2		*	
		24	TC	4.1		*	
		27	TC	4.0		*	
		30	TC	3.8		*	
		33	TC	3.7		*	

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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.		
8	305225	36	TC	3.6		*	
		39	TC	3.6		*	
9	307270	00	DS	<1.0		*	By sign pole
10	310311	00	DS	1.8		*	East edge of
		06	DS	1.9		*	asphalt
11	315285	00	DS	3.1		*	Southeast of
		06	DS	5.7		*	Building 1
		12	DS	4.0		*	
		18	DS	3.3		*	DC = 21 inches
		03	TC	4.9		*	Based on the
		06	TC	5.5		*	deconvolution graph
		09	TC	5.7		*	
		12	TC	5.7		*	
		15	TC	5.4		*	
		18	TC	5.2		*	
		21	TC	4.9		*	
		24	TC	4.6		*	
		27	TC	4.3		*	
		30	TC	4.2		*	
		33	TC	4.2		*	
		36	TC	4.1		*	
12	316196	00	DS	2.7		*	South of Building 1
		03	TC	4.6		*	
		06	TC	5.2		*	
		09	TC	5.4		*	
		12	TC	5.3		*	
		15	TC	5.0		*	DC = 18 inches
		18	TC	4.8		*	Based on the
		21	TC	4.7		*	deconvolution graph
		24	TC	4.7		*	
		27	TC	4.5		*	
		30	TC	4.4		*	
		33	TC	4.2		*	
13	317240	00	DS	4.9		*	South of Building 1
		03	TC	5.1		*	
		06	TC	5.8		*	
		09	TC	5.5		*	

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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.		
13	317240	12	TC	5.0		*	
		15	TC	4.9		*	
		18	TC	4.7		*	
		21	TC	4.8		*	DC = 12 inches
		24	TC	4.6		*	Based on the
		27	TC	4.6		*	deconvolution graph
		30	TC	4.5		*	
		33	TC	4.3		*	
		36	TC	4.3		*	
		39	TC	4.4		*	
		42	TC	4.2		*	
14	324312	00	DS	12.8		*	Southeast corner
		03	TC	8.9		*	property
		06	TC	8.8		*	
		09	TC	8.3		*	
		12	TC	8.3		*	
		15	TC	8.4		*	
		18	TC	9.1		*	DC = 69 inches
		21	TC	9.6		*	Based on the
		24	TC	10.0		*	deconvolution graph
		27	TC	9.8		*	
		30	TC	9.3		*	
		33	TC	8.9		*	
		36	TC	8.6		*	
		39	TC	8.1		*	
		42	TC	7.7		*	
		45	TC	7.3		*	
		48	TC	7.1		*	
		51	TC	6.8		*	
		54	TC	6.6		*	
		57	TC	6.4		*	
15	325270	00	DS	44.8		*	Along North Avenue
		03	TC	37.0		*	South of Building 1
		06	TC	38.1		*	DC = 12 inches
		09	TC	28.1		*	Based on the
		12	TC	21.3		*	deconvolution graph

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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.		
15	325270	15	TC	18.6		*	Elevated readings are shine from nearby deposit
		18	TC	16.6		*	
		21	TC	15.7		*	
		24	TC	14.7		*	
		27	TC	13.8		*	
		30	TC	13.1		*	
		33	TC	12.2		*	
		36	TC	11.5		*	
		39	TC	10.6		*	
		42	TC	9.2		*	
		45	TC	8.3		*	
		48	TC	7.8		*	
		51	TC	7.3		*	
		54	TC	6.8		*	
		57	TC	6.3		*	
		60	TC	5.7		*	
		63	TC	5.3		*	
		66	TC	5.0		*	
		69	TC	5.0		*	
16	325289	00	DS	9.6		*	South of Building 1
		03	TC	13.0		*	
		06	TC	14.0		*	
		09	TC	14.0		*	
		12	TC	13.8		*	
		15	TC	13.6		*	
		18	TC	13.5		*	
		21	TC	13.7		*	
		24	TC	13.6		*	
		27	TC	13.5		*	
		30	TC	13.5		*	DC = 69 inches Based on the deconvolution graph
		33	TC	13.6		*	
		36	TC	13.6		*	
		39	TC	13.7		*	
		42	TC	13.9		*	
		45	TC	13.8		*	
		48	TC	13.3		*	
		51	TC	12.4		*	
		54	TC	11.3		*	
		57	TC	9.9		*	
		60	TC	8.5		*	
		63	TC	7.3		*	
		66	TC	6.4		*	
		69	TC	5.6		*	

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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.		
16	325289	72	TC	5.1		*	
17	326187	00	DS	23.4		*	South of Building 1
		03	TC	57.1		*	
		06	TC	76.1		*	
		09	TC	100.8		*	
		12	TC	118.4		*	DC = 69 inches Based on the deconvolution graph
		15	TC	127.5		*	
		18	TC	129.9		*	
		21	TC	128.2		*	
		24	TC	125.0		*	
		27	TC	124.2		*	
		30	TC	125.5		*	
		33	TC	125.2		*	
		36	TC	135.6		*	
		39	TC	113.1		*	
		42	TC	150.6		*	
		45	TC	143.4		*	
		48	TC	135.1		*	
		51	TC	124.4		*	
		54	TC	108.6		*	
		57	TC	95.2		*	
		60	TC	89.1		*	
		63	TC	77.9		*	
		66	TC	56.3		*	
		69	TC	33.6		*	
		72	TC	21.7		*	
		75	TC	15.5		*	
		78	TC	12.0		*	
		81	TC	9.8		*	
		84	TC	8.6		*	
		87	TC	7.7		*	
		90	TC	7.2		*	
		93	TC	6.7		*	
		96	TC	6.4		*	
		99	TC	6.1		*	
		102	TC	5.7		*	
		105	TC	5.5		*	
		108	TC	5.4		*	
		111	TC	5.2		*	
		114	TC	4.9		*	
		117	TC	4.8		*	
		120	TC	4.8		*	
		123	TC	5.0		*	

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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.		
17	326187	126	TC	5.1		*	
		129	TC	5.3		*	
		132	TC	5.9		*	
		135	TC	6.9		*	
		138	TC	8.8		*	
18	327163	00	DS	13.6		*	South of Building 1
		03	TC	60.6		*	
		06	TC	90.2		*	
		09	TC	120.6		*	
		12	TC	140.5		*	DC = 69 inches Based on the deconvolution graph
		15	TC	156.2		*	
		18	TC	157.6		*	
		21	TC	151.4		*	
		24	TC	150.2		*	
		27	TC	146.2		*	
		30	TC	145.2		*	
		33	TC	139.7		*	
		36	TC	135.8		*	
		39	TC	129.5		*	
		42	TC	114.5		*	
		45	TC	96.3		*	
		48	TC	75.9		*	
		51	TC	58.3		*	
		54	TC	54.8		*	
		57	TC	55.0		*	
		60	TC	40.3		*	
		63	TC	24.9		*	
		66	TC	16.9		*	
		69	TC	12.7		*	
		72	TC	10.1		*	
		75	TC	8.7		*	
		78	TC	7.8		*	
		81	TC	7.2		*	
		84	TC	6.7		*	
		87	TC	6.2		*	
		90	TC	5.9		*	
		93	TC	5.7		*	
		96	TC	5.7		*	
		99	TC	5.7		*	
		102	TC	5.7		*	
		105	TC	6.1		*	
		108	TC	7.6		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-11243-CS

2894 North Avenue

Page 8 of 9

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
19	327206	00	DS	20.2		*	
		03	TC	43.8		*	South of Building 1
		06	TC	62.2		*	
		09	TC	90.4		*	
		12	TC	119.7		*	
		15	TC	128.2		*	DC = 69 inches Based on the deconvolution graph
		18	TC	119.9		*	
		21	TC	99.1		*	
		24	TC	81.7		*	
		27	TC	78.5		*	
		30	TC	91.9		*	
		33	TC	117.6		*	
		36	TC	143.0		*	
		39	TC	153.5		*	
		42	TC	150.0		*	
		45	TC	139.1		*	
		48	TC	118.0		*	
		51	TC	95.0		*	
		54	TC	84.8		*	
		57	TC	83.3		*	
		60	TC	71.7		*	
		63	TC	46.1		*	
		66	TC	30.2		*	
		69	TC	22.4		*	
		72	TC	18.1		*	
		75	TC	13.5		*	
		78	TC	10.0		*	
20	327228	00	DS	28.7		*	
		03	TC	11.6		*	South of Building 1
		06	TC	16.8		*	
		09	TC	22.1		*	
		12	TC	21.6		*	
		15	TC	18.9		*	
		18	TC	17.6		*	
		21	TC	17.1		*	
		24	TC	17.4		*	
		27	TC	18.3		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-11243-CS

2894 North Avenue

Page 9 of 9

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
20	327228	30	TC	18.7		*	
		33	TC	18.7		*	DC = 69 inches
		36	TC	19.2		*	Based on the
		39	TC	19.7		*	deconvolution graph
		42	TC	20.2		*	
		45	TC	20.4		*	
		48	TC	20.0		*	
		51	TC	19.0		*	
		54	TC	17.8		*	
		57	TC	16.6		*	
		60	TC	14.0		*	
		63	TC	11.7		*	
		66	TC	9.8		*	
		69	TC	7.8		*	
		72	TC	6.5		*	
		75	TC	5.5		*	
		78	TC	5.1		*	
		81	TC	4.7		*	
		84	TC	4.3		*	
		87	TC	4.1		*	
		90	TC	3.9		*	
		93	TC	3.7		*	
		96	TC	3.7		*	
		99	TC	3.7		*	
		102	TC	3.8		*	

Measurement Types:

GB = GAD-6 Borehole

GS = GAD-6 Surface

DS = Delta Scintillometer

TC = Total Count Borehole

SS = Soil Sample

BH = Combined GAD-6 and
Total Count Borehole

Notes: DC = Depth of Contamination

* = No Soil Sample Taken

[n] = Reading Taken n-Inches
Above Floor or Ground

Date of Survey = 06-25-85

Team Leader = MR

Radium Concentrations at Interior Locations

DOE ID #GJ-11243-CS

2894 North 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	1.1		*	East wall of Building 1
2		00	DS	1.3		*	Middle of alignment pit

Measurement Types: GB = GAD-6 Borehole
GS = GAD-6 Surface
DS = Delta Scintillometer
TC = Total Count Borehole
SS = Soil Sample
BH = Combined GAD-6 and
Total Count Borehole

Notes: DC = Depth of Contamination
* = No Soil Sample Taken
[n] = Reading Taken n-Inches
Above Floor or Ground
Date of Survey = 06-25-85
Team Leader = MR

Table 3.3

Summary of Interior Gamma Exposure Rates

DOE ID No. GJ-11243-CS

2894 North 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)
Room A Building 1	24	13-17	15	24	14-18	15
Room B Building 1	*	*	*	*	13-16	*
Building 2	*	*	*	*	14-17	*

* A walking gamma scan was performed to confirm the absence of interior contamination at this location.

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-11243-CS

Page 1 of 1

<u>AREA</u>	<u>CALCULATIONS(ft)</u>		<u>SF</u>	<u>DEPTH(ft)</u>		<u>CF</u>	<u>CUBIC YARDS</u>
EXTERIOR							
A	0.5 x 10	=	5	x	1.8	=	9
C	0.5 x 55	=	28	x	1.0	=	28
E	0.5 x 20	=	10	x	1.5	=	15
TOTAL VOLUME - EXTERIOR						= 52 =	52/27 = 2

Total square feet of Exterior Areas A, C, and E = 43 square feet
43 square feet = 3.9 square meters

NOTE: Calculations are based on deposits found within the legal property boundaries.

See Appendix Figure 3.3 For Areas

=====

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

Where

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

C_c = Concentration of Contamination (pCi/g)

A_c = Area of Concentration (m²)

C_b = Background Concentration (pCi/g)

$$C_{avg} = \frac{104 \times 3.9 + 2 (100 - 3.9)}{100}$$

$$C_{avg} = 5.98 < 7$$

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

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

=====

RR072485
REAL1243/REA-704/AP

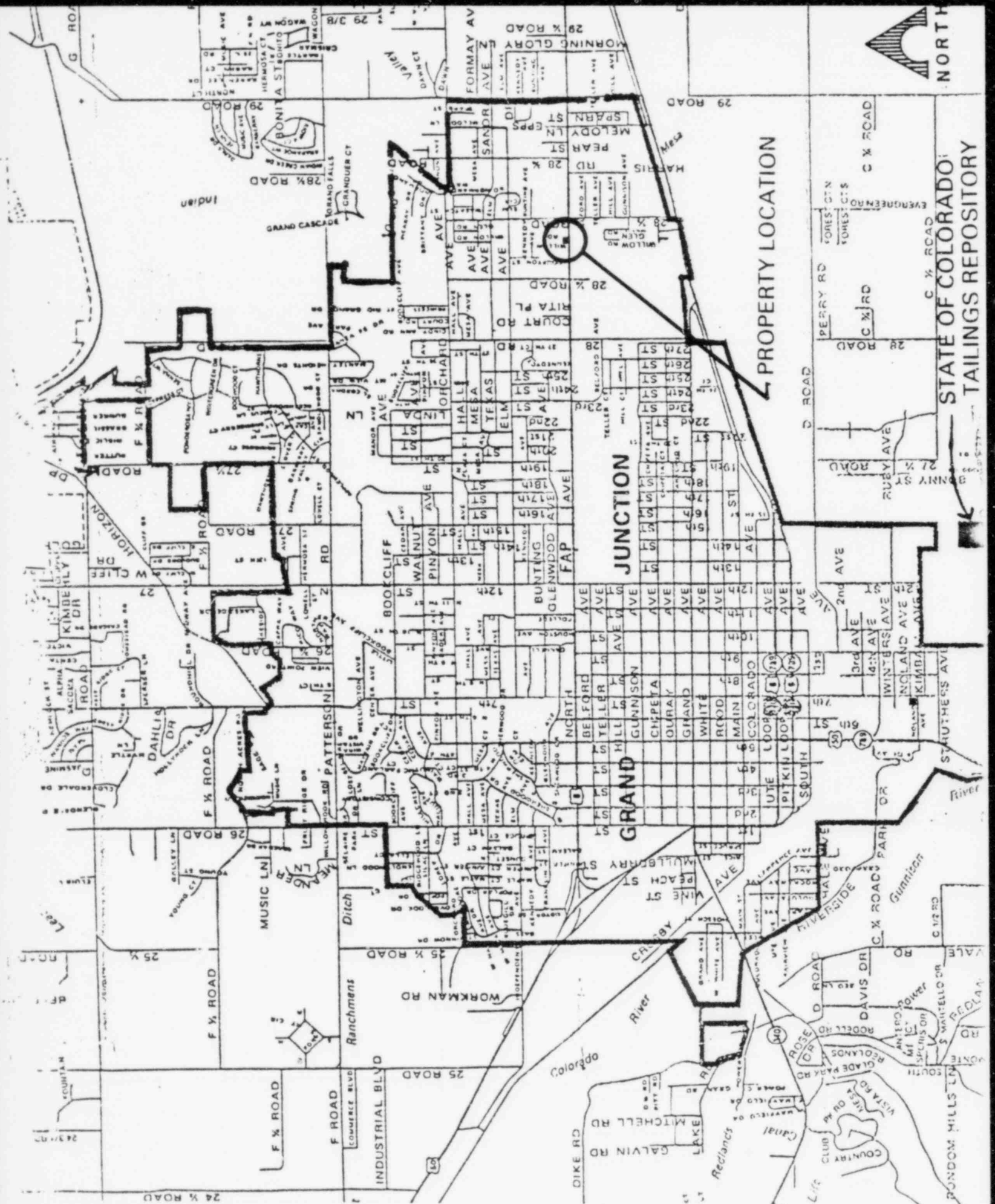
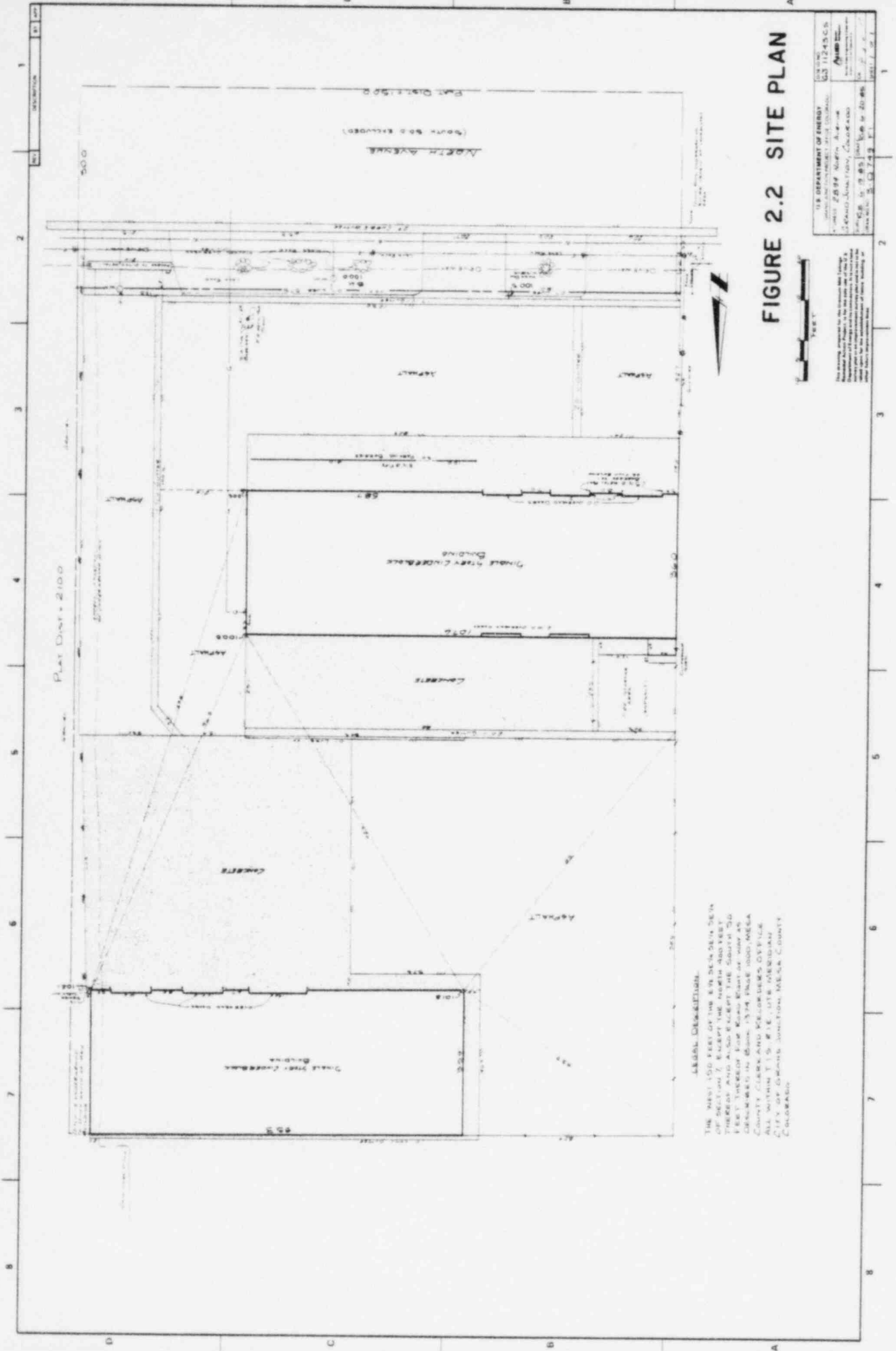
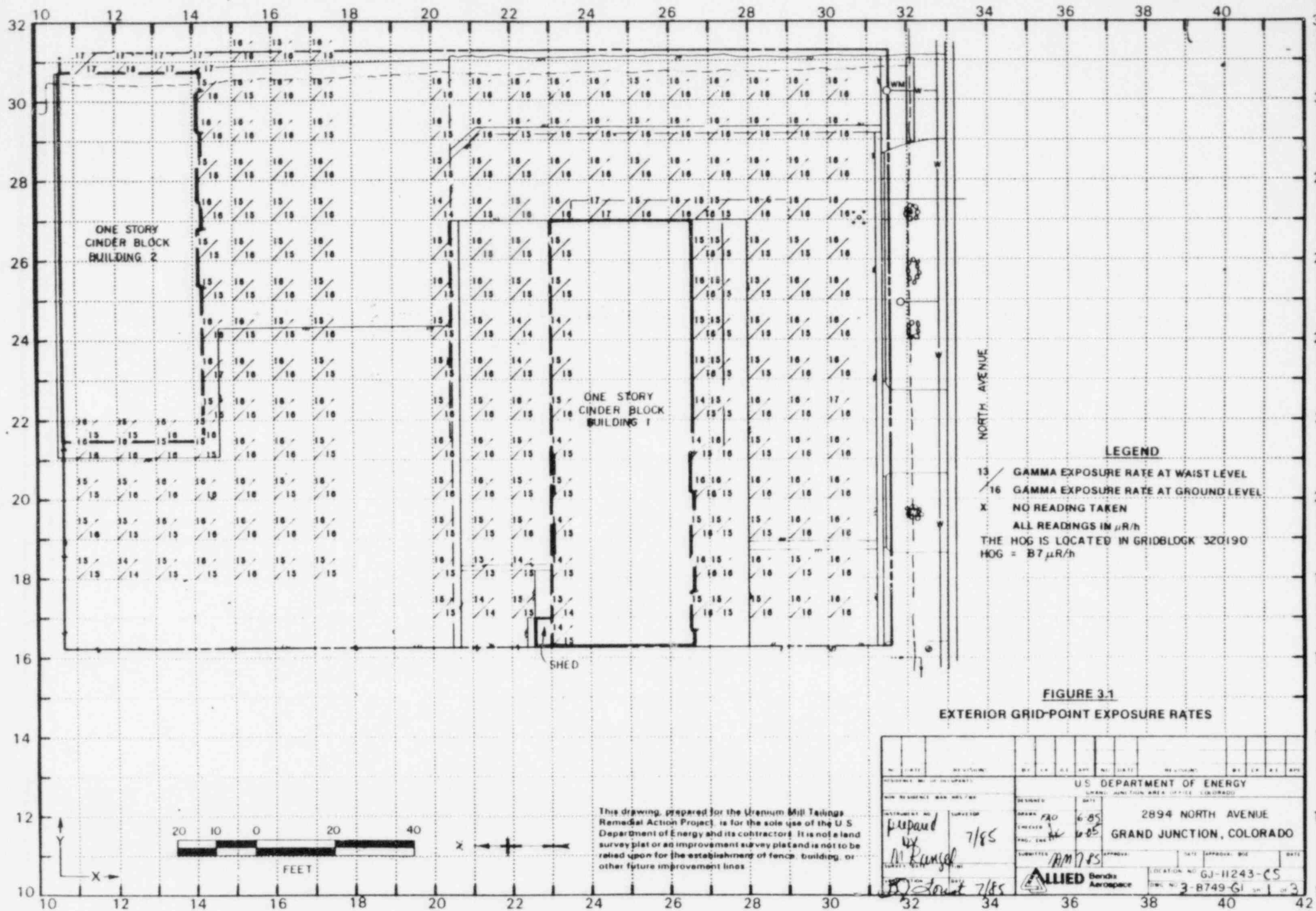
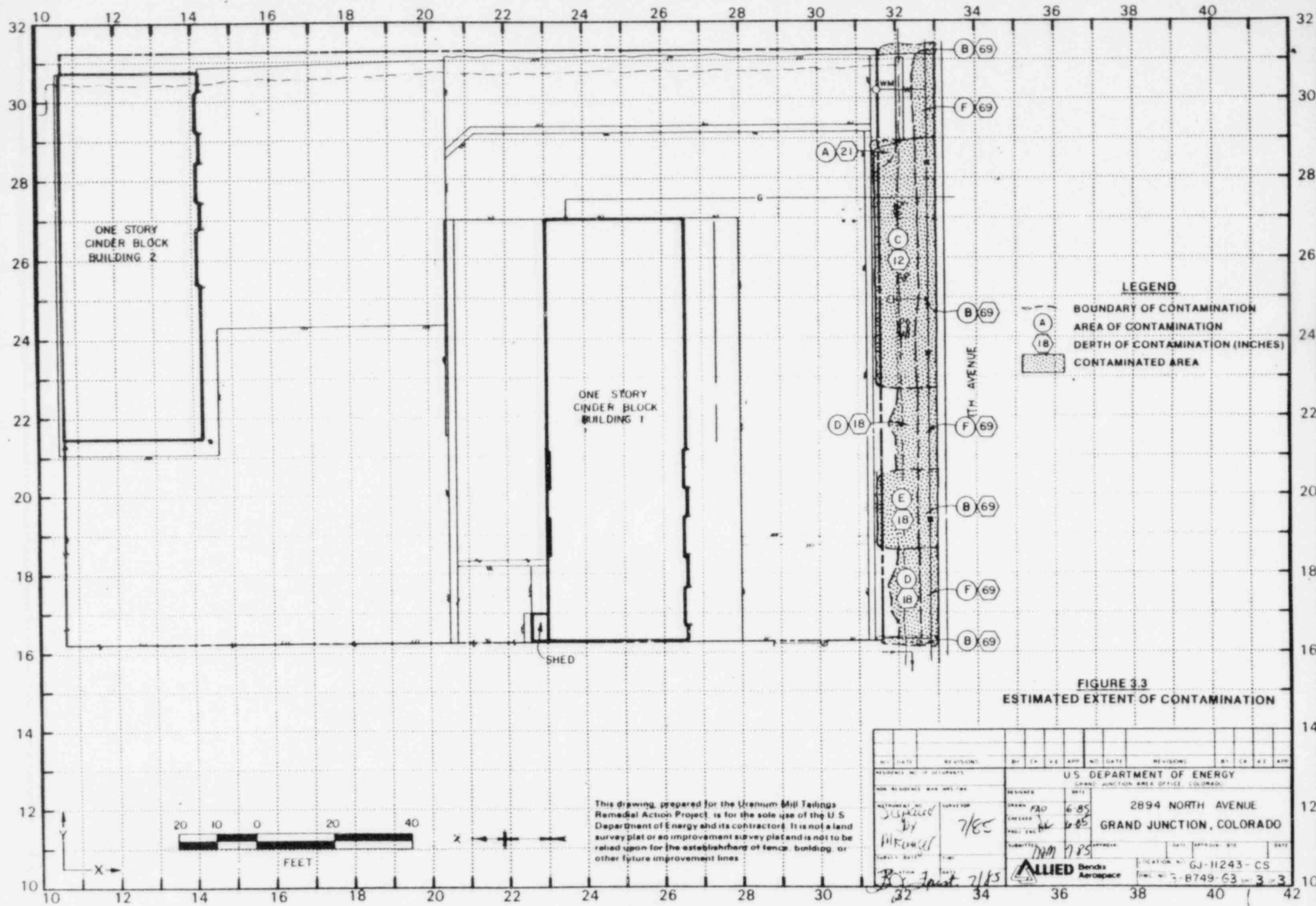


FIGURE 2.1
VICINITY MAP







3/85

DOE ID NO. GJ-11243-CS

Date 7/2/85

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

Official Survey Report

Property Address 2894 North Avenue

Property Owner E. E. Lewis & Co.

Address of Owner (if different from above) P. O. Box 1481, Grand Junction, 81501

Report Prepared By M. Rangel

I. PRESENCE/ABSENCE OF RESIDUAL RADIOACTIVE MATERIALS

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

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

1 XX 1 In open areas.

1 XX 1 Under or around exterior improvements.

1 1 Under or around a typically nonoccupied structure.

1 1 Under or around a typically occupied structure.

II. RESULTS OF RADIOLOGIC ASSESSMENT

1 1 Levels of radiation from residual radioactive materials, if any, do not exceed EPA Standards and no action is required under the Uranium Mill Tailings Remedial Action Project.

1 XX 1 Levels of radiation from residual radioactive materials exceed EPA Standards such that Remedial Action is recommended and will be accomplished, with your consent, as soon as budget and schedule permit.

cc:

G. A. Franz, III, GJ/CDH

J. Themelis, Mgr. UMTRA Proj. Off.

HIG = 18 uR/h
HOG = 87 uR/h



Bendix
Aerospace

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

July 18, 1985

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

ATTN: Coleen Campbell

Dear Coleen:

The following is in response to your questions and comments concerning Department of Energy (DOE) Identification (ID) number GJ-11243-CS (2894 North Avenue), reviewed 10 July 1985.

1. As noted in the Team Leader Notes, we were unable to locate the utility lines at the time the survey was conducted. If you have any suggestions as how to locate them, please advise.

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

Sincerely,

A handwritten signature in cursive script that reads "Mark Rangel".

Mark Rangel
RSD Survey Team Leader

MR:pr

ALLIED Bendix
Aerospace

Bendix Field Engineering Corporation
Grand Junction Operations
Grand Junction, Colorado

Date: June 25, 1985

To: Files

From: Mark Rangel

Subject: Team Leader Notes - GJ-11243-CS

Address: 2894 North Avenue

Owner: E. E. Lewis Company

Team Members

M. Rangel (Team Leader)
D. Dow
D. Clay
M. Johnson

M. Dexter
S. Larsen
M. Duran
M. Gilfillan

Instruments

See Equipment Summary sheet.

Team members were not able to locate the sewer and water lines to Building 2 and the sewer line to Building 1.

The residence to the west is an abandoned house. The property was fenced in and all gates were locked. Therefore, a spillover investigation was not possible.

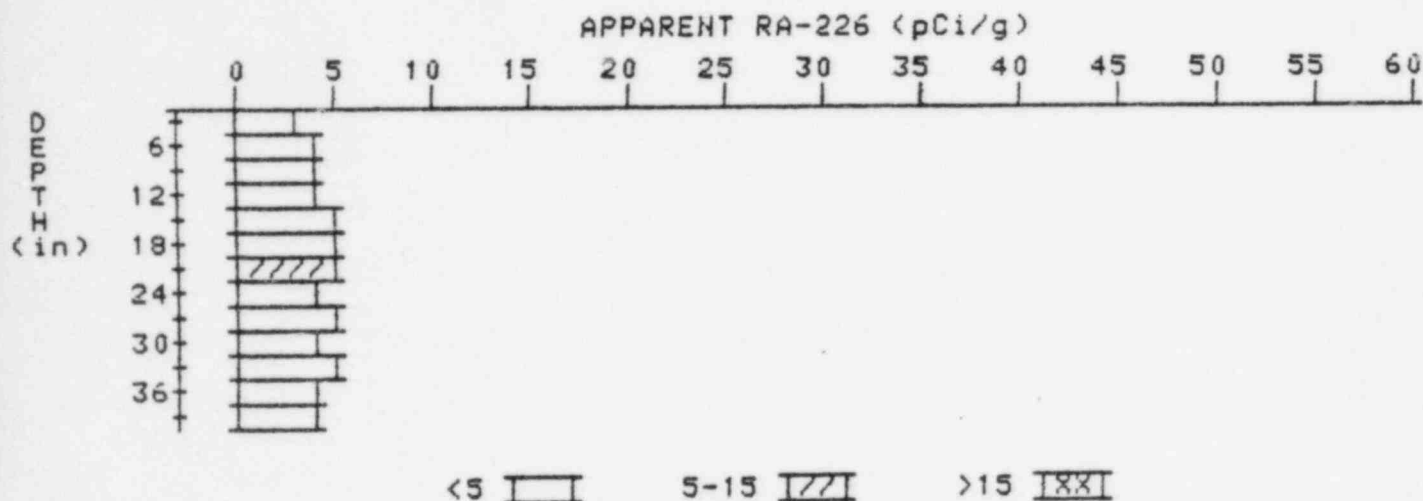
The property owner to the east has already signed a consent form.

A delta was taken in the front end alignment pit which indicated no contamination. We are seeing a natural elevated gamma from the geometry of the pit. No holes were necessary.

No problems were encountered while on the site. All personnel were frisked before leaving the site.

APPARENT RADIUM-226 CONCENTRATION 3 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11243-CS
HOLE NUMBER: 3
LOCATION: 150230



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.0	3.0
6	3.5	3.5
9	4.0	4.4
12	4.3	4.3
15	4.6	5.0
18	4.7	4.9
21	4.7	5.1
24	4.5	4.0
27	4.6	5.0
30	4.5	4.3
33	4.5	4.7
36	4.4	4.2
39	4.4	4.4

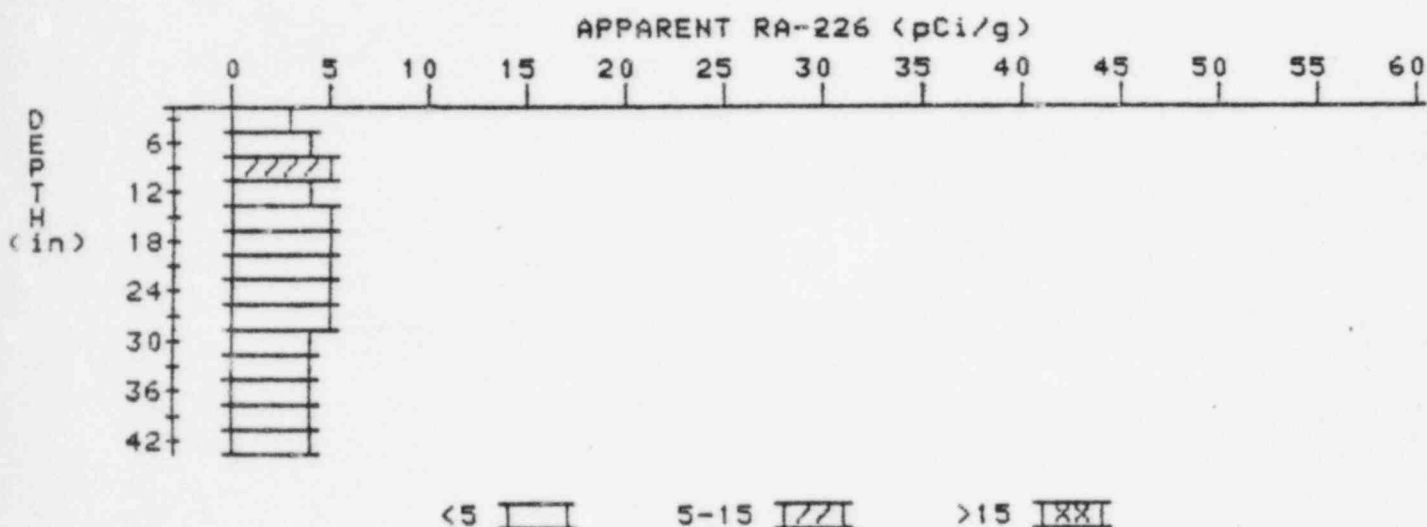
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

4

PROPERTY NUMBER: GJ-11243-CS

HOLE NUMBER: 4

LOCATION: 204215



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.4	3.4
6	3.8	3.6
9	4.3	5.0
12	4.4	4.2
15	4.6	5.0
18	4.6	4.6
21	4.6	4.8
24	4.5	4.5
27	4.4	4.6
30	4.2	4.0
33	4.1	3.9
36	4.1	4.1
39	4.1	4.3
42	4.0	4.0

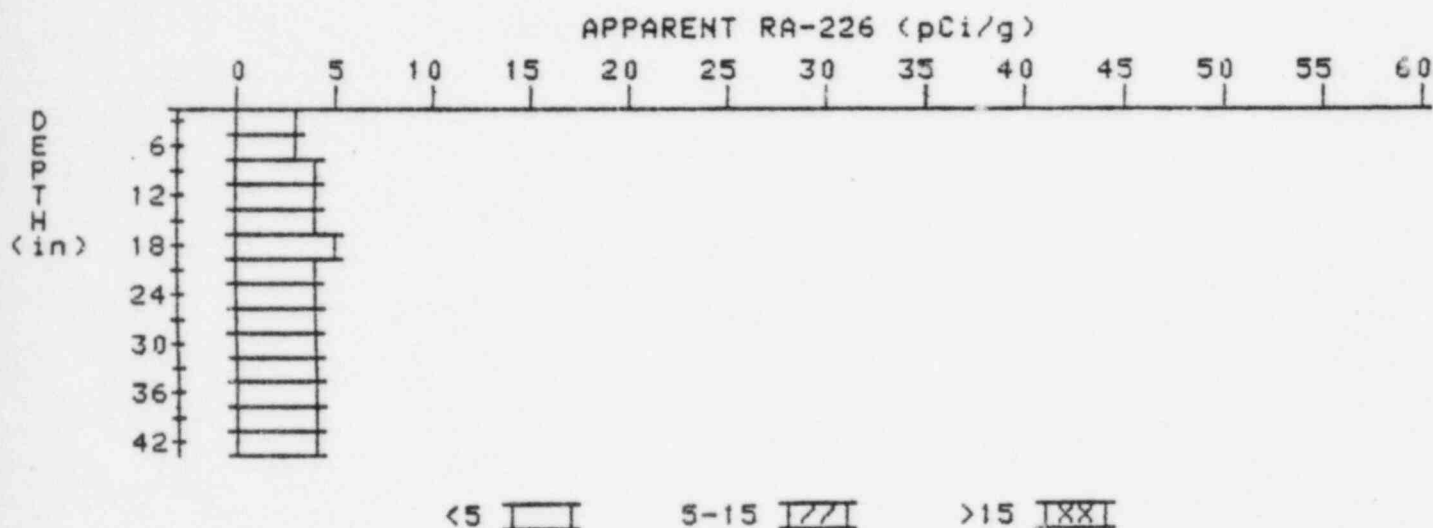
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

5

PROPERTY NUMBER: GJ-11243-CS

HOLE NUMBER: 5

LOCATION: 205280



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.8	2.8
6	3.3	3.3
9	3.8	4.2
12	4.1	4.5
15	4.2	4.2
18	4.3	4.8
21	4.1	4.1
24	3.9	3.7
27	3.8	3.8
30	3.7	3.5
33	3.7	3.7
36	3.7	3.5
39	3.8	4.0
42	3.8	3.8

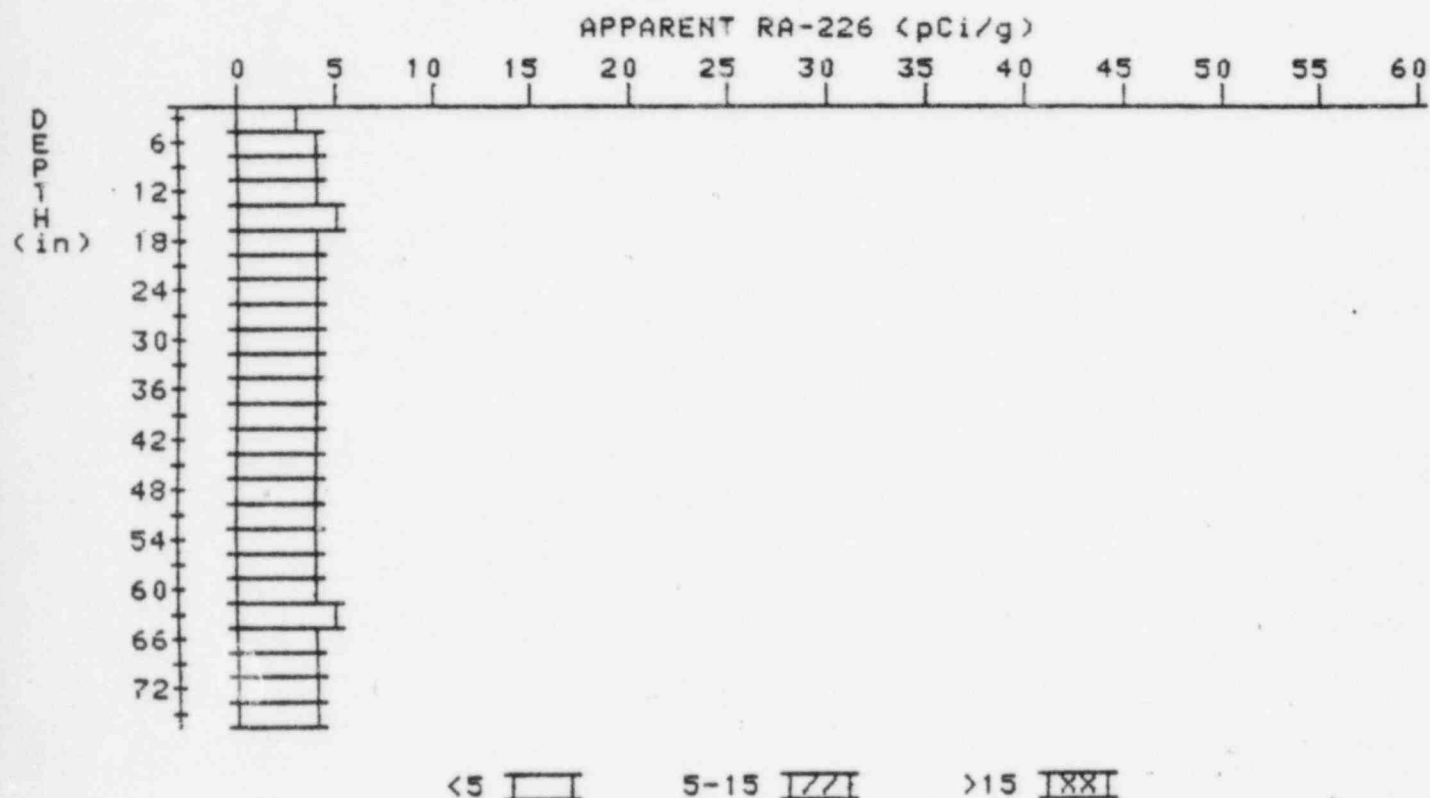
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

7

PROPERTY NUMBER: GJ-11243-CS

HOLE NUMBER: 7

LOCATION: 279271



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.7	2.7
6	3.2	3.6
9	3.5	3.5
12	3.8	3.6
15	4.2	4.7
18	4.3	4.5
21	4.3	4.5
24	4.2	4.2
27	4.1	4.3
30	3.9	3.7
33	3.8	3.8
36	3.7	3.5
39	3.7	3.7
42	3.7	3.7

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3.9
4.1
4.2
4.2
4.2
4.0
3.9
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3.5
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3.9

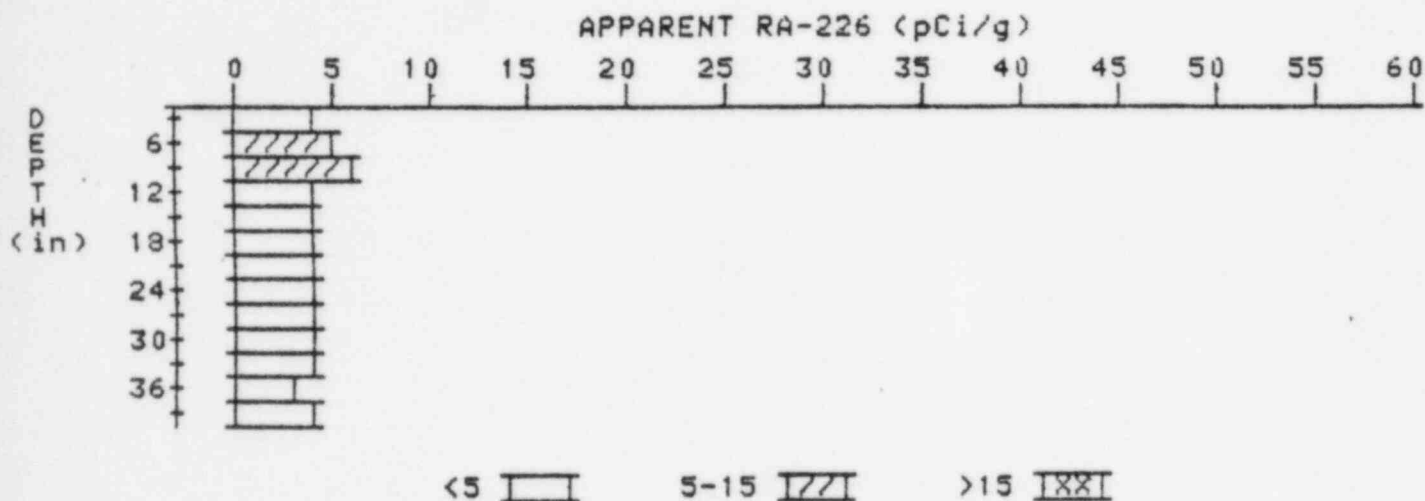
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

8

PROPERTY NUMBER: GJ-11243-CS

HOLE NUMBER: 8

LOCATION: 305225



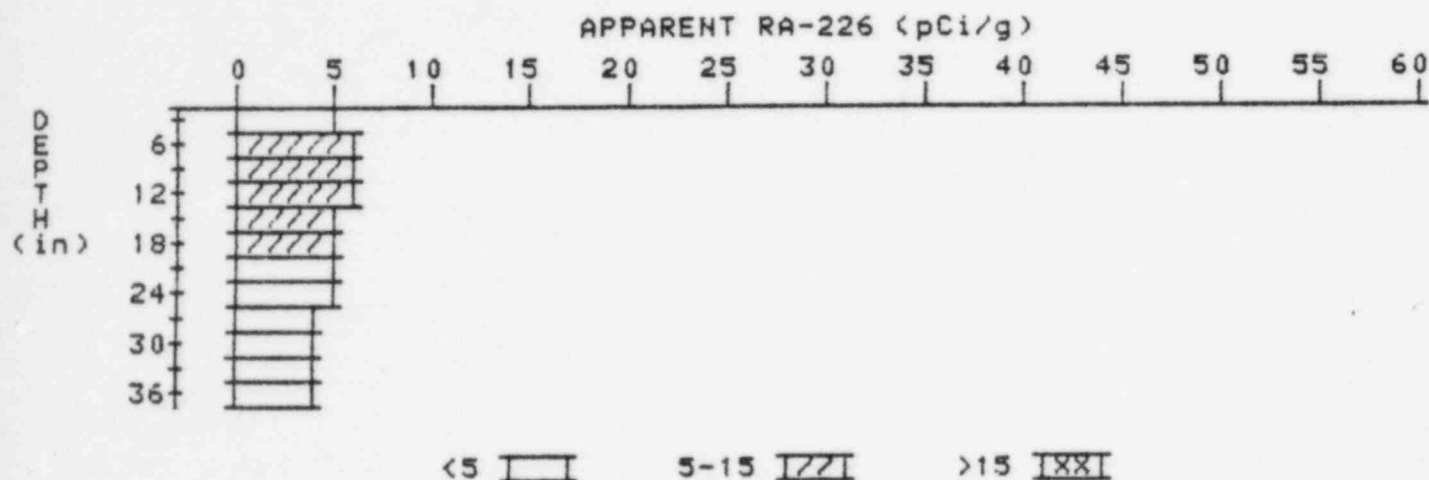
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.6	3.6
6	4.4	5.3
9	4.7	5.8
12	4.4	4.0
15	4.3	4.1
18	4.3	4.5
21	4.2	4.2
24	4.1	4.1
27	4.0	4.2
30	3.8	3.6
33	3.7	3.7
36	3.6	3.4
39	3.6	3.6

APPARENT RADIUM-226 CONCENTRATION 11 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11243-CS

HOLE NUMBER: 11

LOCATION: 315285



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.9	4.9
6	5.5	6.2
9	5.7	6.1
12	5.7	6.2
15	5.4	5.2
18	5.2	5.4
21	4.9	4.9
24	4.6	4.6
27	4.3	3.9
30	4.2	4.0
33	4.2	4.4
36	4.1	4.1

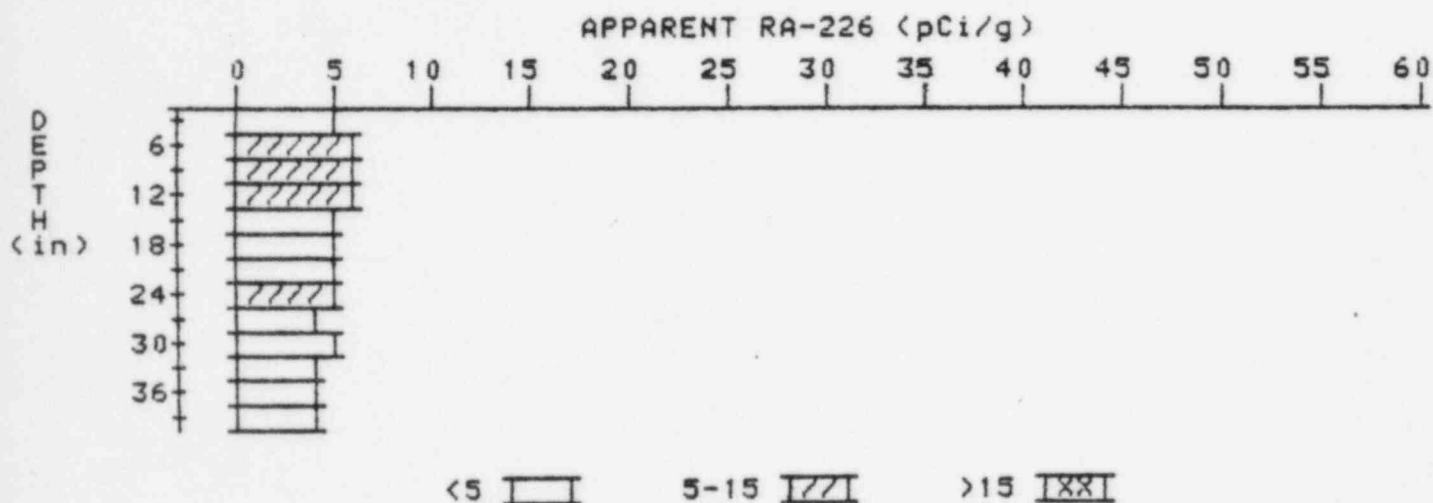
APPARENT RADIUM-226 CONCENTRATION 12

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11243-CS

HOLE NUMBER: 12

LOCATION: 316196



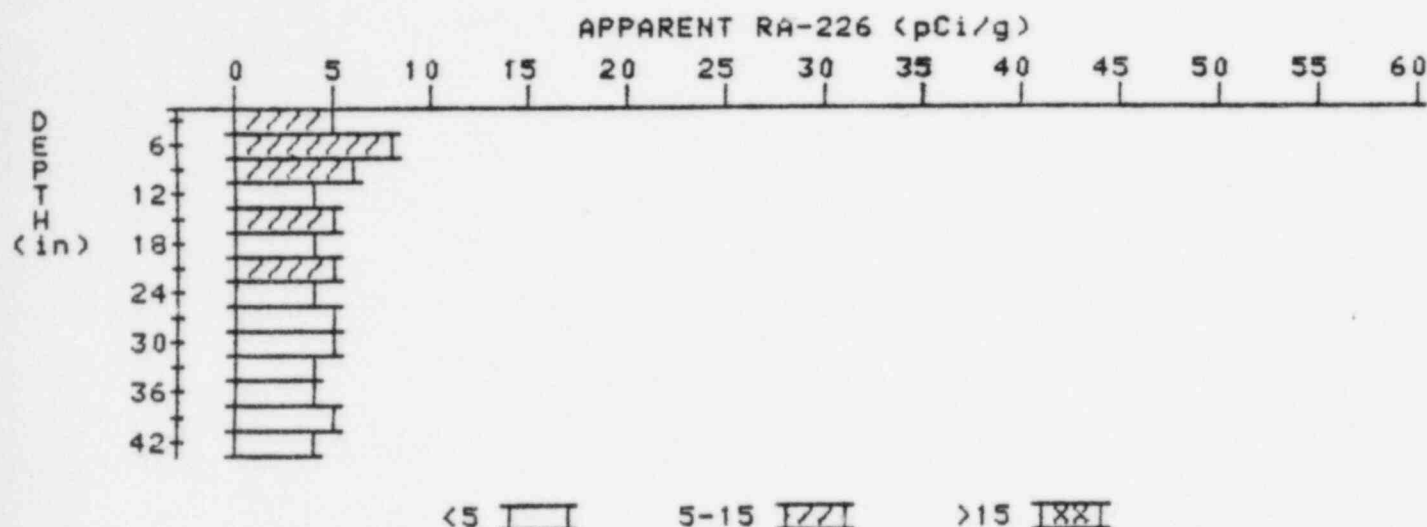
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.6	4.6
6	5.2	5.9
9	5.4	5.9
12	5.3	5.7
15	5.0	4.8
18	4.8	4.6
21	4.7	4.5
24	4.7	5.1
27	4.5	4.3
30	4.4	4.6
33	4.2	4.0
36	4.1	3.7
39	4.2	4.2

APPARENT RADIUM-226 CONCENTRATION 13 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11243-CS

HOLE NUMBER: 13

LOCATION: 317240



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.1	5.1
6	5.8	7.6
9	5.5	5.9
12	5.0	4.3
15	4.9	5.1
18	4.7	4.2
21	4.8	5.3
24	4.6	4.2
27	4.6	4.8
30	4.5	4.7
33	4.3	3.9
36	4.3	4.1
39	4.4	4.9
42	4.2	4.2

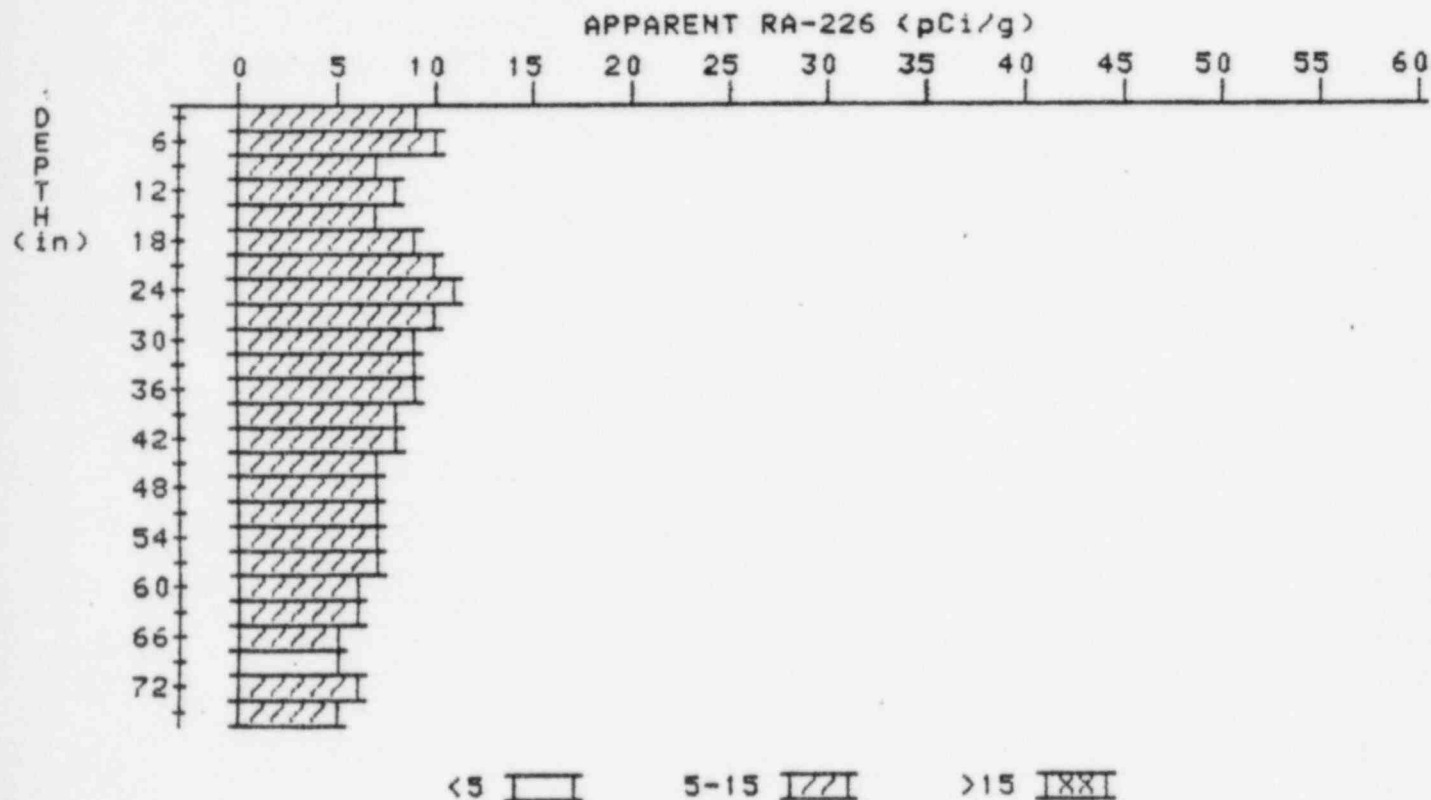
APPARENT RADIUM-226 CONCENTRATION 14

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11243-CS

HOLE NUMBER: 14

LOCATION: 324312



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	8.9	8.9
6	8.8	9.5
9	8.3	7.4
12	8.3	8.1
15	8.4	7.3
18	9.1	9.5
21	9.6	9.8
24	10.0	11.1
27	9.8	10.3
30	9.3	9.1
33	8.9	8.7
36	8.6	9.0
39	8.1	7.9
42	7.7	7.7

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72
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7.3
7.1
6.8
6.6
6.4
6.1
5.9
5.5
5.3
5.3
5.1

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6.3
5.1
4.9
5.7
5.1

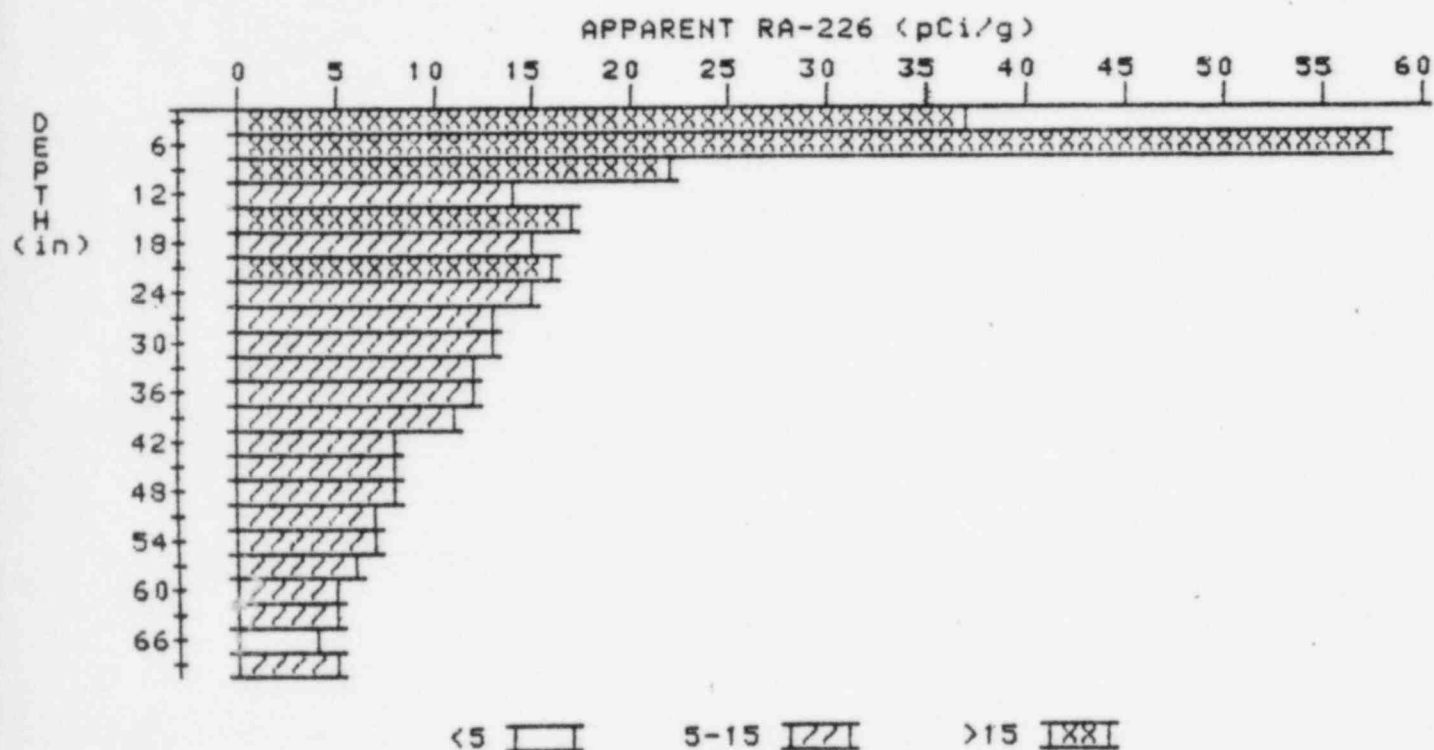
APPARENT RADIUM-226 CONCENTRATION 15

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11243-CS

HOLE NUMBER: 15

LOCATION: 325270



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	37.0	37.0
6	38.1	57.8
9	28.1	22.4
12	21.3	14.0
15	18.6	17.4
18	16.6	14.6
21	15.7	15.9
24	14.7	14.5
27	13.8	13.4
30	13.1	13.5
33	12.2	11.8
36	11.5	11.9
39	10.6	11.5
42	9.2	8.3
45	8.3	7.6

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7.3
6.8
6.3
5.7
5.3
5.0
5.0

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6.8
6.5
5.3
5.1
4.5
5.0

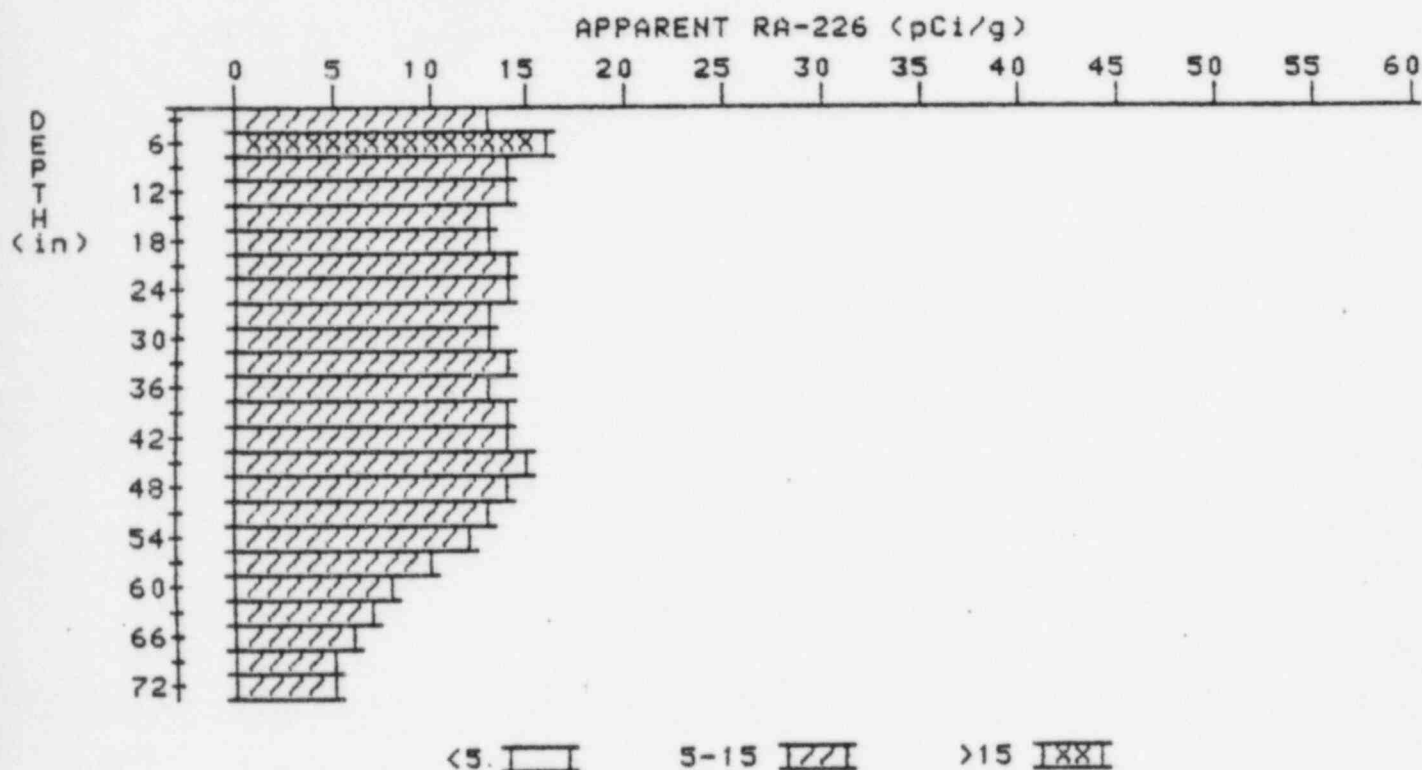
APPARENT RADIUM-226 CONCENTRATION 16

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11243-CS

HOLE NUMBER: 16

LOCATION: 325289



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	13.0	13.0
6	14.0	15.8
9	14.0	14.4
12	13.8	13.8
15	13.6	13.4
18	13.5	13.0
21	13.7	14.2
24	13.6	13.6
27	13.5	13.3
30	13.5	13.3
33	13.6	13.8
36	13.6	13.4
39	13.7	13.5
42	13.9	14.4
45	13.8	14.5

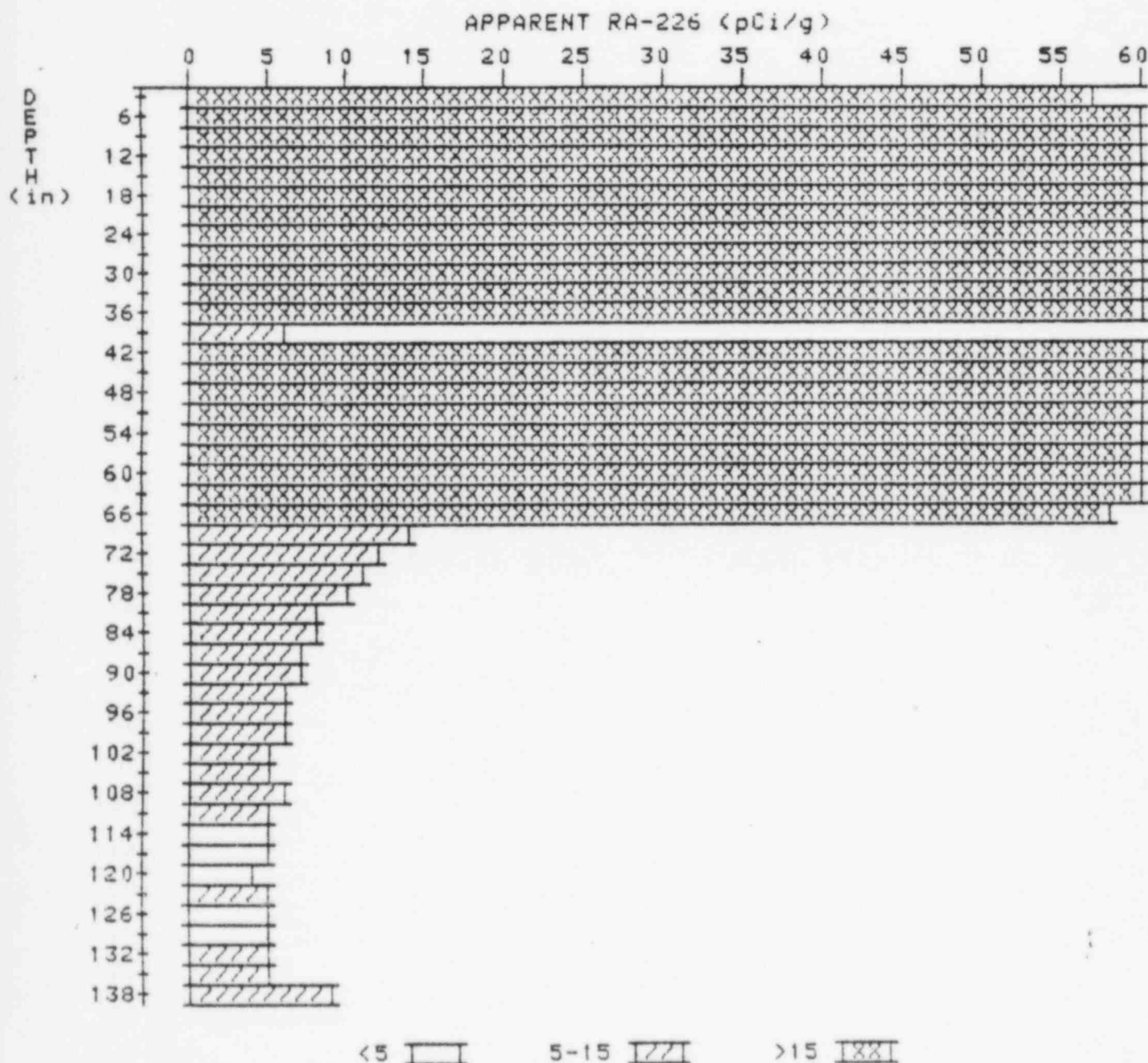
48	13.3	14.0
51	12.4	12.8
54	11.3	11.8
57	9.9	9.9
60	8.5	8.1
63	7.3	6.8
66	6.4	6.2
69	5.6	5.1
72	5.1	5.1

APPARENT RADIUM-226 CONCENTRATION 17 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11243-CS

HOLE NUMBER: 17

LOCATION: 326187



Depth	Apparent Radium-226 (pCi/g)	Apparent Radium-226 (pCi/g)
-------	-----------------------------------	-----------------------------------

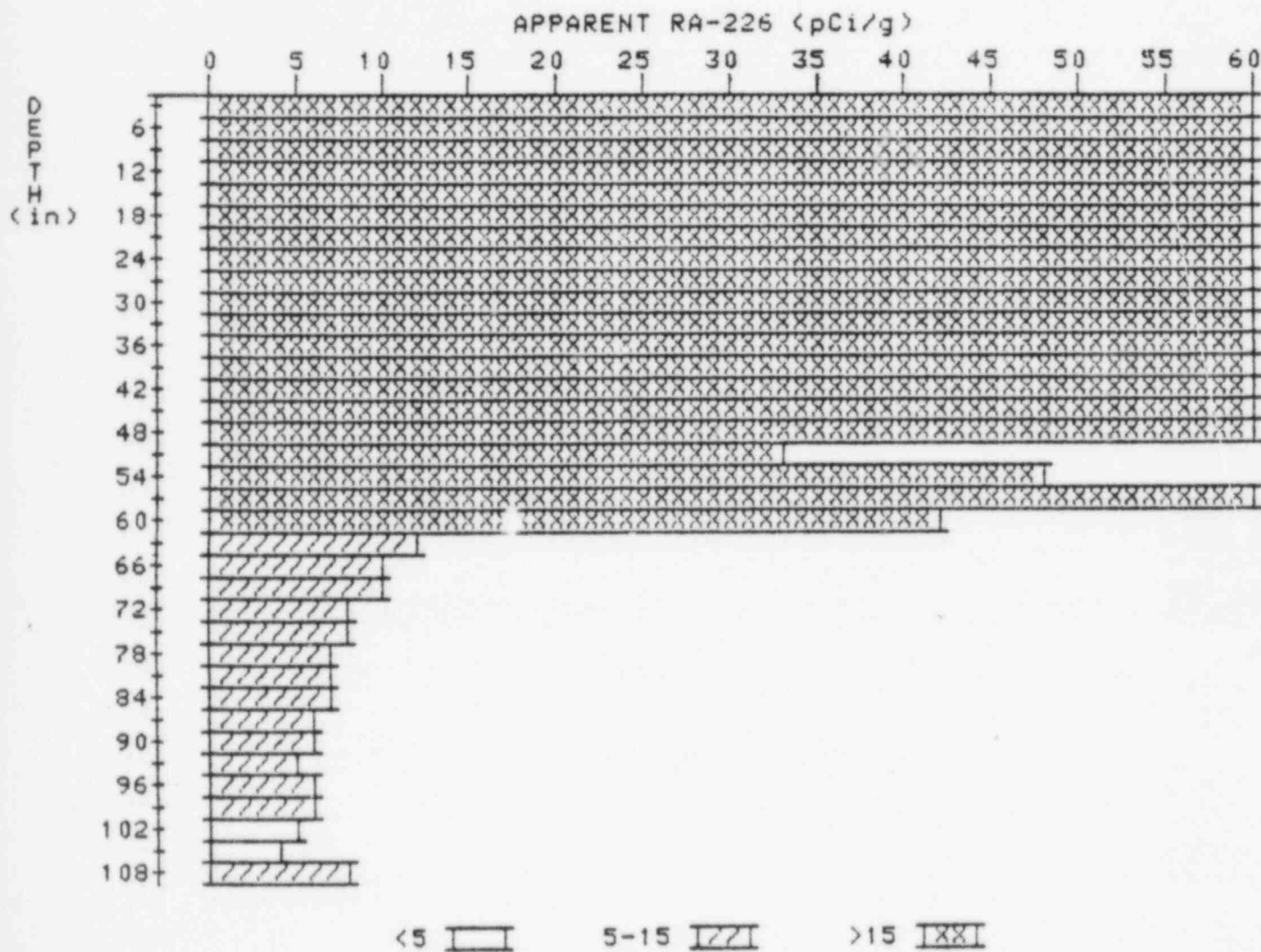
(in)	Undeconvolved	Deconvolved
3	57.1	57.1
6	76.1	66.0
9	100.8	113.4
12	118.4	133.5
15	127.5	139.4
18	129.9	137.2
21	128.2	130.9
24	125.0	120.7
27	124.2	120.5
30	125.5	128.3
33	125.2	106.2
36	135.6	194.1
39	113.1	6.4
42	150.6	230.1
45	143.4	145.4
48	135.1	139.4
51	124.4	133.5
54	108.6	104.3
57	95.2	82.2
60	89.1	98.2
63	77.9	96.4
66	56.3	58.3
69	33.6	14.4
72	21.7	11.6
75	15.5	10.7
78	12.0	9.7
81	9.8	8.0
84	8.6	8.1
87	7.7	7.0
90	7.2	7.2
93	6.7	6.3
96	6.4	6.4
99	6.1	6.3
102	5.7	5.3
105	5.5	5.3
108	5.4	5.6
111	5.2	5.4
114	4.9	4.5
117	4.8	4.6
120	4.8	4.4
123	5.0	5.2
126	5.1	4.9
129	5.3	4.6
132	5.9	5.2
135	6.9	5.3
138	8.8	8.8

APPARENT RADIUM-226 CONCENTRATION 18 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11243-CS

HOLE NUMBER: 18

LOCATION: 327163



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	60.6	60.6
6	90.2	88.8
9	120.6	139.3
12	140.5	148.0
15	156.2	181.6
18	157.6	171.1

21	151.4	142.5
24	150.2	155.2
27	146.2	140.9
30	145.2	153.2
33	139.7	136.9
36	135.8	140.1
39	129.5	145.0
42	114.5	120.2
45	96.3	100.2
48	75.9	70.9
51	58.3	33.2
54	54.8	48.2
57	55.0	81.5
60	40.3	41.5
63	24.9	11.7
66	16.9	10.1
69	12.7	9.9
72	10.1	8.0
75	8.7	7.8
78	7.8	7.3
81	7.2	7.0
84	6.7	6.7
87	6.2	5.8
90	5.9	5.7
93	5.7	5.3
96	5.7	5.7
99	5.7	5.7
102	5.7	5.0
105	6.1	4.1
108	7.6	7.6

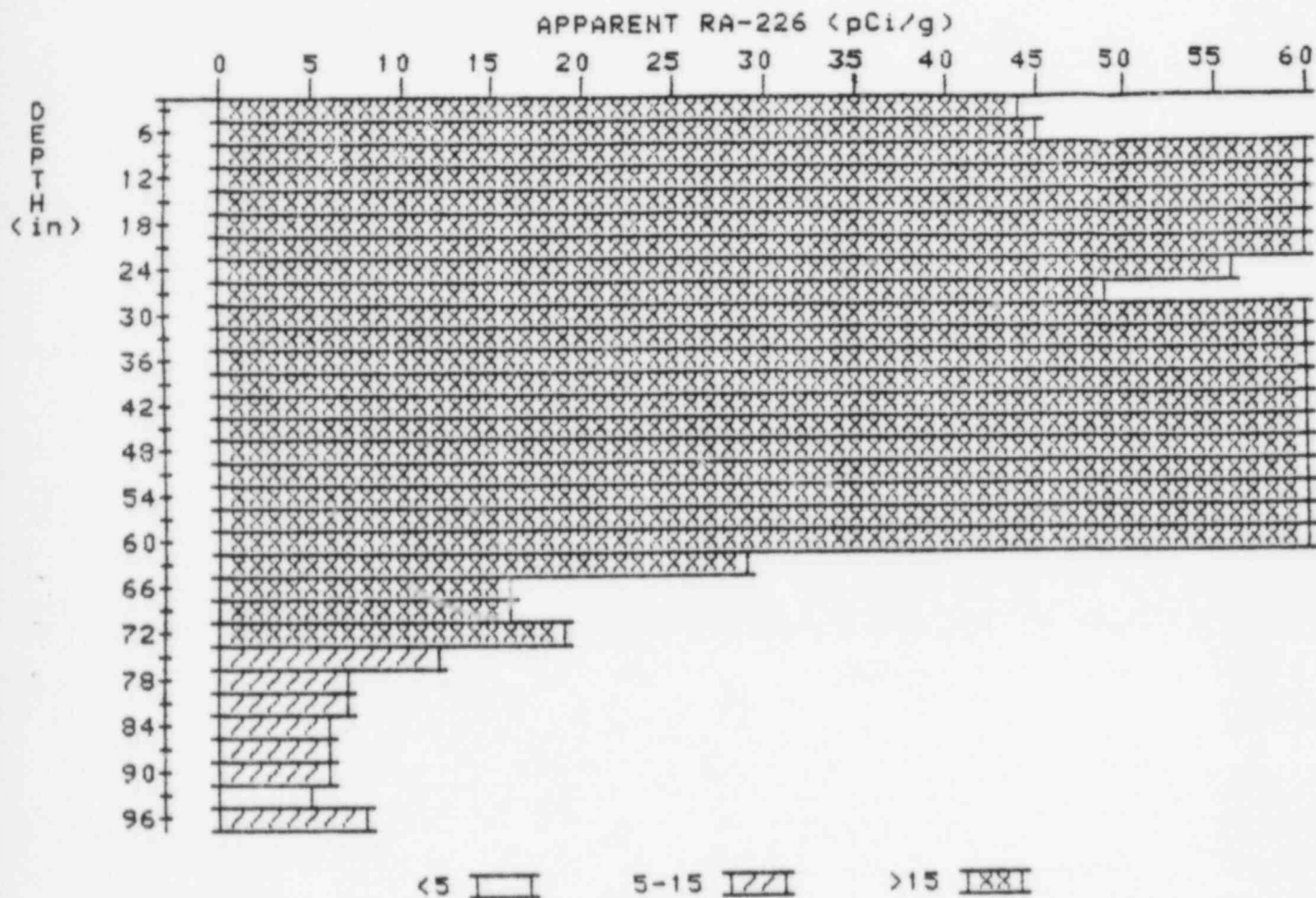
APPARENT RADIUM-226 CONCENTRATION 19

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11243-CS

HOLE NUMBER: 19

LOCATION: 327206



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	43.8	43.8
6	62.2	44.8
9	90.4	88.4
12	119.7	156.7
15	128.2	158.1
18	119.9	142.1
21	99.1	93.1
24	81.7	56.5
27	78.5	49.0

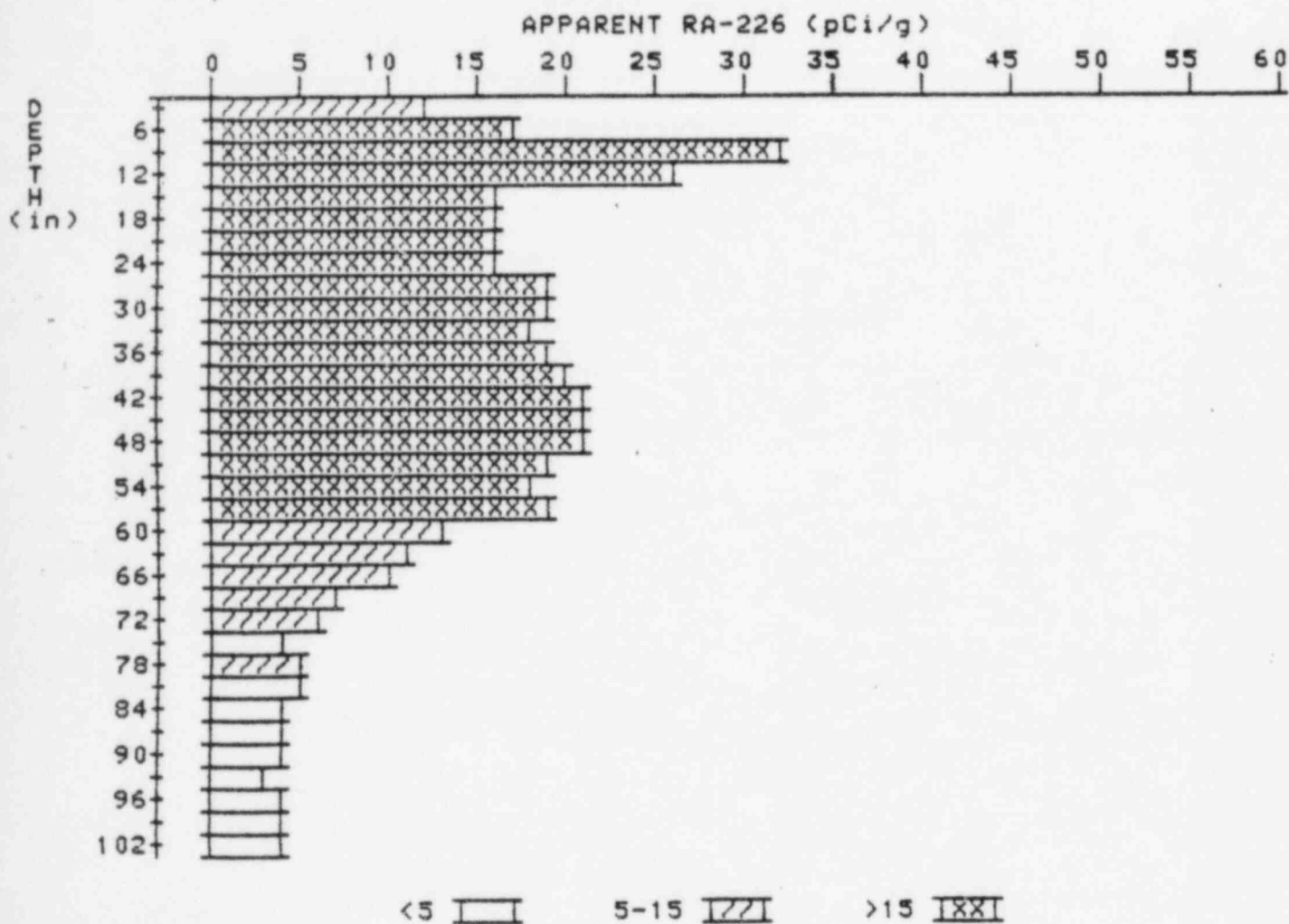
30	91.9	70.0
33	117.6	118.1
36	143.0	169.5
39	153.5	178.4
42	150.0	163.2
45	139.1	157.2
48	118.0	121.4
51	95.0	72.2
54	84.8	69.3
57	83.3	101.3
60	71.7	96.6
63	46.1	28.9
66	30.2	15.8
69	22.4	16.2
72	18.1	18.6
75	13.5	11.5
78	10.0	6.8
81	8.3	7.2
84	7.2	6.3
97	6.6	5.7
90	6.5	6.3
93	6.5	4.7
96	7.5	7.5

APPARENT RADIUM-226 CONCENTRATION 20 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11243-CS

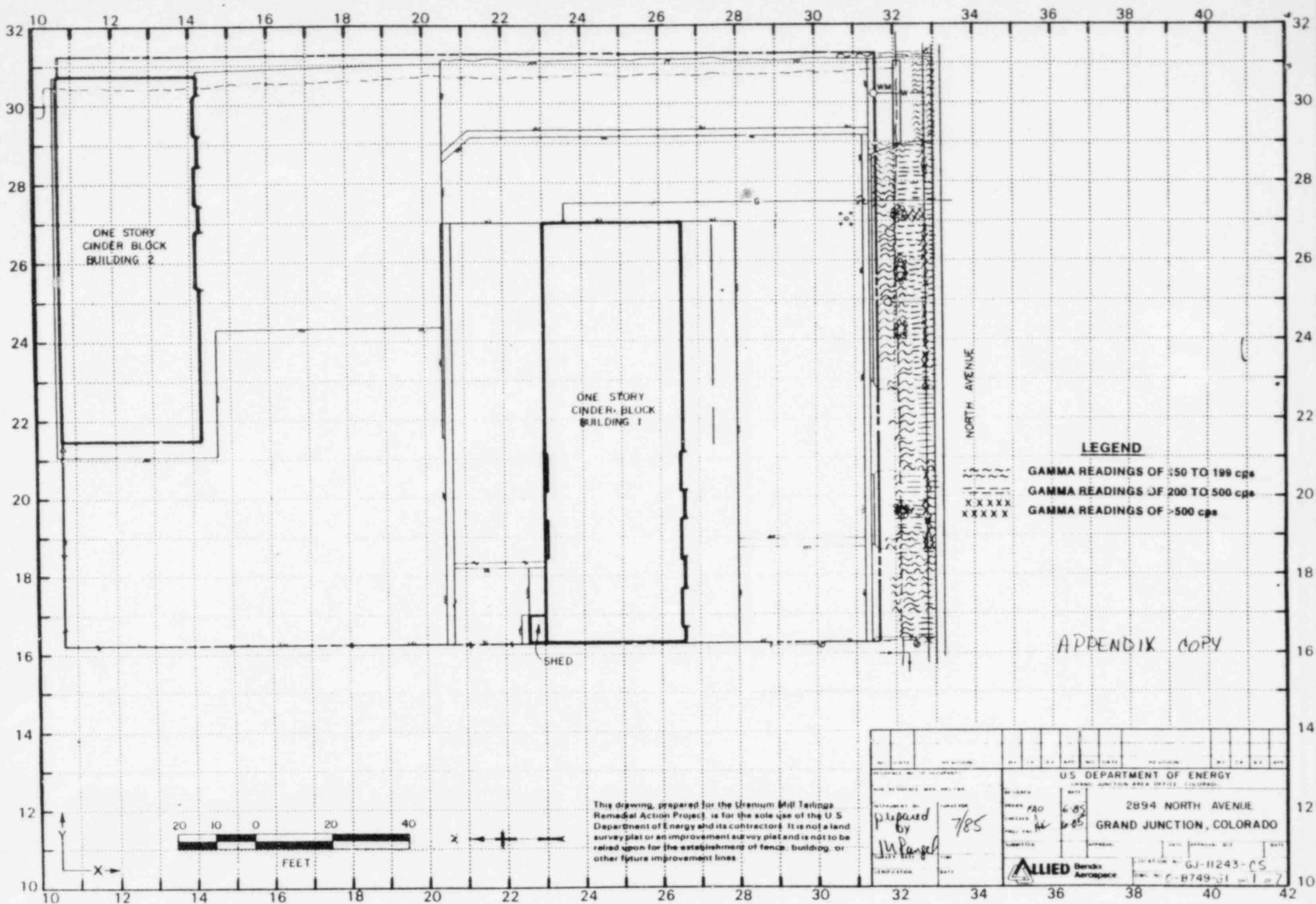
HOLE NUMBER: 20

LOCATION: 327228



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	11.6	11.6
6	16.8	16.6
9	22.1	32.4
12	21.6	25.5
15	18.9	16.4
18	17.6	16.2
21	17.1	15.7

24	17.4	16.3
27	18.3	19.2
30	18.7	19.4
33	18.7	17.8
36	19.2	19.2
39	19.7	19.7
42	20.2	20.7
45	20.4	21.5
48	20.0	21.1
51	19.0	19.4
54	17.8	17.8
57	16.6	19.1
60	14.0	13.5
63	11.7	11.0
66	9.8	10.0
69	7.8	6.6
72	6.5	6.0
75	5.5	4.4
78	5.1	5.1
81	4.7	4.7
84	4.3	3.9
87	4.1	4.1
90	3.9	3.9
93	3.7	3.3
96	3.7	3.7
99	3.7	3.5
102	3.8	3.8



APPENDIX COPY

NO. 1-1072		NO. 1-1072		NO. 1-1072		NO. 1-1072		NO. 1-1072	
RECEIVED BY THE FOLLOWING:				U.S. DEPARTMENT OF ENERGY					
NAME, ADDRESS, AND CITY:				GRAND JUNCTION AREA OFFICE, COLORADO					
RECEIVED BY:		DATE:		2894 NORTH AVENUE		GRAND JUNCTION, COLORADO			
prepared by		7/85		6-85		6-85			
DATE:		TIME:		APPROVED:		DATE:		APPROVED:	
CERTIFICATION:		DATE:		ALLIED		Bendix Aerospace		GJ-11243-C5	
32		34		36		38		40	