

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-09699-RS
ADDRESS: 390 28 ROAD

JULY 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

The location, DOE ID No. GJ-09699-RS, is a single-family residence located at 390 28 Road, 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, 216 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is \$12,336. Remedial action on this property will take approximately 14 days to complete.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 390 28 Road, Grand Junction, Colorado

Zoning: Agriculture Forest Transition (AFT)

Lot Size: Approximately 25,920 sf (0.6 acres)

Legal Description: Beginning 660.0 feet south and 30.0 feet east of the northwest corner of Section 19, T1S, R1E, U.M., thence north 270.0 feet, thence east 96.0 feet, thence south 270.0 feet, thence west to beginning, County of Mesa, State of Colorado.

Point of Reference: This property is located approximately 1 mile northeast of the State of Colorado Tailings Repository. Appendix Figure 2.1 shows the property location relative to its surroundings.

Utilities: Utility locations are shown in Appendix Figure 2.2.

Electrical:	Overhead
Gas:	Underground
Telephone:	Overhead
Sewer:	Porta-can
Water:	Underground
Cable TV:	Overhead

Bordering Properties:

North:	Perry Street
South:	Open field
East:	Single-family residence
West:	28 Road

2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-family residence
Size:	Approximately 682 sf
Construction Date:	1930
Construction:	Wood-frame with asbestos shingles used as siding
Foundation:	Wood 4x4's and 2x4's
Footing Depth:	Approximately 4" to bottom of footing from grade
Basement:	None
Crawl Space:	Yes; full
Condition:	Poor

Other Structures:

Type: Coop (1)
 Size: Approximately 189 sf
 Construction: Wood and wire
 Foundation: None
 Condition: Poor

Type: Coop (2)
 Size: Approximately 32 sf
 Construction: Wood and wire
 Foundation: None
 Condition: Poor

Type: Coop (3, 4, 5, 6, 7, 8, 9, and 10)
 Size: Approximately 320 sf
 Construction: Wood and wire
 Foundation: None
 Condition: Poor

Type: Coop (11)
 Size: Approximately 293 sf
 Construction: Wood and wire
 Foundation: None
 Condition: Poor

Type: Coop (12)
 Size: Approximately 530 sf
 Construction: Wood and wire
 Foundation: None
 Condition: Poor

Type: Shed (1)
 Size: Approximately 200 sf
 Construction: Wood-frame
 Foundation: None
 Condition: Poor

Type: Shed (2A, 2B, and 3)
 Size: Approximately 425 sf
 Construction: Wood-frame
 Foundation: None
 Condition: Poor

Type: Shed (4, 5, 6, 7, and 8)
 Size: Approximately 262 sf
 Construction: Wood-frame
 Foundation: None
 Condition: Poor

Type:	Lean-to (1A and 1B)
Size:	Approximately 300 sf
Construction:	Wood
Foundation:	None
Condition:	Poor

Type:	Lean-to (2)
Size:	Approximately 200 sf
Construction:	Wood
Foundation:	None
Condition:	Poor

Type:	Porta-can
Size:	Approximately 16 sf
Construction:	Fiberglass
Foundation:	None
Condition:	Excellent

General Remarks:

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

Historical Data:

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

Alterations to Structure: A washroom was added to the east of the structure and a shed was attached to the west of the structure.

Architectural Significance: None known

Historical Significance: None known

3.0 RADIOLOGIC SURVEY

3.1 Introduction

Radiologic data were collected by Bendix at DOE ID No. GJ-09699-RS on April 23, 1985. Data collection methods were performed in accordance with procedures fully described in the Radiologic Support Operations Procedures Manual GJ-07(84) (Bendix Field Engineering Corporation, 1984). These data were evaluated to determine the areal and vertical extent of uranium mill tailings contamination at this property as well as any other contaminated material that may have originated from the millsite.

A review of historical information from the files of the Colorado Department of Health (CDH) and the inclusion data from Oak Ridge National Laboratory (ORNL) was conducted. These records indicate that there is contamination in the north and west yards, as well as around and possibly under the primary structure.

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

3.2 Gamma Exposure-Rate Surveys

3.2.1 Exterior Findings

Background Readings: 14 to 16 uR/h
Highest Outside Gamma Reading (HOG): 60 uR/h

Exterior radium-concentration measurements are presented in Appendix Table 3.1. Grid-point survey results are shown in Appendix Figure 3.1. Appendix Figure 3.2 presents the ranges of elevated gamma readings and indicates areas of possible contamination.

3.2.2 Interior Findings

Background Readings: 13 to 16 uR/h
Highest Inside Gamma Reading (HIG): 26 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 3.3 shows interior exposure rates and locations of these measurements.

3.3 Boreholes, Soil Samples, and Other Measurements

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

3.4 Radon/Radon Daughter Concentration (RDC)

Determined by CDH: 0.009 gross working level (WL). No additional RDC measurements were taken by Bendix.

3.5 Extent of Contamination

Appendix Figure 3.5 shows 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) At the southwest corner of Coop 11, there is a small deposit contaminated to a depth of 6 inches (approximately 20 sf).
- (AREA B) In the yard northeast of the primary structure, there is a deposit which is contaminated to a depth of 6 inches (approximately 160 sf).
- (AREA C) The soil surrounding the gas line northeast of the primary structure is contaminated to an estimated depth of 15 inches, based on the depth of the trench (approximately 36 sf).
- (AREA D) In the yard north and west of the primary structure, there is contamination to a depth of 12 inches (approximately 1,287 sf).
- (AREA E) West of Area D, contamination extends to a depth of 12 inches (approximately 1,620 sf).
- (AREA F) Northwest of Area E, there is contamination which extends to an estimated depth of 18 inches, based on all available data taken (approximately 180 sf).
- (AREA G) Near the west property line, contamination extends to a depth of 18 inches (approximately 50 sf).
- (AREA H) Southwest of the primary structure, contamination extends to a depth of 15 inches (approximately 879 sf).
- (AREA I) South of Area H, contamination extends to a depth of 12 inches (approximately 335 sf).
- (AREA J) South of the primary structure, contamination extends to a depth of 6 inches (approximately 50 sf).

- (AREA K) South of the primary structure, the soil surrounding the water line is contaminated to a depth of 24 inches (approximately 84 sf).
- (AREA L) East of the primary structure, there is a deposit which is contaminated to a depth of 12 inches (approximately 35 sf).
- (AREA M) West of Shed 1, there are three deposits which are contaminated to a depth of 12 inches (approximately 300 sf).
- (AREA N) West of Coop 11, in the dirt driveway, there is contamination 21 inches deep (approximately 150 sf).
- (AREA O) Between the west property line and Coop 11, there is a deposit which is contaminated to a depth of 12 inches (approximately 175 sf).

(AREAS REQUIRING FURTHER INVESTIGATION DURING REMEDIAL ACTION)

Elevated gamma readings were observed inside the primary structure. These readings were determined to be secondary radiation from exterior deposits. After exterior sources of radiation have been removed, the structure should be monitored to confirm the absence of interior contamination.

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-09699-RS, includes removal of all areas identified as containing radioactive material (as discussed in Section 3.5 and shown in Appendix Figure 3.5) 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, but owner's personal property and livestock will have to be relocated and moved back. At the present time, there are forty game cocks, many rabbits, and junk within the area affected by remedial action. The game cocks will require special care and handling.

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 \$12,336.

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

Owner preference is for him to move his own game cocks and rabbits out of the area affected by remedial action. No legal or other complications are foreseen at this time.

5.0 REFERENCES

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

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

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

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

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

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

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

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

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

6.0 APPENDIX

This Appendix contains the following:

Appendix Tables:

Table 3.1	Radium Concentrations at Exterior Locations
Table 3.2	Radium Concentrations at Interior Locations
Table 3.3	Summary of Interior Gamma Exposure Rates
Table 4.1	Area and Volume Calculations
Table 4.2	Estimated Cost of Decontamination and Restoration

Appendix Figures:

Figure 2.1	Vicinity Map
Figure 2.2	Site Plan
Figure 3.1	Exterior Grid-Point Exposure Rates
Figure 3.2	Exterior Gamma Scan
Figure 3.3	Interior Gamma Exposure Rates and Sample Locations
Figure 3.4	Exterior Sample Locations
Figure 3.5	Exterior Estimated Extent of Contamination

Official Survey Report

Memo of Understanding

Team Leader Notes

Deconvolution Graphs (Apparent Radium-226 Concentration)

Radium Concentrations at Exterior Locations

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Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
8	125245	00	DS	1.8		*	Next to fence
		06	DS	1.2		*	
9	125255	03	TC	3.4		*	Northwest of primary structure
		06	TC	3.7		*	
		09	TC	3.9		*	
		12	TC	4.0		*	
		15	TC	4.2		*	DC = 0 inches
		18	TC	4.4		*	
		21	TC	4.3		*	
		24	TC	4.3		*	
		27	TC	4.3		*	
		30	TC	4.2		*	
10	133254	00	DS	3.3		*	Next to fence
		06	DS	2.5		*	
		00-06	SS			8.6	Moist
11	136218	00	DS	4.3		*	West of primary structure
		06	DS	5.5		*	
		12	DS	4.3		*	
12	140280	03	TC	2.7		*	North of primary structure
		06	TC	3.1		*	
		09	TC	3.4		*	
		12	TC	3.6		*	
		15	TC	3.6		*	DC = 0 inches
		18	TC	3.6		*	
		21	TC	3.5		*	
		24	TC	3.4		*	
		27	TC	3.5		*	
		30	TC	3.5		*	
13	145245	00	DS	5.4		*	West of primary structure
		03	TC	6.9		*	
		06	TC	7.6		*	
		09	TC	7.0		*	
		12	TC	6.0		*	DC = 12 inches Based on the deconvolution graph
		15	TC	5.3		*	
		18	TC	5.0		*	

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Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
13	145245	21	TC	4.6		*	
		24	TC	4.5		*	
		27	TC	4.2		*	
		30	TC	4.2		*	
		33	TC	4.2		*	
		36	TC	4.2		*	
		39	TC	4.2		*	
		42	TC	4.1		*	
14	145303	00	DS	3.1		*	Northeast of primary structure Front yard
		03	TC	4.5		*	
		06	TC	4.7		*	
		09	TC	4.5		*	
		12	TC	4.2		*	
		15	TC	4.1		*	
		18	TC	4.0		*	DC = 6 inches Based on the deconvolution graph
		21	TC	3.8		*	
		24	TC	3.6		*	
		27	TC	3.5		*	
		30	TC	3.5		*	
		33	TC	3.6		*	
		36	TC	3.6		*	
15	155285	00	DS	6.6		*	North of primary structure
		06	DS	3.4		*	
		12	DS	2.1		*	
		00-06	SS			11.4	Moist
16	157276	00	DS	8.8		*	By front door
		06	DS	2.8		*	
17	159295	00	DS	8.3		*	Gas line
		12	DS	3.8		*	
18	166230	00	DS	4.5		*	West of primary structure
		06	DS	6.5		*	
		12	DS	2.2		*	
19	170240	00	DS	9.8		*	West of primary structure DC = 12 inches Based on the deconvolution graph
		03	TC	10.2		*	
		06	TC	10.9		*	
		09	TC	9.2		*	
		12	TC	7.2		*	

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Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
19	170240	15	TC	5.9		*	
		18	TC	5.3		*	
		21	TC	5.0		*	
		24	TC	4.9		*	
		27	TC	4.8		*	
		30	TC	4.7		*	
20	170260	00	DS	7.4		*	Next to primary structure
		03	TC	8.6		*	
		06	TC	8.1		*	
		09	TC	6.6		*	DC = 12 inches Based on the deconvolution graph
		12	TC	5.4		*	
		15	TC	4.9		*	
		18	TC	4.2		*	
		21	TC	4.1		*	
		24	TC	4.1		*	
		27	TC	3.9		*	
		30	TC	3.9		*	
		33	TC	3.9		*	
21	176298	00	DS	7.9		*	Southeast side of primary structure
		03	TC	10.6		*	
		06	TC	13.7		*	
		09	TC	11.5		*	
		12	TC	8.1		*	
		15	TC	6.1		*	DC = 12 inches Based on deconvolution graph
		18	TC	5.1		*	
		21	TC	4.7		*	
		24	TC	4.3		*	
		27	TC	4.0		*	
		30	TC	3.8		*	
		33	TC	3.7		*	
		36	TC	3.6		*	
		39	TC	3.7		*	
		42	TC	3.7		*	
		45	TC	3.7		*	
22	178235	00	DS	1.4		*	West of primary structure
		06	DS	4.9		*	
		12	DS	1.5		*	

Radium Concentrations at Exterior Locations

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Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
23	183275	00	DS	2.6		*	South side of primary structure
		03	TC	4.4		*	
		06	TC	4.3		*	
		09	TC	4.2		*	
		12	TC	3.9		*	
		15	TC	3.9		*	DC = 6 inches Based on all available data
		18	TC	3.9		*	
		21	TC	3.9		*	
		24	TC	4.0		*	
		27	TC	3.9		*	
		30	TC	3.9		*	
24	183292	00	DS	3.0		*	Water line
		03	TC	8.0		*	
		06	TC	9.9		*	
		09	TC	10.6		*	
		12	TC	9.0		*	
		15	TC	7.1		*	DC = 24 inches Based on the deconvolution graph
		18	TC	6.5		*	
		21	TC	5.8		*	
		24	TC	4.8		*	
		27	TC	4.1		*	
		30	TC	3.8		*	
		33	TC	3.6		*	
		36	TC	3.6		*	
25	190240	03	TC	15.1		*	In driveway
		06	TC	13.7		*	
		09	TC	10.1		*	
		12	TC	7.6		*	
		15	TC	5.9		*	
		18	TC	4.9		*	DC = 15 inches Based on the deconvolution graph
		21	TC	4.5		*	
		24	TC	4.3		*	
		27	TC	4.1		*	
		30	TC	4.0		*	
		33	TC	4.0		*	
		36	TC	4.0		*	
		39	TC	4.1		*	
		42	TC	4.0		*	
		45	TC	4.1		*	
		48	TC	4.0		*	
		51	TC	4.1		*	
		54	TC	4.2		*	

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Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
25	190240	57	TC	4.3		*	
		60	TC	4.4		*	
		63	TC	4.4		*	
		66	TC	4.5		*	
		69	TC	4.5		*	
		72	TC	4.6		*	
		75	TC	4.6		*	
		78	TC	4.5		*	
		81	TC	4.5		*	
		84	TC	4.5		*	
26	191234	00	DS	6.6		*	Southwest of primary structure
		06	DS	3.4		*	
		12	DS	<1.0		*	
27	195250	00	DS	13.5		*	Southwest of primary structure Middle of driveway
		06	DS	9.9		*	
		03	TC	11.6		*	
		06	TC	11.6		*	
		09	TC	9.5		*	
		12	TC	7.0		*	
		15	TC	5.4		*	
		18	TC	4.5		*	DC = 15 inches Based on the deconvolution graph
		21	TC	4.3		*	
		24	TC	4.1		*	
		27	TC	3.9		*	
		30	TC	4.1		*	
		33	TC	3.9		*	
28	199218	00	DS	4.7		*	Southwest of primary structure
		06	DS	8.1		*	
		12	DS	2.8		*	
		18	DS	2.2		*	
29	200260	00	DS	5.1		*	South of primary structure
		06	DS	4.1		*	
		12	DS	1.8		*	
30	210300	00	DS	<1.0		*	
		00-06	SS			1.2	Moist
		03	TC	3.4		*	
		06	TC	4.2		*	Background hole
		09	TC	4.5		*	
		12	TC	4.4		*	

Radium Concentrations at Exterior Locations

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
30	210300	15	TC	4.5		*	DC = 0 inches
		18	TC	4.4		*	
		21	TC	4.3		*	
		24	TC	4.2		*	
		27	TC	4.3		*	
		30	TC	4.4		*	
		33	TC	4.5		*	
		36	TC	4.5		*	
		39	TC	4.4		*	
31	214260	00	DS	1.5		*	South of primary structure
		03	TC	3.4		*	
		06	TC	3.8		*	
		09	TC	4.0		*	
		12	TC	4.1		*	
		15	TC	4.1		*	DC = 0 inches
		18	TC	4.1		*	
		21	TC	3.9		*	
		24	TC	3.9		*	
		27	TC	3.8		*	
		30	TC	3.9		*	
		33	TC	3.9		*	
		36	TC	3.9		*	
		39	TC	3.8		*	
32	220220	03	TC	34.7		*	In the driveway
		06	TC	30.3		*	
		09	TC	21.0		*	
		12	TC	14.8		*	DC = 21 inches Based on the deconvolution graph
		15	TC	10.3		*	
		18	TC	7.6		*	
		21	TC	6.1		*	
		24	TC	5.2		*	
		27	TC	4.9		*	
		30	TC	4.6		*	
		33	TC	4.5		*	
		36	TC	4.4		*	
		39	TC	4.3		*	
		42	TC	4.2		*	
		45	TC	4.4		*	
		48	TC	4.2		*	
		51	TC	4.2		*	
		54	TC	4.2		*	
		57	TC	4.3		*	

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390 28 Road

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Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
32	220220	60	TC	4.3		*	
		63	TC	4.4		*	
		66	TC	4.4		*	
		69	TC	4.4		*	
		72	TC	4.4		*	
		75	TC	4.4		*	
		78	TC	4.5		*	
33	225285	03	TC	14.5		*	South of primary structure
		06	TC	15.1		*	
		09	TC	9.9		*	
		12	TC	6.6		*	DC = 12 inches Based on the deconvolution graph
		15	TC	5.3		*	
		18	TC	4.7		*	
		21	TC	4.5		*	
		24	TC	4.5		*	
		27	TC	4.5		*	
		30	TC	4.5		*	
34	226232	00	DS	4.2		*	Southeast of primary structure
		06	DS	6.2		*	
35	232217	00	DS	5.4		*	By the ditch
		06	DS	6.0		*	
		12	DS	1.9		*	
36	233235	00	DS	2.7		*	East of Coop 12
		06	DS	1.8		*	
37	248282	00	DS	1.9		*	South end of primary structure
		06	DS	1.3		*	
38	248288	00	DS	2.1		*	South side of primary structure
		06	DS	1.9		*	
39	255216	00	DS	1.7		*	By the ditch
		03	TC	3.5		*	
		06	TC	3.9		*	
		09	TC	4.3		*	
		12	TC	4.4		*	DC = 0 inches
		15	TC	4.3		*	
		18	TC	4.2		*	
		21	TC	4.3		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-09699-RS

390 28 Road

Page 8 of 8

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
39	255216	24	TC	4.2		*	
		27	TC	4.1		*	
		30	TC	4.1		*	
		33	TC	4.0		*	
		36	TC	4.0		*	
40	255285	03	TC	4.0		*	East of Porta- Can
		06	TC	4.2		*	
		09	TC	4.3		*	
		12	TC	4.3		*	
		15	TC	4.3		*	
		18	TC	4.3		*	DC = 0 inches
		21	TC	4.1		*	
		24	TC	4.2		*	
		27	TC	4.3		*	
		30	TC	4.5		*	
		33	TC	4.6		*	

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 = 04-23-85
 Team Leader = MR

Radium Concentrations at Interior Locations

DOE ID #GJ-09699-RS

390 28 Road

Page 1 of 1

Loc No.	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
1		00	DS	10.2		*	
2		00	DS	4.5		*	
3		00	DS	4.1		*	
4		00	DS	4.5		*	
5		00	DS	5.6		*	
6		00	DS	6.4		*	
7		00	DS	<1.0		*	

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 = 04-23-85
Team Leader = MR

Table 3.3
Summary of Interior Gamma Exposure Rates

DOE ID No. GJ-09699-RS 390 28 Road 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	06	13-18	16	06	13-20	17
ROOM B	06	13-16	14	06	13-26	17
ROOM C	06	13-16	15	06	14-19	17
ROOM D	04	13-15	14	04	13-19	15
ROOM E	02	14-14	14	02	14-15	15
ROOM F	02	14-14	14	02	13-14	15

*Exposure Rates and Room Locations Shown in Appendix Figure 3.3

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-09699-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	4 x 5	= 20	x 0.5	= 10	
B	8 x 20	= 160	x 0.5	= 80	
C	12 x 3	= 36	x 1.3	= 47	
D	7 x 13	= 91			
	17 x 8	= 136			
	53 x 20	= 1,060			
		<u>1,287</u>	x 1.0	= 1,287	
E	20 x 15	= 300			
	40 x 33	= 1,320			
		<u>1,620</u>	x 1.0	= 1,620	
F	15 x 12	= 180	x 1.5	= 270	
G	5 x 10	= 50	x 1.5	= 75	
H	15 x 15	= 225			
	10 x 7	= 70			
	25 x 20	= 500			
	7 x 12	= 84			
		<u>879</u>	x 1.3	= 1,143	
I	5 x 12	= 60			
	35 x 5	= 175			
	10 x 10	= 100			
		<u>335</u>	x 1.0	= 335	
J	10 x 5	= 50	x 0.5	= 25	
K	12 x 7	= 84	x 2.0	= 168	
L	7 x 5	= 35	x 1.0	= 35	

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-09699-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>
M	15 x 12	=	180		
	10 x 10	=	100		
	5 x 4	=	20		
			<hr/> 300	x 1.0 =	300
N	15 x 10	=	150	x 1.8 =	270
O	15 x 5	=	75		
	10 x 10	=	100		
			<hr/> 175	x 1.0 =	175
TOTAL VOLUME - EXTERIOR				= 5,840 = 5,840/27 =	216

See Appendix Figure 3.5 For Areas

=====

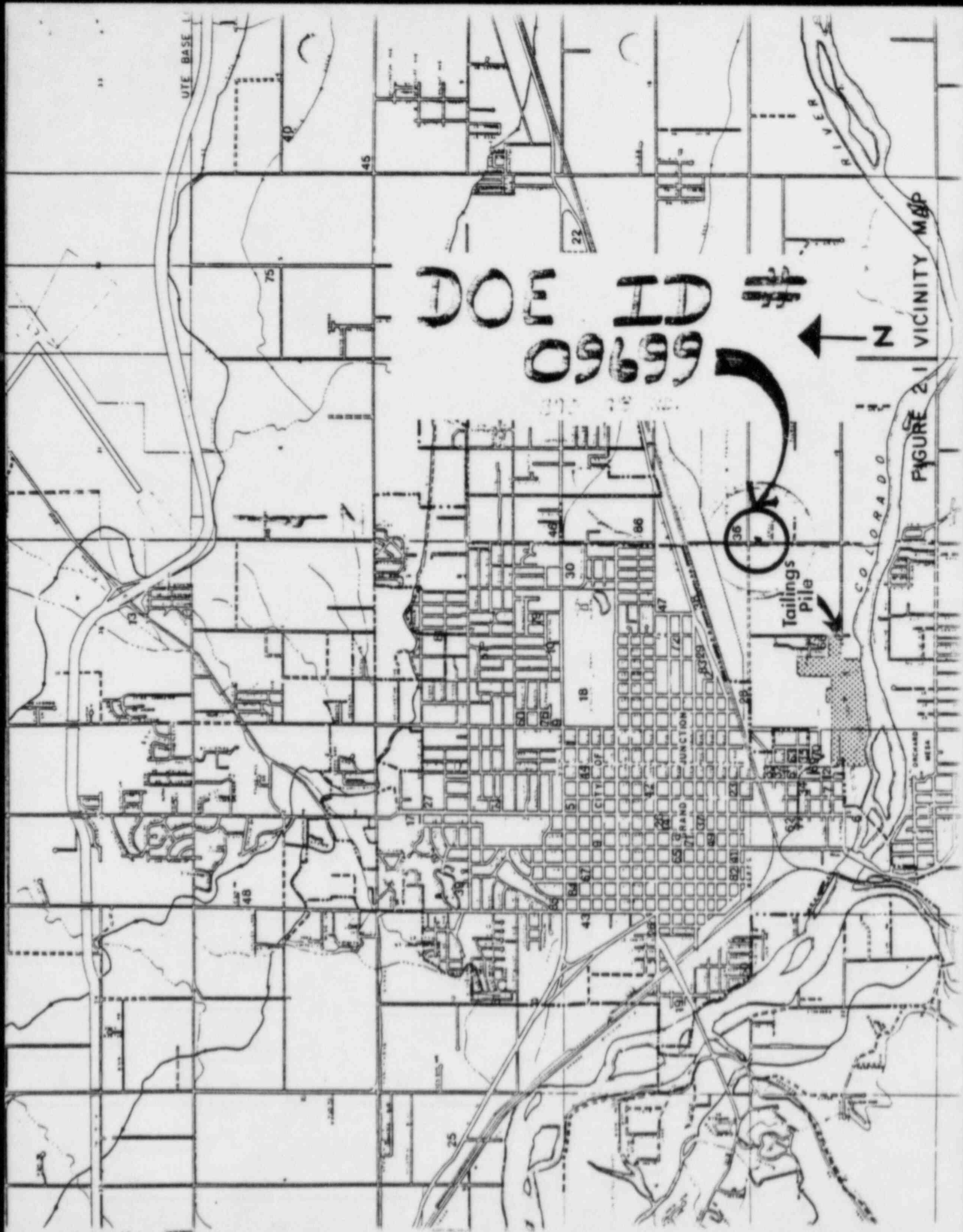
EXTERIOR

Remove identified residual radioactive material	
4 ea @ \$100/ea (large trees)	\$ 400
26 cy @ \$44/cy (manual)	1,144
190 cy @ \$14.50/cy (machine)	2,755
Replace area with roadbase	
30 cy @ \$11.50/cy	345
Replace area with topsoil	
186 cy @ \$9.50/cy	1,767
Remove and replace fencing	
100 lf @ \$1/lf	100
Remove and replace cinder block	50
Remove and replace timbers	100
Replace sod	
1,483 sf @ \$.25/sf	371
Replace trees	
10 ea @ \$30/ea	300
Remove and replace game cocks and rabbits	800
Remove and replace personal property	300
Foundation bracing	
90 lf @ \$3/lf	270
Disconnect air conditioner and extend drain line from washroom	20
	<hr/>
TOTAL EXTERIOR	\$ 8,722

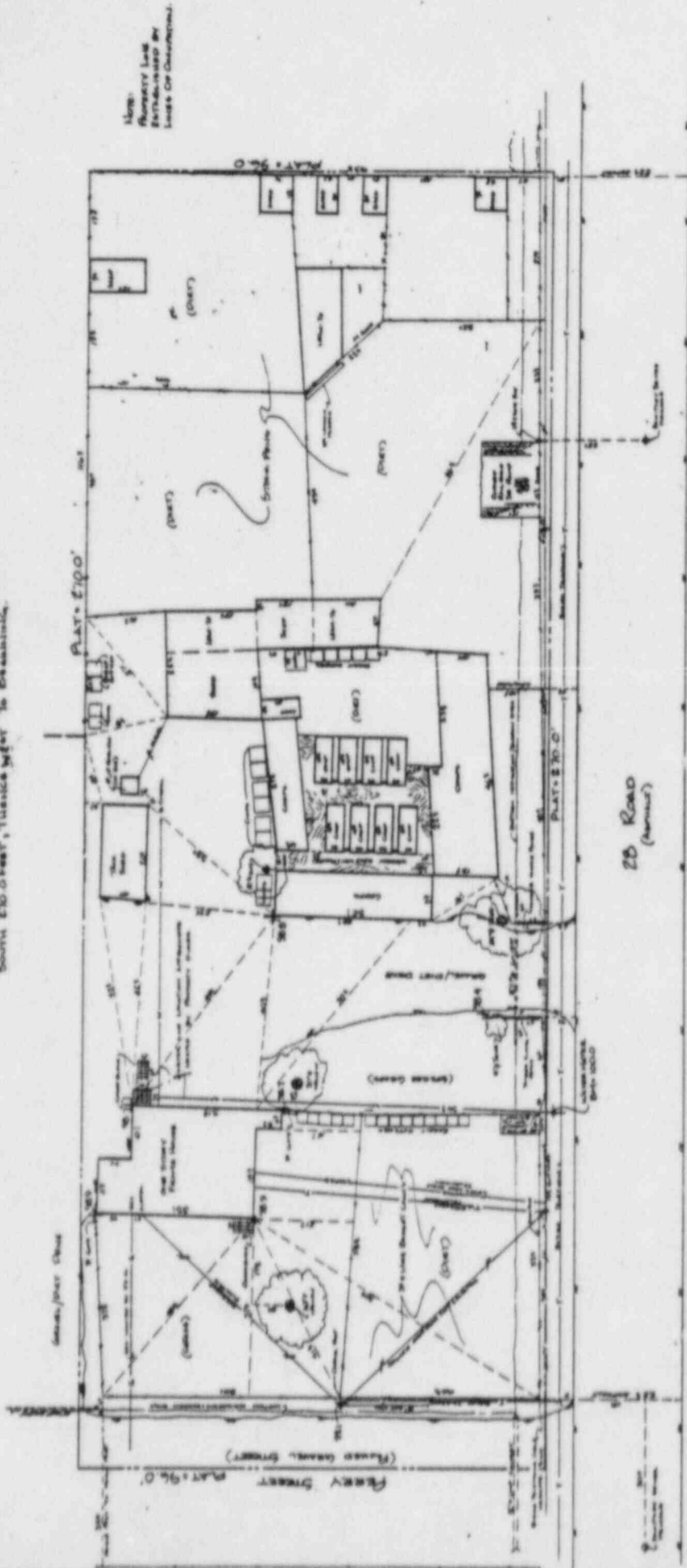
TOTAL EXTERIOR	\$	8,722
TOTAL INTERIOR		0
ACCESS CONTROL		250
		<hr/>
SUBTOTAL	\$	8,972
CONTINGENCY @ 10%		897
		<hr/>
SUBTOTAL	\$	9,869
CONTRACTOR OVERHEAD & PROFIT @ 25%		2,467
		<hr/>
GRAND TOTAL	\$	12,336

=====

VG/071585
REA09699/REA-37/KL



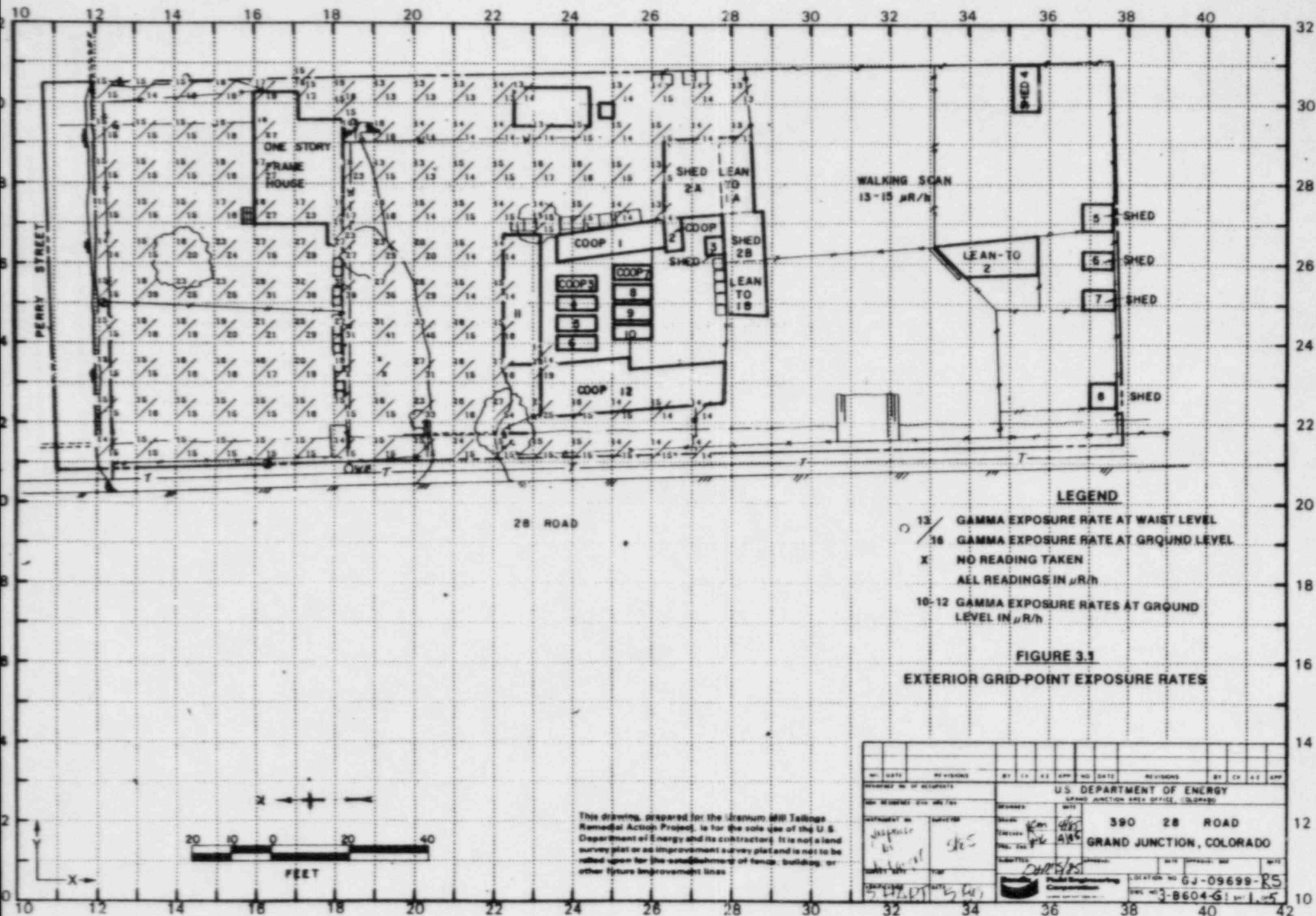
Demolition 440.0 Feet South And 30.0 Feet East Of The
 Monumental Column. Of Section 19, T.15, R.1E, U.14,
 T.15, R.1E, U.14, T.15, R.1E, U.14, T.15, R.1E, U.14,
 South 470.0 Feet, T.15, R.1E, U.14, T.15, R.1E, U.14,
 South 470.0 Feet, T.15, R.1E, U.14, T.15, R.1E, U.14,

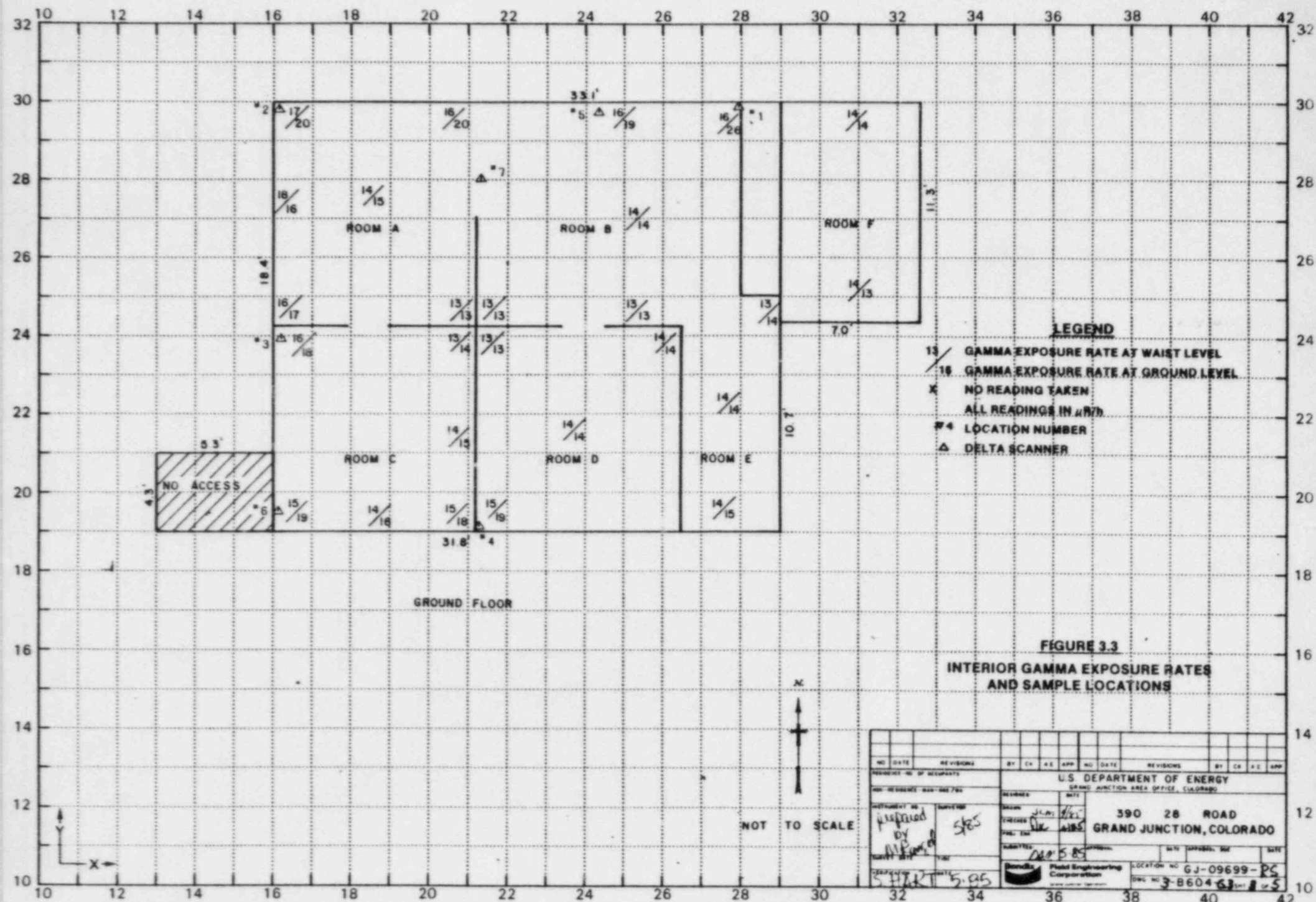


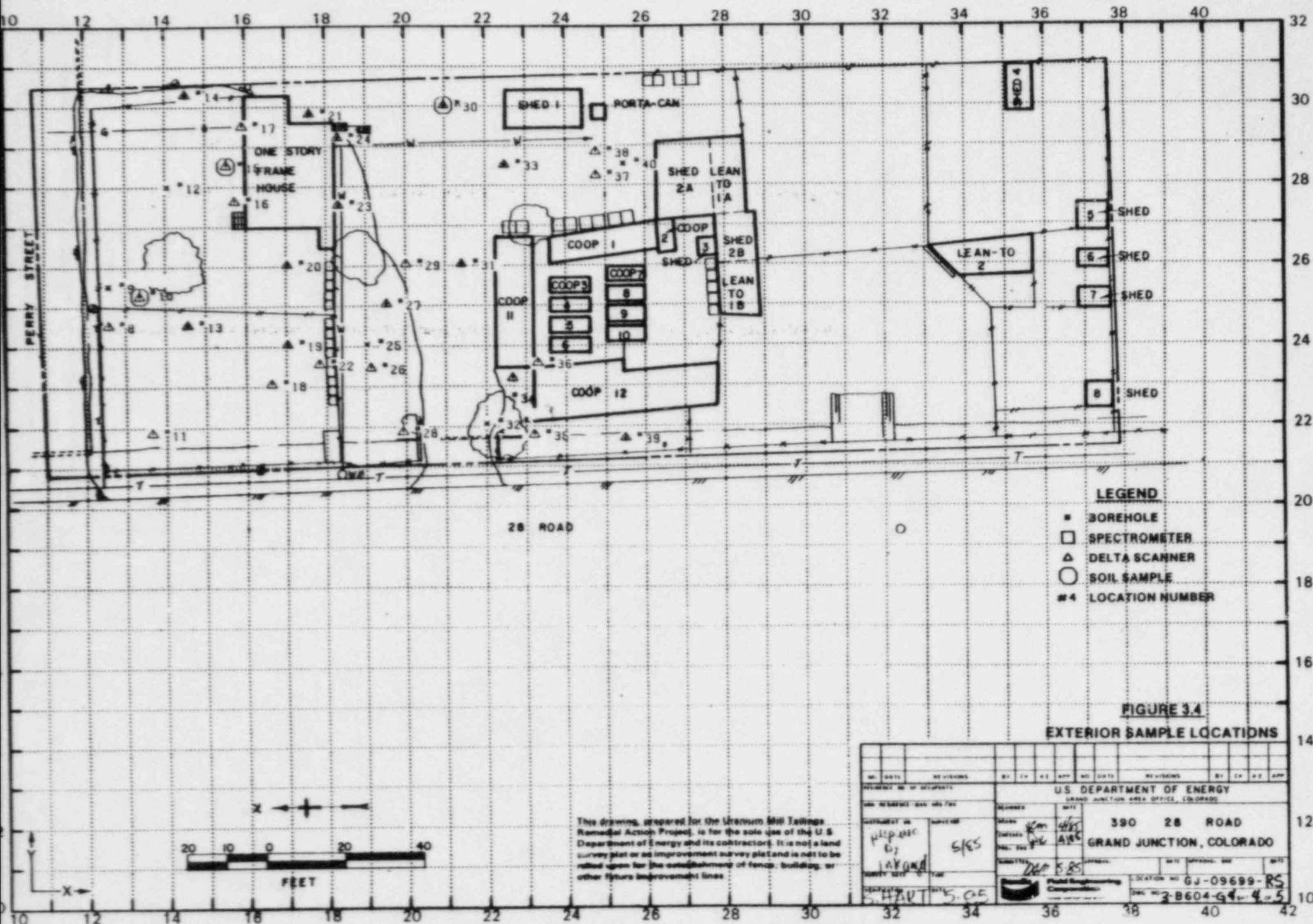
Scale 1/4" = 100'

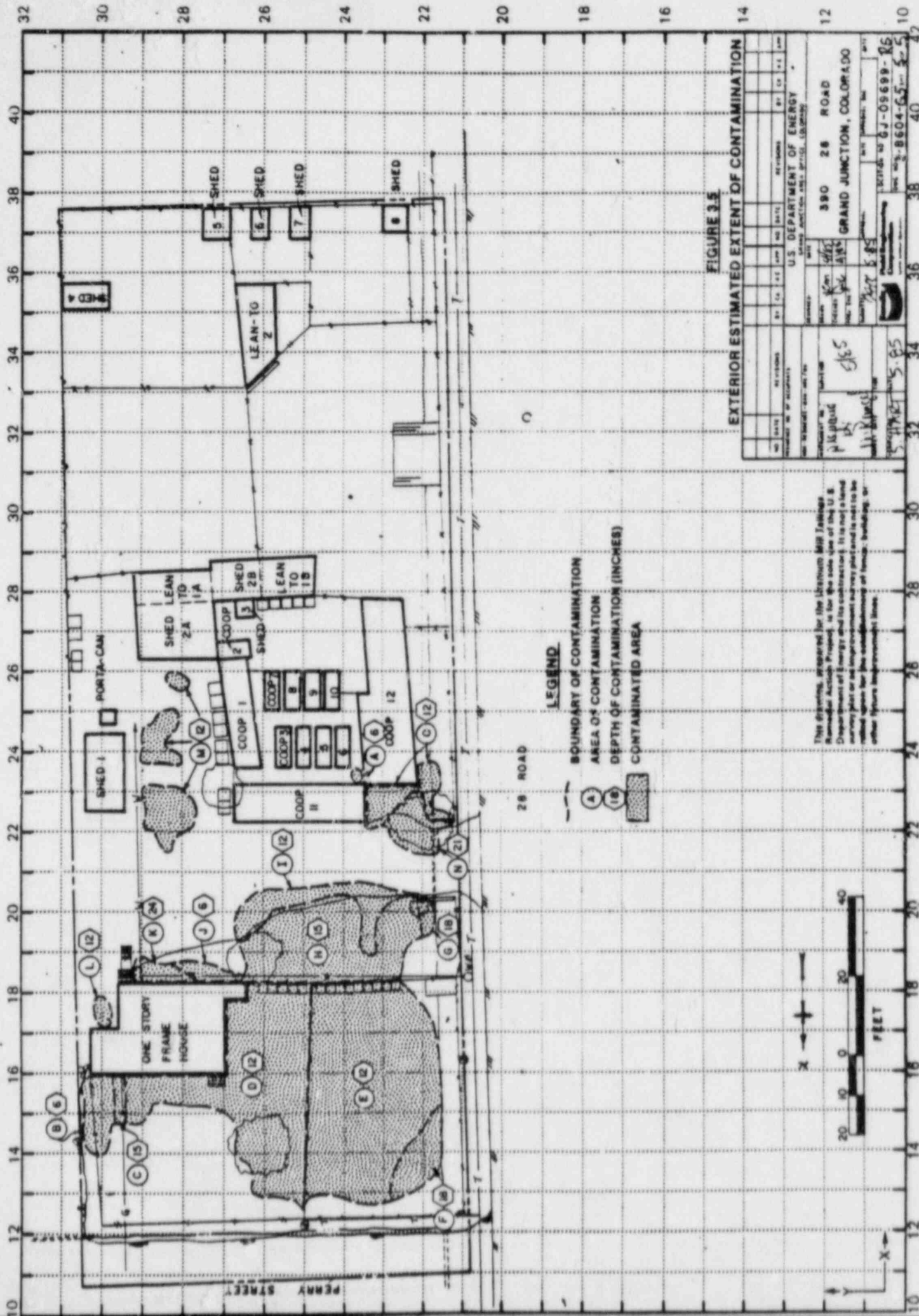
FIGURE 2.2 SITE PLAN

U.S. DEPARTMENT OF ENERGY	Page 4 of 4
PROJECT NAME: 500 2B ROAD	DATE: 10/10/95
PROJECT NO: 500 2B ROAD	SCALE: 1/4" = 100'
PROJECT LOCATION: 500 2B ROAD	PROJECT NO: 500 2B ROAD
PROJECT NO: 500 2B ROAD	PROJECT NO: 500 2B ROAD









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 plot or an improvement survey plot and is not to be relied upon for the establishment of fence, building, or other features. Measurements shown.

3/85

DOE ID NO. GI-09699-RS Date 5/8/85

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

Official Survey Report

Property Address 390 28 Road

Property Owner Orie Nickle

Address of Owner (if different from above) _____

Report Prepared By Mark Rangel

I. PRESENCE/ABSENCE OF RESIDUAL RADIOACTIVE MATERIALS

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

☒ 1 Residual radioactive materials found at the following locations:

☒ 1 In open areas.

☐ 1 Under or around exterior improvements.

☐ 1 Under or around a typically nonoccupied structure.

☒ 1 Under or around a typically occupied structure.

II. RESULTS OF RADIOLOGIC ASSESSMENT

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

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

cc:

G. A. Franz, III, GJ/CDH

J. Themelis, Mgr. UMTRA Proj. Off.

HIG = 26 uR/h
HOG = 60 uR/h

May 8, 1985

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

ATTN: Jon Luellen

Dear Jon:

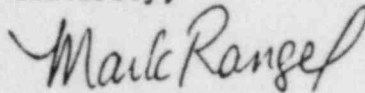
The following is in response to your questions and comments during the Technical Review concerning Department of Energy (DOE) Identification (ID) number GJ-09699-RS (390 28 Road).

1. The gross working level of 0.009 has been included in the Radiologic and Engineering Assessment.
2. Interior contamination is estimated to be one foot around the exterior walls.
3. The gamma scan in this area ranges from 120 to 140 cps. Delta Location 11 was elevated and, therefore, this area was included.
4. South of the house, Location 23 has been included on the Exterior Extent of Contamination map.
5. Locations 37 and 38 will be corrected to 248282 and 248288. Also a couple of squiggles on the gamma map needs to be added at the east edge of this grid block.
6. The gas line was investigated with delta 159295.
7. Locations 136218, 159259, 170240, and 176298 will be monitored during remedial action.
8. The water meter will be monitored during remedial action.
9. Soil sample results for Location 133257 are 8.6 pCi/g.

Jon Luellen
Colorado Department of Health
GJ-09699-RS
May 8, 1985
Page 2

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,



Mark Rangel
RSD Survey Team

MR:pr

CDH.LETTER:09699:RANGEL

ALLIED Bendix
Aerospace

Bendix Field Engineering Corporation
Grand Junction Operations
Grand Junction, Colorado 81501

DATE: April 23, 1985

TO: Files

FROM: Mark Rangel

SUBJECT: Team Leader Notes - GJ-09699-RS

Address: 390 28 Road

Owner: Orie Nickle

Occupancy: Three

Team Members

M. Rangel (Team Leader)
P. Tuhey
D. Bell
V. Young
S. Larsen

L. Kula
H. Mattison
M. Duran
V. Rothman
D. Dow

Instruments

C-3510, C-1247, C-1182, C-1128, C-1127, C-3940, C-3957, C-4006,
C-3937

Located west of the house is an area where the owner keeps chickens, this is a very crowded area. Located on the south, one-third of the property is corrals; this area has approximately 6-inches of water with lots of mud. A gamma scan of this area was completed. Readings ranging from 95 to 120 cps were received.

In the house, elevated readings were found along the north, west, and south walls. The floor is wooden with no crawl space. The floor is approximately 4- to 6-inches from ground level, thus no interior augers were possible.

Team Leader Notes
Mark Rangel
GJ-09699-RS
April 23, 1985
Page 2

This property does not have a septic system, but there is an outhouse located south of Shed 1.

All personnel were frisked before leaving the site.

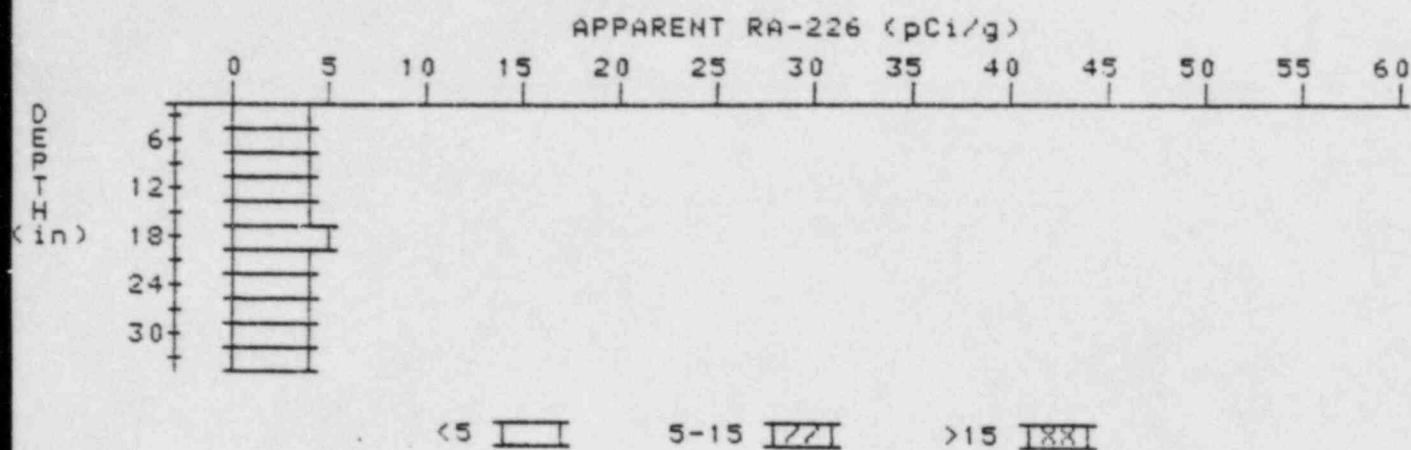
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

9

PROPERTY NUMBER: GJ-09699-RS

HOLE NUMBER: 9

LOCATION: 125255



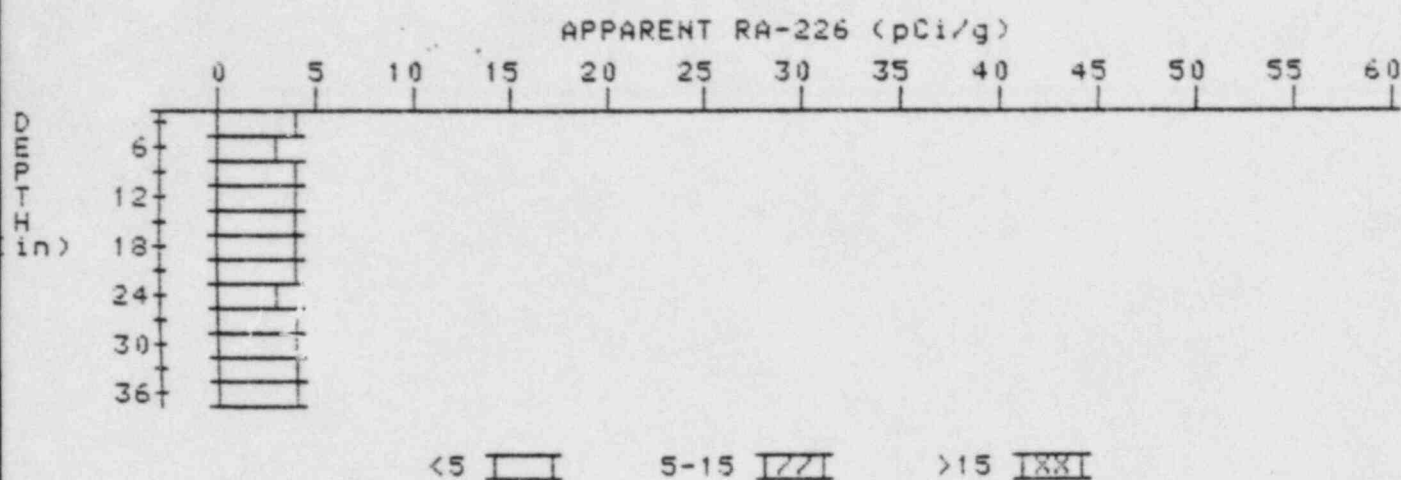
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.4	3.4
6	3.7	3.9
9	3.9	4.1
12	4.0	3.8
15	4.2	4.2
18	4.4	4.9
21	4.3	4.1
24	4.3	4.3
27	4.3	4.5
30	4.2	4.0
33	4.2	4.2

APPARENT RADIUM-226 CONCENTRATION 12 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-09699-RS

HOLE NUMBER: 12

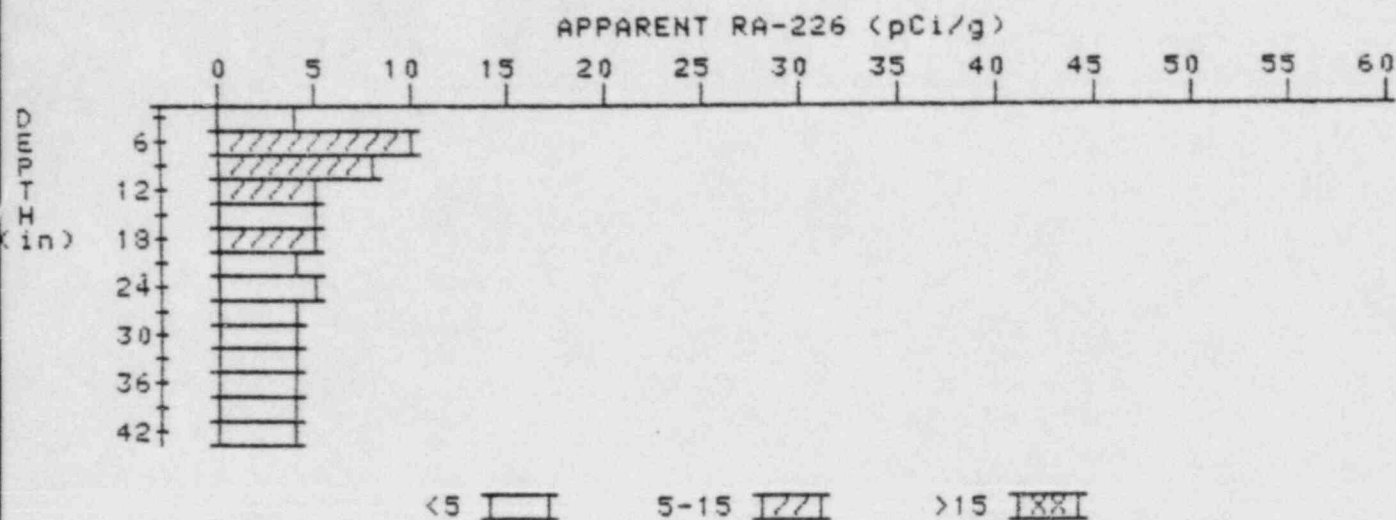
LOCATION: 140280



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	3.6
18	3.6	3.8
21	3.5	3.5
24	3.4	3.0
27	3.5	3.7
30	3.5	3.5
33	3.5	3.5
36	3.5	3.5

APPARENT RADIUM-226 CONCENTRATION 13 DECONVOLUTION GRAPH

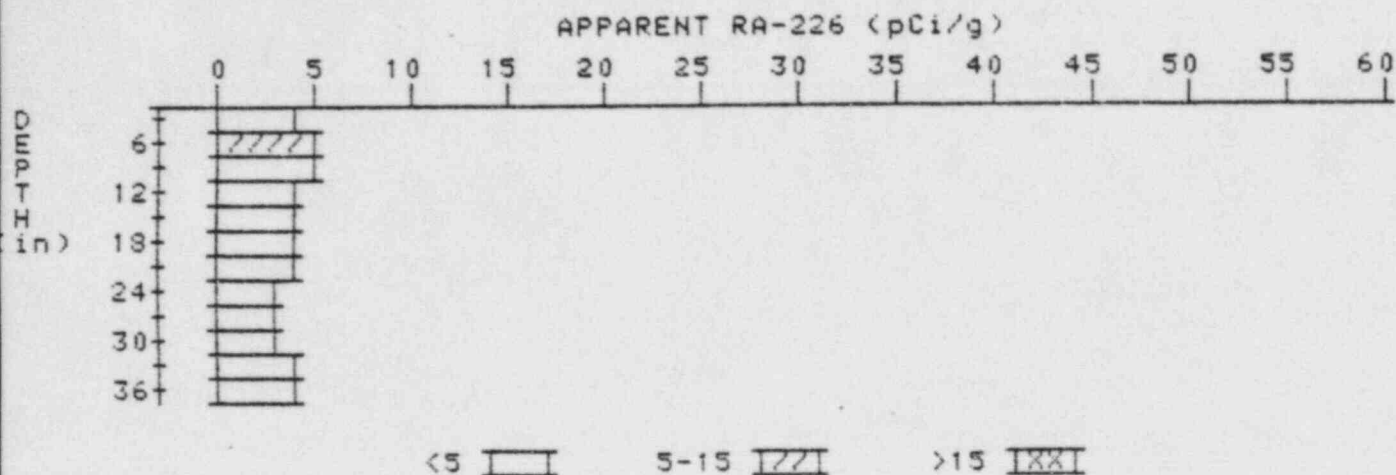
PROPERTY NUMBER: GJ-09699-R5
HOLE NUMBER: 13
LOCATION: 145245



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	6.9	6.9
6	7.6	9.9
9	7.0	7.7
12	6.0	5.5
15	5.3	4.6
18	5.0	5.2
21	4.6	4.1
24	4.5	4.9
27	4.2	3.7
30	4.2	4.2
33	4.2	4.2
36	4.2	4.2
39	4.2	4.4
42	4.1	4.1

APPARENT RADIUM-226 CONCENTRATION 14 DECONVOLUTION GRAPH

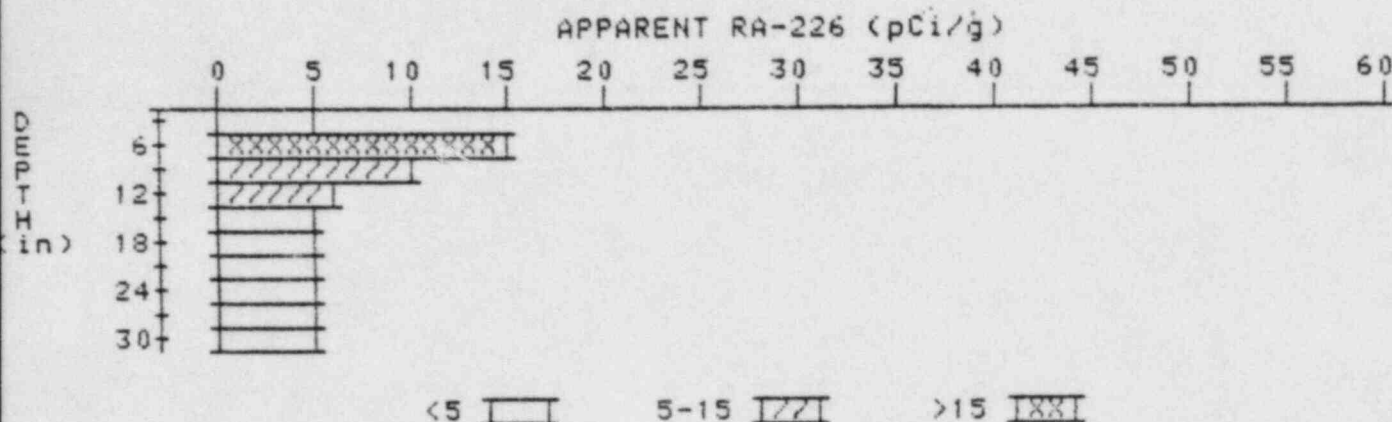
PROPERTY NUMBER: GJ-09699-RS
HOLE NUMBER: 14
LOCATION: 145303



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.5	4.5
6	4.7	5.4
9	4.5	4.7
12	4.2	3.8
15	4.1	4.1
18	4.0	4.2
21	3.8	3.8
24	3.6	3.4
27	3.5	3.3
30	3.5	3.3
33	3.6	3.8
36	3.6	3.6

APPARENT RADIUM-226 CONCENTRATION 19 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-09699-RS
HOLE NUMBER: 19
LOCATION: 170240



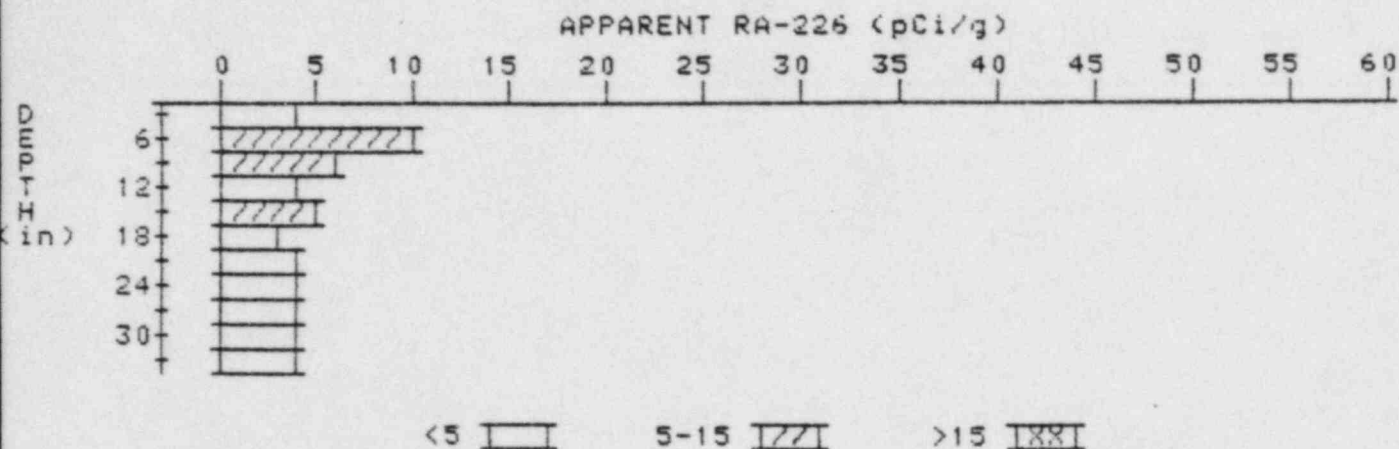
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	10.2	10.2
6	10.9	15.2
9	9.2	9.7
12	7.2	6.0
15	5.9	4.7
18	5.3	4.3
21	5.0	4.6
24	4.9	4.9
27	4.8	4.8
30	4.7	4.7

APPARENT RADIUM-226 CONCENTRATION 20 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-09699-RS

HOLE NUMBER: 20

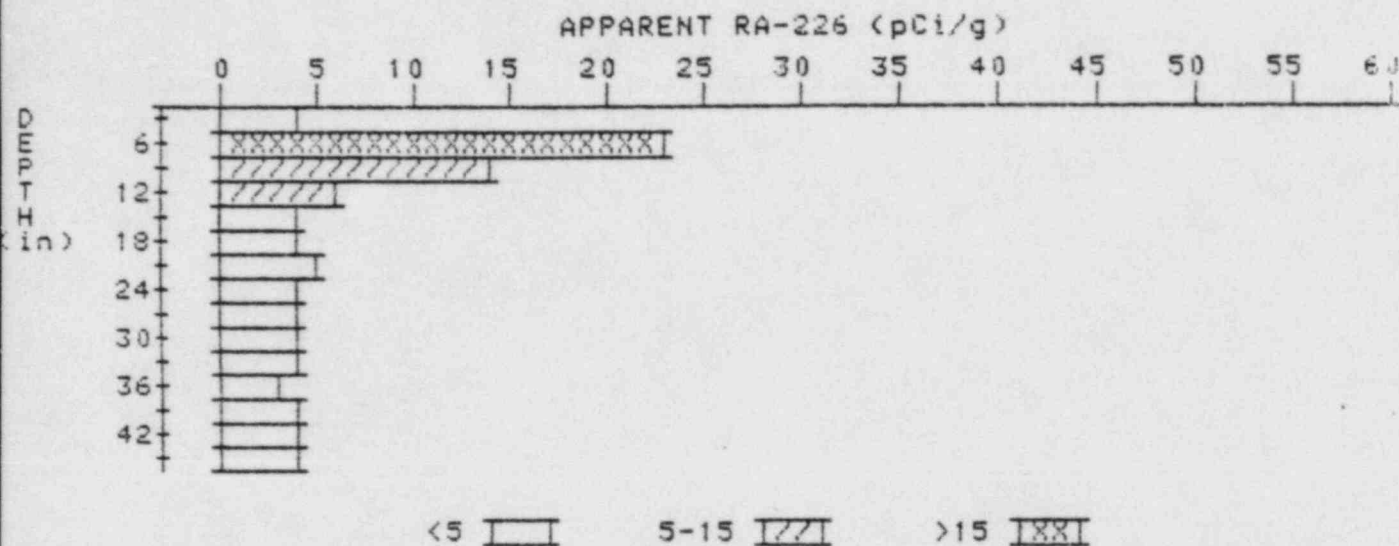
LOCATION: 170260



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	8.6	8.6
6	8.1	9.9
9	6.6	6.1
12	5.4	4.2
15	4.9	5.3
18	4.2	3.1
21	4.1	3.9
24	4.1	4.5
27	3.9	3.5
30	3.9	3.9
33	3.9	3.9

APPARENT RADIUM-226 CONCENTRATION 21 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-09699-RS
HOLE NUMBER: 21
LOCATION: 176298



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	10.6	10.6
6	13.7	23.1
9	11.5	13.6
12	8.1	5.6
15	6.1	4.3
18	5.1	4.0
21	4.7	4.7
24	4.3	4.1
27	4.0	3.8
30	3.8	3.6
33	3.7	3.7
36	3.6	3.2
39	3.7	3.9
42	3.7	3.7
45	3.7	3.7

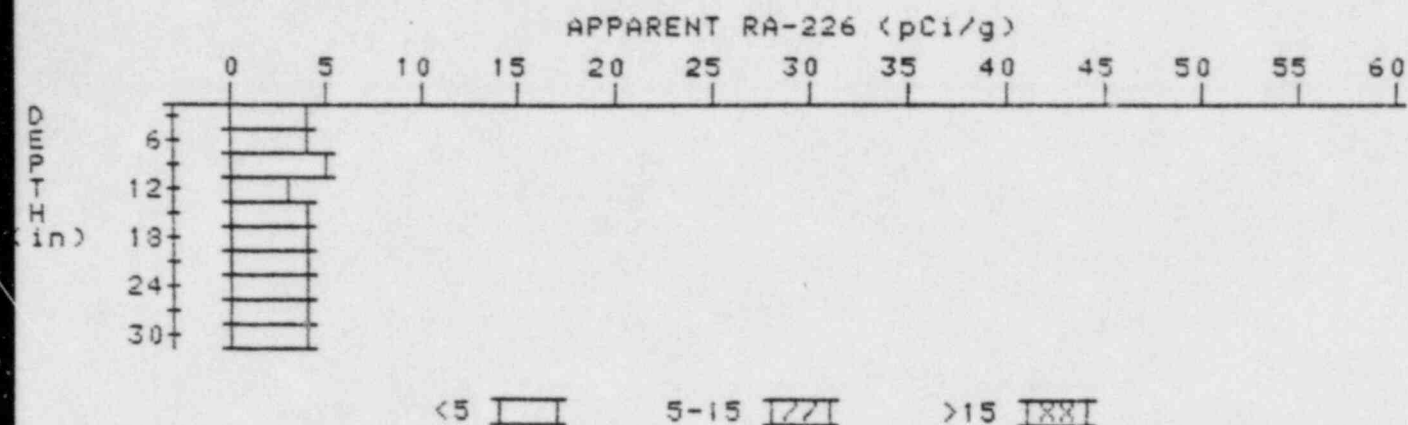
APPARENT RADIUM-226 CONCENTRATION 23

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-09699-RS

HOLE NUMBER: 23

LOCATION: 183275



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.4	4.4
6	4.3	4.3
9	4.2	4.6
12	3.9	3.4
15	3.9	3.9
18	3.9	3.9
21	3.9	3.7
24	4.0	4.4
27	3.9	3.7
30	3.9	3.9

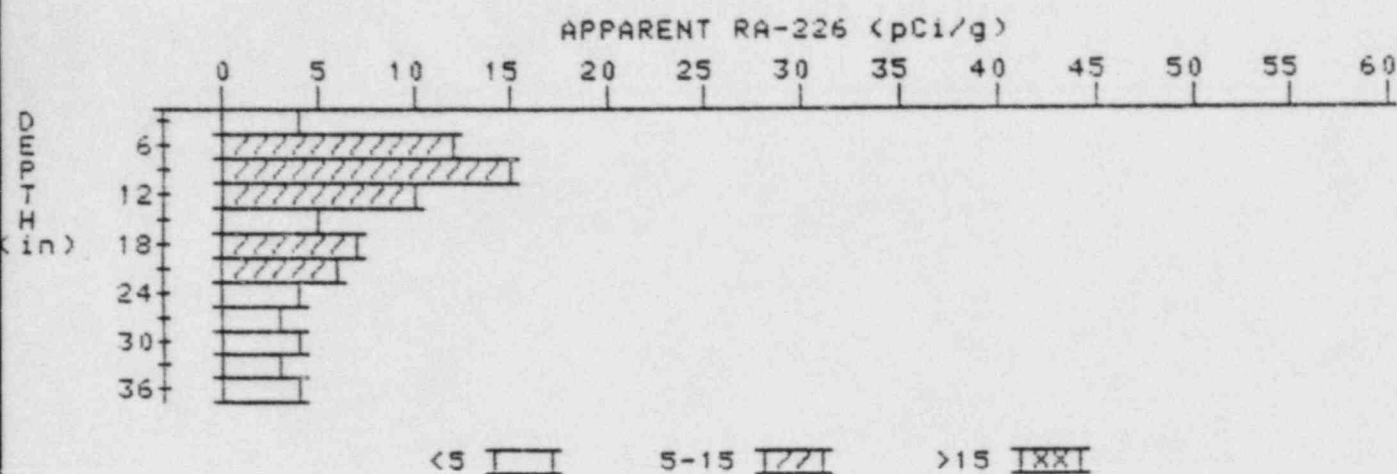
APPARENT RADIUM-226 CONCENTRATION 24

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-09699-RS

HOLE NUMBER: 24

LOCATION: 183292

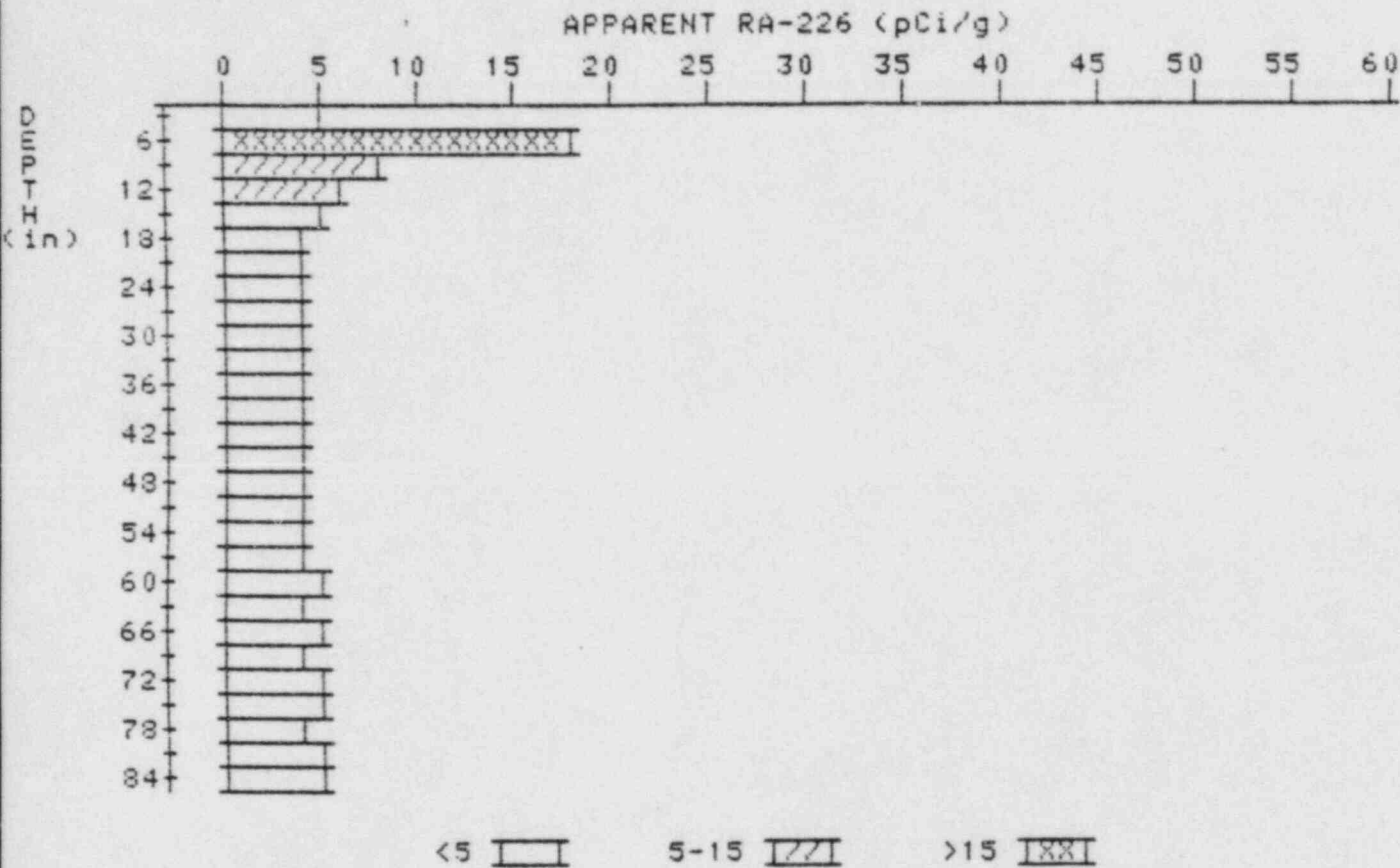


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	8.0	8.0
6	9.9	12.0
9	10.6	14.7
12	9.0	9.5
15	7.1	4.8
18	6.5	6.7
21	5.8	6.3
24	4.8	4.3
27	4.1	3.4
30	3.8	3.6
33	3.6	3.2
36	3.6	3.6

APPARENT RADIUM-226 CONCENTRATION 25

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-09699-RS
HOLE NUMBER: 25
LOCATION: 190240

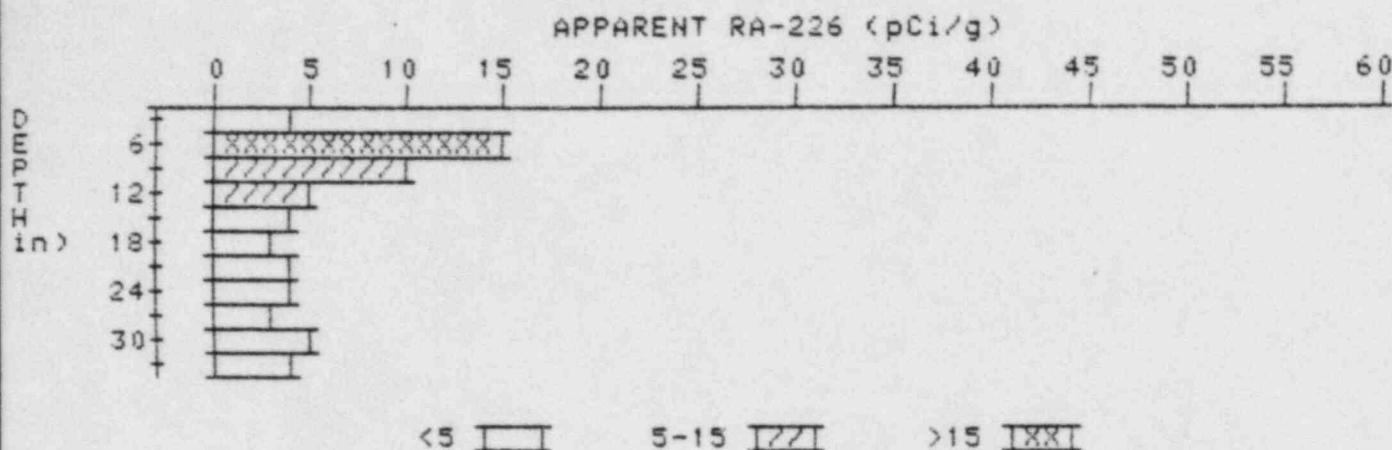


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	15.1	15.1
6	13.7	17.6
9	10.1	8.1
12	7.6	6.2
15	5.9	4.7
18	4.9	3.8
21	4.5	4.1
24	4.3	4.3
27	4.1	3.9
30	4.0	3.8
33	4.0	4.0
36	4.0	3.8

39	4.1	4.5
42	4.0	3.6
45	4.1	4.5
48	4.0	3.6
51	4.1	4.1
54	4.2	4.2
57	4.3	4.3
60	4.4	4.6
63	4.4	4.2
66	4.5	4.7
69	4.5	4.3
72	4.6	4.8
75	4.6	4.8
78	4.5	4.3
81	4.5	4.5
84	4.5	4.5

APPARENT RADIUM-226 CONCENTRATION 27 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-09699-RS
HOLE NUMBER: 27
LOCATION: 195250



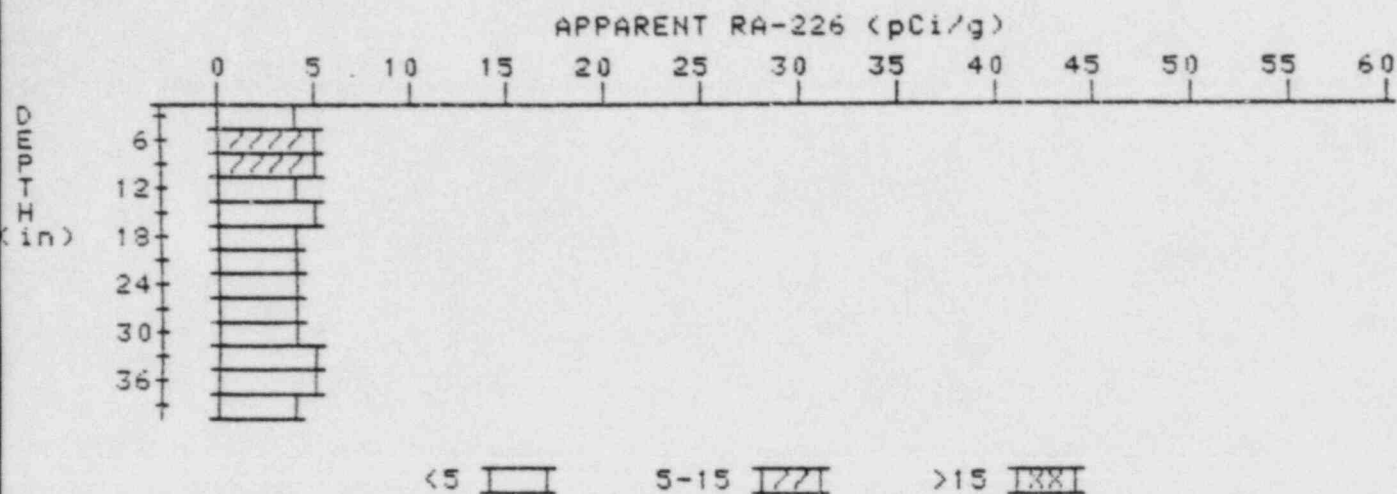
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	11.6	11.6
6	11.6	15.3
9	9.5	10.2
12	7.0	5.4
15	5.4	4.2
18	4.5	3.3
21	4.3	4.3
24	4.1	4.1
27	3.9	3.2
30	4.1	4.8
33	3.9	3.9

APPARENT RADIUM-226 CONCENTRATION 30 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-09699-RS

HOLE NUMBER: 30

LOCATION: 210300



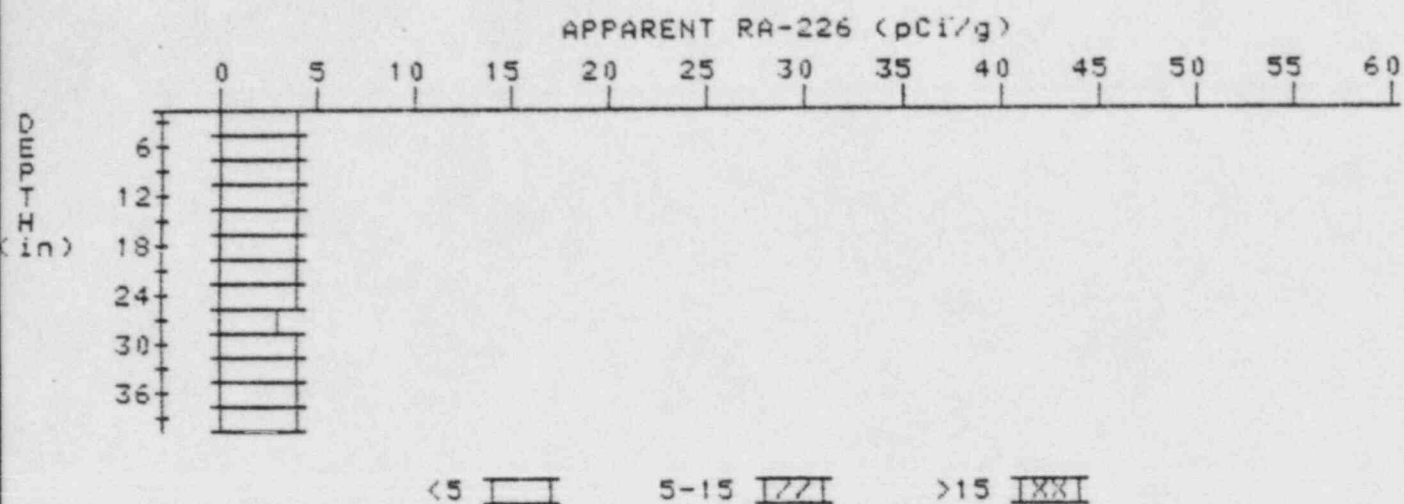
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.4	3.4
6	4.2	5.1
9	4.5	5.2
12	4.4	4.0
15	4.5	4.9
18	4.4	4.4
21	4.3	4.3
24	4.2	3.8
27	4.3	4.3
30	4.4	4.4
33	4.5	4.7
36	4.5	4.7
39	4.4	4.4

APPARENT RADIUM-226 CONCENTRATION 31 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-09699-RS

HOLE NUMBER: 31

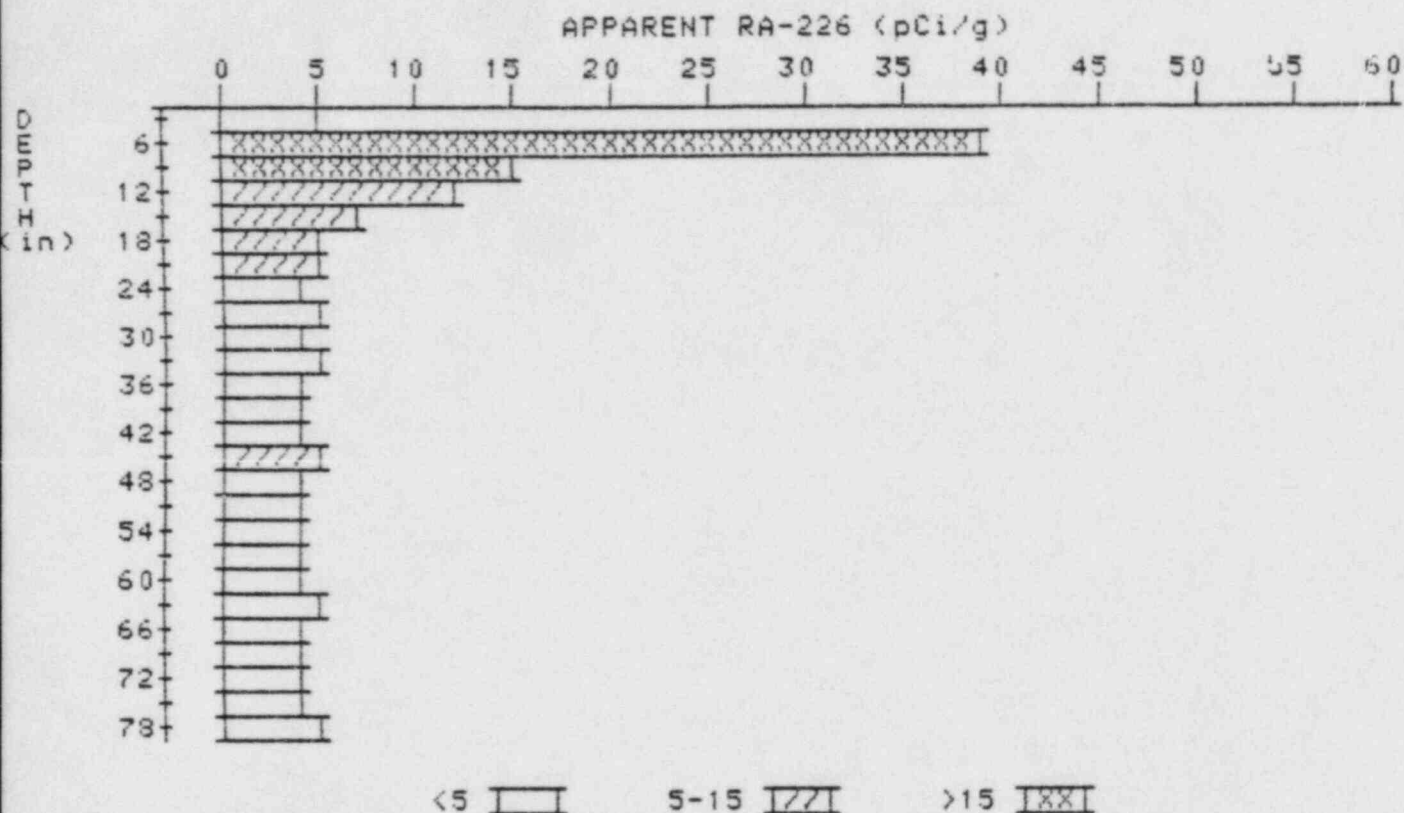
LOCATION: 214260



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.4	3.4
6	3.8	4.2
9	4.0	4.2
12	4.1	4.3
15	4.1	4.1
18	4.1	4.5
21	3.9	3.5
24	3.9	4.1
27	3.8	3.4
30	3.9	4.1
33	3.9	3.9
36	3.9	4.1
39	3.8	3.8

APPARENT RADIUM-226 CONCENTRATION 32 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-09699-RS
HOLE NUMBER: 32
LOCATION: 220220



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	34.7	34.7
6	30.3	39.0
9	21.0	15.5
12	14.8	11.8
15	10.3	7.1
18	7.6	5.5
21	6.1	5.0
24	5.2	4.1
27	4.9	4.9
30	4.6	4.2
33	4.5	4.5
36	4.4	4.4
39	4.3	4.3

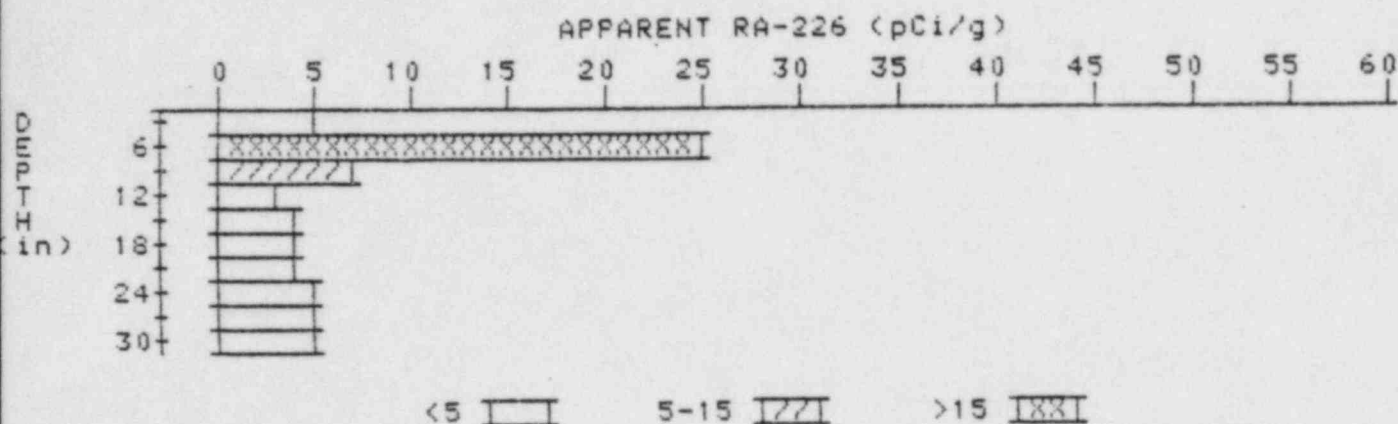
42	4.2	3.7
45	4.4	5.1
48	4.2	3.8
51	4.2	4.2
54	4.2	4.0
57	4.3	4.5
60	4.3	4.1
63	4.4	4.6
66	4.4	4.4
69	4.4	4.4
72	4.4	4.4
75	4.4	4.2
78	4.5	4.5

APPARENT RADIUM-226 CONCENTRATION 33 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-09699-RS

HOLE NUMBER: 33

LOCATION: 225285



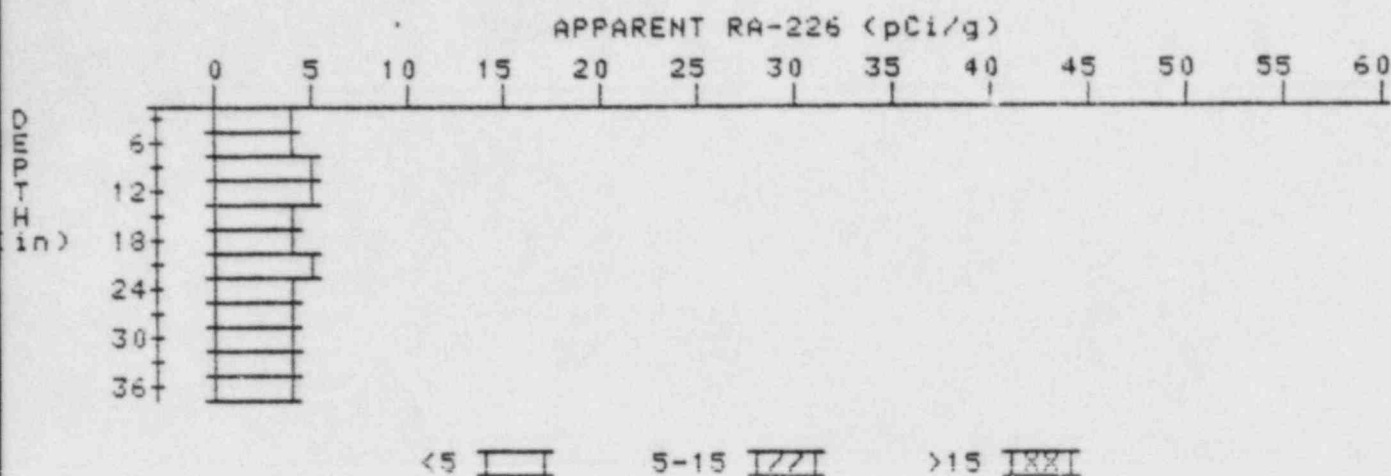
Depth (in)	Apparent Radium-226 (pCi/g)	Apparent Radium-226 (pCi/g)
	Undeconvolved	Deconvolved
3	14.5	14.5
6	15.1	25.4
9	9.9	6.5
12	6.6	3.0
15	5.3	4.1
18	4.7	4.0
21	4.5	4.1
24	4.5	4.5
27	4.5	4.5
30	4.5	4.5

APPARENT RADIUM-226 CONCENTRATION 39 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-09699-RS

HOLE NUMBER: 39

LOCATION: 255216



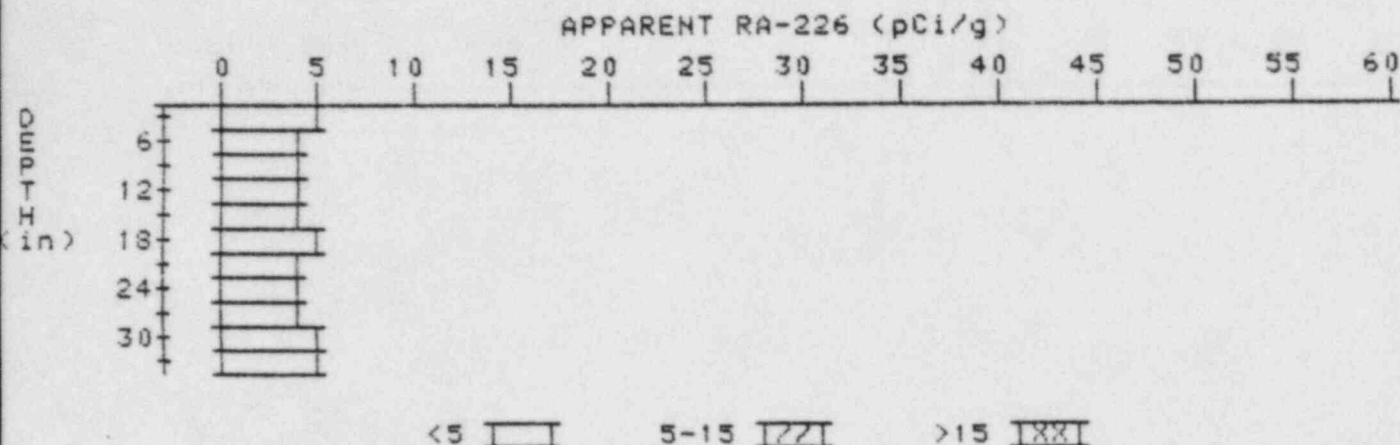
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.5	3.5
6	3.9	3.9
9	4.3	4.8
12	4.4	4.8
15	4.3	4.3
18	4.2	3.8
21	4.3	4.7
24	4.2	4.2
27	4.1	3.9
30	4.1	4.3
33	4.0	3.8
36	4.0	4.0

APPARENT RADIUM-226 CONCENTRATION 40 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-09699-RS

HOLE NUMBER: 40

LOCATION: 255285



Depth (in)	Apparent Radium-226 (pCi/g)	Apparent Radium-226 (pCi/g)
	Undeconvolved	Deconvolved
3	4.0	4.0
6	4.2	4.4
9	4.3	4.5
12	4.3	4.3
15	4.3	4.3
18	4.3	4.7
21	4.1	3.6
24	4.2	4.2
27	4.3	4.1
30	4.5	4.7
33	4.6	4.6