RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-07866-RS
ADDRESS: 134 MIRIAM AVENUE

MAY 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

BENDIX FIELD ENGINEERING CORPORATION
P.O. Box 1569
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DATE May 23, 1985

REA07866:REA-505

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

The location, DOE ID No. GJ-07866-RS, is a single-family residence located at 134 Miriam 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 contaminated 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, 106 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is $6,399. Remedial action on this property will take approximately 10 days to complete.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 134 Miriam Avenue, Grand Junction, Colorado

Zoning: Single-family residence (RSF8)

Lot Size: Approximately 12,800 sf (0.3 acres)

Legal Description: Lot 7, Block 5, Artesia Heights Replat, Sec 25, 1S, 1W, City of Grand Junction, County of Mesa, State of Colorado.

Point of Reference: This property is located approximately 1 mile south 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:	None

Bordering Properties:

North:	Single-family residence
South:	Single-family residence
East:	Alley
West:	Miriam Avenue

2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-story residence
Size:	Approximately 1,900 sf
Construction Date:	1955
Construction:	Wood-frame with stucco exterior
Foundation:	Monolithic slab-on-grade
Footing Depth:	Approximately 12" to bottom of footing from grade
Basement:	None
Crawl Space:	None
Condition:	Good

Other Structures:

Type:	Storage shed
Size:	Approximately 167 sf
Construction:	Wood-frame
Foundation:	Concrete blocks on grade
Condition:	Fair

Improvements or Attachments to Structure:

Additions:	An enclosed porch was added to the northeast side of the structure
Porches:	
Type:	Wood-frame with concrete floor
Size:	Approximately 259 sf
Location:	Northeast side of the structure
Patios:	
Type:	Concrete
Size:	Approximately 232 sf
Location:	West side of the structure
Driveways:	
Type:	Gravel parking area
Location:	From Miriam Avenue to chain link fence
Sidewalks:	
Type:	Concrete
Location:	On north, west, south, and portion of east side of primary structure
Fences:	
Type:	Chain link and wood
Location:	Around perimeter of the yard, northeast side is wood
General Remarks:	The property is well landscaped. A dog kennel with a chain link fence is located in the south portion of the lot. A cellar is located near the southeast portion of the property. 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-07866-RS on March 7, 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 on the southern half of the 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, and deconvolution graphs are included in the Appendix (Section 6.0).

3.2 Gamma Exposure-Rate Surveys

3.2.1 Exterior Findings

Background Readings: 11 to 14 uR/h
Highest Outside Gamma Reading (HOG): 44 uR/h

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

3.2.2 Interior Findings

Background Readings: 10 to 13 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 3.3 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)

The working level was not assessed by CDH. No 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 this figure, areas recommended for remedial action that contain identified residual radioactive materials are:

(AREA A) An isolated deposit in the southwest corner of the property is contaminated to a depth of 6 inches (approximately 21 sf).

(AREA B) On the south and west fence lines there are two spots of contamination. The depth of contamination is 12 inches (approximately 24 sf).

(AREA C) Midway along the west fence line contamination extends to a depth of 9 inches (approximately 140 sf).

(AREA D) Adjacent to the south property line contamination extends to a depth of 6 inches (approximately 50 sf).

(AREA E) Southwest of the primary structure the depth of contamination is 12 inches (approximately 40 sf).

(AREA F) South of the south sidewalk, contamination in the lawn extends to a depth of 18 inches (approximately 160 sf).

(AREA G) A small deposit of contamination exists between the south sidewalk and south garden. The depth of contamination is 6 inches (approximately 50 sf).

(AREA H) The middle portion of the south yard, adjacent to the fence line, there is contamination to a depth of 15 inches (approximately 586 sf).

(AREA I) The majority of the garden in the south yard is contaminated to a depth of 12 inches (approximately 235 sf).

(AREA J) Near the southeast corner of the primary structure, contamination extends to a depth of 12 inches (approximately 16 sf).

(AREA K) Near the southeast corner of the sidewalk, contamination extends to a depth of 12 inches (approximately 45 sf).

(AREA L) The lawn in the southeast portion of the yard is contaminated to a depth of 3 inches (approximately 255 sf).

(AREA M) East of the primary structure, contamination in the lawn extends to a depth of 12 inches (approximately 75 sf).

(AREA N) East of the primary structure, a deposit is contaminated to a depth of 18 inches (approximately 78 sf).

(AREA O) The soil in the fenced dog yard is contaminated to a depth of 18 inches (approximately 204 sf).

(AREA P) In the middle of the garden a point source is contaminated to a depth of 6 inches (approximately 4 sf).

(AREA Q) Near the southeast corner of the property there is contamination to a depth of 12 inches (approximately 304 sf).

(AREA R) The soil in the garden, east of the primary structure, is contaminated to a depth of 9 inches (approximately 400 sf).

(AREA S) The soil in the garden, adjacent to the northeast corner of the yard is contaminated to a depth of 6 inches (approximately 226 sf).

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-07866-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.

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 $6,399.

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

Owner preference is to have the remedial action done in the fall.

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
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Table 3.3	Summary of Interior Gamma Exposure Rates
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Figure 3.5	Exterior Estimated Extent of Contamination

Official Survey Report
Memo of Understanding
Team Leader Notes
Deconvolution Graphs (Apparent Radium-226 Concentration)

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
2	143270	00	DS	1.4		*	Water meter
		03	TC	3.6		*	DC = 0 inches
		06	TC	3.9		*	
		09	TC	4.2		*	
		12	TC	4.3		*	
		15	TC	4.3		*	
		18	TC	4.2		*	
		21	TC	4.2		*	
		24	TC	4.1		*	
		27	TC	4.1		*	
		30	TC	4.0		*	
		33	TC	3.9		*	
3	151222	00	DS	2.6		*	South fence line
		06	DS	2.0		*	DC = 6 inches
		12	DS	1.6		*	
4	164230	00	DS	3.6		*	West fence line
		06	DS	3.8		*	DC = 12 inches
		12	DS	2.1		*	
		18	DS	1.8		*	
5	168257	00	DS	4.3		*	West fence line
		06	DS	3.1		*	DC = 9 inches
		03	TC	5.0		*	Based on the
		06	TC	4.8		*	deconvolution graph
		09	TC	4.7		*	
		12	TC	4.3		*	
		15	TC	4.2		*	
		18	TC	4.0		*	
		21	TC	3.9		*	
		24	TC	3.9		*	
		27	TC	3.9		*	
		30	TC	3.9		*	
		33	TC	3.8		*	
6	169223	00	DS	3.6		*	South fence line
		06	DS	3.1		*	DC = 12 inches
		12	DS	2.2		*	
7	182224	00	DS	3.2		*	South fence line
		06	DS	1.6		*	DC = 6 inches

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	In Situ Ra-226 (pCi/g) Spectr.	Chem Ra-226 (pCi/g)	Comments
8	189253	00	DS	2.4		*	Water line
		03	TC	3.6		*	West of house
		06	TC	4.0		*	DC = 0 inches
		09	TC	4.2		*	
		12	TC	4.1		*	
		15	TC	4.0		*	
		18	TC	3.9		*	
		21	TC	3.9		*	
		24	TC	3.8		*	
		27	TC	3.8		*	
		30	TC	3.7		*	
		33	TC	3.7		*	
		36	TC	3.6		*	
		39	TC	3.7		*	
		42	TC	3.5		*	
		45	TC	3.6		*	
		48	TC	3.5		*	
		51	TC	3.6		*	
		54	TC	3.7		*	
		57	TC	3.6		*	
		60	TC	3.5		*	
		63	TC	3.4		*	
		66	TC	3.2		*	
		69	TC	2.9		*	
		72	TC	2.4		*	
9	190230	00	DS	1.7		*	Rock garden
		06	DS	2.4		*	DC = 12 inches
		12	DS	1.3		*	
		00-06	SS			4.7	
10	191247	00	DS	3.8		*	Southwest corner
		06	DS	3.7		*	of house
		12	DS	<1.0		*	DC = 12 inches
11	193245	00	DS	3.1		*	Sewer line
		03	TC	3.9		*	DC = 0 inches
		06	TC	4.1		*	
		09	TC	4.1		*	
		12	TC	4.1		*	
		15	TC	4.1		*	
		18	TC	4.0		*	
		21	TC	4.0		*	
		24	TC	3.8		*	

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
11	193245	27	TC	3.9		*	
		30	TC	3.9		*	
		33	TC	3.8		*	
		36	TC	3.8		*	
		39	TC	3.7		*	
		42	TC	3.7		*	
		45	TC	3.7		*	
		48	TC	3.8		*	
		51	TC	3.7		*	
		54	TC	3.8		*	
		57	TC	3.8		*	
		60	TC	3.7		*	
		63	TC	3.8		*	
		66	TC	3.8		*	
		69	TC	3.8		*	
		72	TC	3.8		*	
12	202234	00	DS	4.9		*	Septic tank
		03	TC	6.7		*	DC = 18 inches
		06	TC	7.9		*	Based on the
		09	TC	8.0		*	deconvolution graph
		12	TC	7.2		*	
		15	TC	6.2		*	
		18	TC	5.4		*	
		21	TC	5.1		*	
		24	TC	5.3		*	Auger refusal
13	209251	00	DS	1.1		*	Gas meter
		06	DS	1.7		*	DC = 0 inches
		12	DS	<1.0		*	
		18	DS	1.5		*	
		24	DS	<1.0		*	
		27	DS	<1.0		*	
14	211242	00	DS	4.1		*	South of house
		06	DS	1.6		*	DC = 6 inches
		00-06	SS			7.1	
15	214223	00	DS	15.7		*	South fence line
		03	TC	9.5		*	DC = 15 inches
		06	TC	10.8		*	Based on all
		09	TC	9.3		*	data available
		12	TC	7.7		*	

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
15	214223	15	TC	6.0		*	
		18	TC	5.1		*	
		21	TC	4.7		*	
		24	TC	4.5		*	
		27	TC	4.3		*	
		30	TC	4.2		*	
		33	TC	4.1		*	
		36	TC	4.2		*	
16	219251	00	DS	1.2		*	South foundation
		06	DS	1.6		*	DC = 0 inches
		00-06	SS			2.3	
17	228236	00	DS	2.4		*	South of house
		06	DS	2.3		*	DC = 12 inches
		12	DS	1.1		*	
		00-06	SS			6.1	
18	232249	00	DS	5.8		*	Southeast corner
		03	TC	6.1		*	of house
		06	TC	6.2		*	DC = 12 inches
		09	TC	5.5		*	Based on the
		12	TC	4.9		*	deconvolution graph
		15	TC	4.4		*	
		18	TC	4.2		*	
		21	TC	4.1		*	
		24	TC	4.1		*	
		27	TC	4.1		*	
		30	TC	4.1		*	
		33	TC	4.0		*	
		36	TC	4.0		*	
		39	TC	3.9		*	
19	234242	00	DS	3.7		*	Southeast corner
		06	DS	3.2		*	of house
		12	DS	1.9		*	DC = 12 inches
		00-06	SS			7.7	
20	240290	00	DS	<1.0		*	East of house
		00-06	SS			1.8	Background
		03	TC	3.5		*	DC = 0 inches
		06	TC	3.7		*	
		09	TC	3.8		*	

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
20	240290	12	TC	3.8		*	
		15	TC	3.8		*	
		18	BH	3.8	1.1	*	
		21	TC	3.8		*	
		24	TC	3.8		*	
		27	TC	3.8		*	
		30	BH	3.8	1.2	*	
		33	TC	3.7		*	
21	241233	00	DS	3.6		*	South of house
		03	TC	4.5		*	DC = 3 inches
		06	TC	4.5		*	Based on all
		09	TC	4.3		*	data available
		12	TC	4.2		*	
		15	TC	4.1		*	
		18	TC	4.1		*	
		21	TC	4.1		*	
		24	TC	3.9		*	
		27	TC	3.9		*	
		30	TC	4.0		*	
		33	TC	3.9		*	
		36	TC	3.8		*	
		39	TC	3.9		*	
22	244258	00	DS	10.3		*	East of house
		03	TC	7.1		*	DC = 12 inches
		06	TC	8.3		*	Based on the
		09	TC	7.6		*	deconvolution graph
		12	TC	6.1		*	
		15	TC	5.2		*	
		18	TC	4.7		*	
		21	TC	4.5		*	
		24	TC	4.2		*	
		27	TC	4.2		*	
		30	TC	4.1		*	
		33	TC	4.1		*	
		36	TC	4.1		*	
		39	TC	4.0		*	
		42	TC	4.0		*	
23	246251	00	DS	6.2		*	West garden
		06	DS	3.1		*	DC = 18 inches
		12	DS	2.7		*	
		18	DS	1.2		*	

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
24	260226	00	DS	20.9		*	In dog kennel
		03	TC	12.9		*	DC = 18 inches
		06	TC	13.1		*	Based on all
		09	TC	11.2		*	data available
		12	TC	8.6		*	
		15	TC	6.7		*	
		18	TC	5.2		*	
		21	TC	4.6		*	
		24	TC	4.5		*	
		27	TC	4.4		*	
		30	TC	4.2		*	
25	270272	00	DS	3.2		*	Mid garden
		06	DS	1.9		*	DC = 6 inches
		12	DS	1.7		*	
26	272231	00	DS	5.5		*	Southeast of
		06	DS	4.2		*	property
		12	DS	1.9		*	DC = 12 inches
		18	DS	1.2		*	
27	275252	00	DS	3.5		*	West of shed
		06	DS	2.9		*	DC = 9 inches
		03	TC	4.8		*	Based on the
		06	TC	5.1		*	deconvolution graph
		09	TC	4.9		*	
		12	TC	4.5		*	
		15	TC	4.3		*	
		18	TC	4.2		*	
		21	TC	4.2		*	
		24	BH	4.0	1.2	*	
		27	TC	4.0		*	
		30	TC	4.1		*	
		33	TC	4.1		*	
		36	BH	3.9	1.3	*	
		39	TC	4.0		*	

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
28	283299	00	DS	3.4		*	North fence line
		06	DS	1.9		*	DC = 6 inches

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

Notes:
DC = Depth of Contamination
* = No Soil Sample Taken
[n] = Reading Taken n-Inches Above Floor or Ground
Date of Survey = 03-07-85
Team Leader = TC

Radium Concentrations at Interior Locations

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	In Situ Ra-226 (pCi/g) Spectr.	Chem Ra-226 (pCi/g)	Comments
1		00	DS	<1.0		*	Root cellar
		06	DS	<1.0		*	DC = 0 inches
		00-06	SS			1.7	

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

Notes:
DC = Depth of Contamination
* = No Soil Sample Taken
[n] = Reading Taken n-Inches Above Floor or Ground
Date of Survey = 03-07-85
Team Leader = TC

Table 3.3
Summary of Interior Gamma Exposure Rates

DOE ID No. GJ-07866-RS 134 Miriam Avenue

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)
PRIMARY STRUCTURE	*	*	*	*	10-13	*
CELLAR	01	16-16	16	01	17-17	17
SHED	*	*	*	*	10-12	*

* The CDH and ORNL data indicated the absence of interior contamination at this property. This information was investigated by performing a walking gamma scan. These areas and the ranges of gamma measurements are shown in Appendix Figure 3.3. The exposure rate in the cellar is also shown in Appendix Figure 3.3.

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-07866-RS

AREA	CALCULATIONS(ft)				SF		DEPTH(ft)		CF	CUBIC YARDS
A	7	x	3	=	21	x	0.5	=	11	
B	2 (4x3)			=	24	x	1.0	=	24	
C	24	x	5	=	120					
	5	x	4	=	20					
					140	x	0.8	=	112	
D	10	x	5	=	50	x	0.5	=	25	
E	8	x	5	=	40	x	1.0	=	40	
F	8	x	20	=	160	x	1.5	=	240	
G	10	x	5	=	50	x	0.5	=	25	
H	62	x	9	=	558					
	7	x	4	=	28					
					586	x	1.3	=	762	
I	28	x	7	=	196					
	13	x	3	=	39					
					235	x	1.0	=	235	
J	4	x	4	=	16	x	1.0	=	16	
K	9	x	5	=	45	x	1.0	=	45	
L	15	x	11	=	165					
	10	x	5	=	50					
	2 (4x5)			=	40					
					255	x	0.3	=	77	
M	5	x	15	=	75	x	1.0	=	75	
N	6	x	13	=	78	x	1.5	=	117	
O	17	x	12	=	204	x	1.5	=	306	
P	2	x	2	=	4	x	0.5	=	2	
Q	15	x	16	=	240					
	16	x	4	=	64					
					304	x	1.0	=	304	

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-07866-RS

AREA	CALCULATIONS(ft)				SF		DEPTH(ft)		CF	CUBIC YARDS
R	20	x	20	=	400	x	0.8	=	320	
S	32	x	3	=	96					
	13	x	10	=	130					
					226	x	0.5	=	113	
	TOTAL VOLUME - EXTERIOR				2,849		= 2,849/27	=		106

See Appendix Figure 3.5 For Areas

Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-07866-RS

Remove identified residual radioactive material		
92 cy @ $14.50/cy (machine-open)		$ 1,334
14 cy @ $44.00/cy (manual-open)		616
Remove/replace chain link fence		
138 ft @ $2.60/1f		359
Replace compacted roadbase		
13 cy @ $11.50/cy		150
Replace water-settled topsoil		
93 cy @ $9.50/cy		884
Replace sod		
2,025 sf @ $0.30/sf		608
Replace rose bush and tree		
5 ea @ $50.00/ea		250
	TOTAL EXTERIOR	$ 4,201
	TOTAL INTERIOR	0
	ACCESS CONTROL	250
	SUBTOTAL	$ 4,451
	CONTINGENCY @ 15%	668
	SUBTOTAL	$ 5,119
	CONTRACTOR OVERHEAD & PROFIT @ 25%	1,280
	GRAND TOTAL	$ 6,399

LR050885
REA07866/REA-505/LAJ

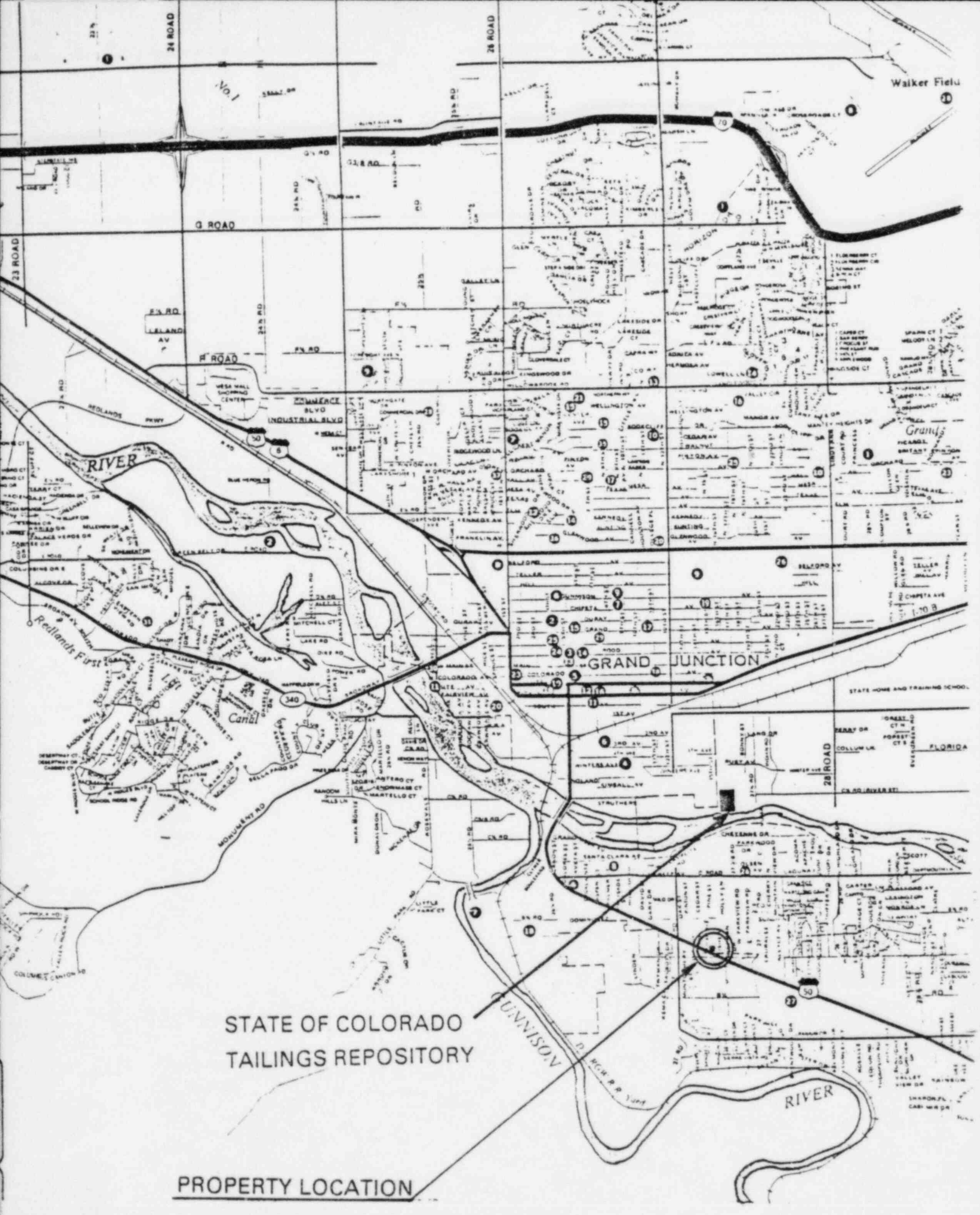
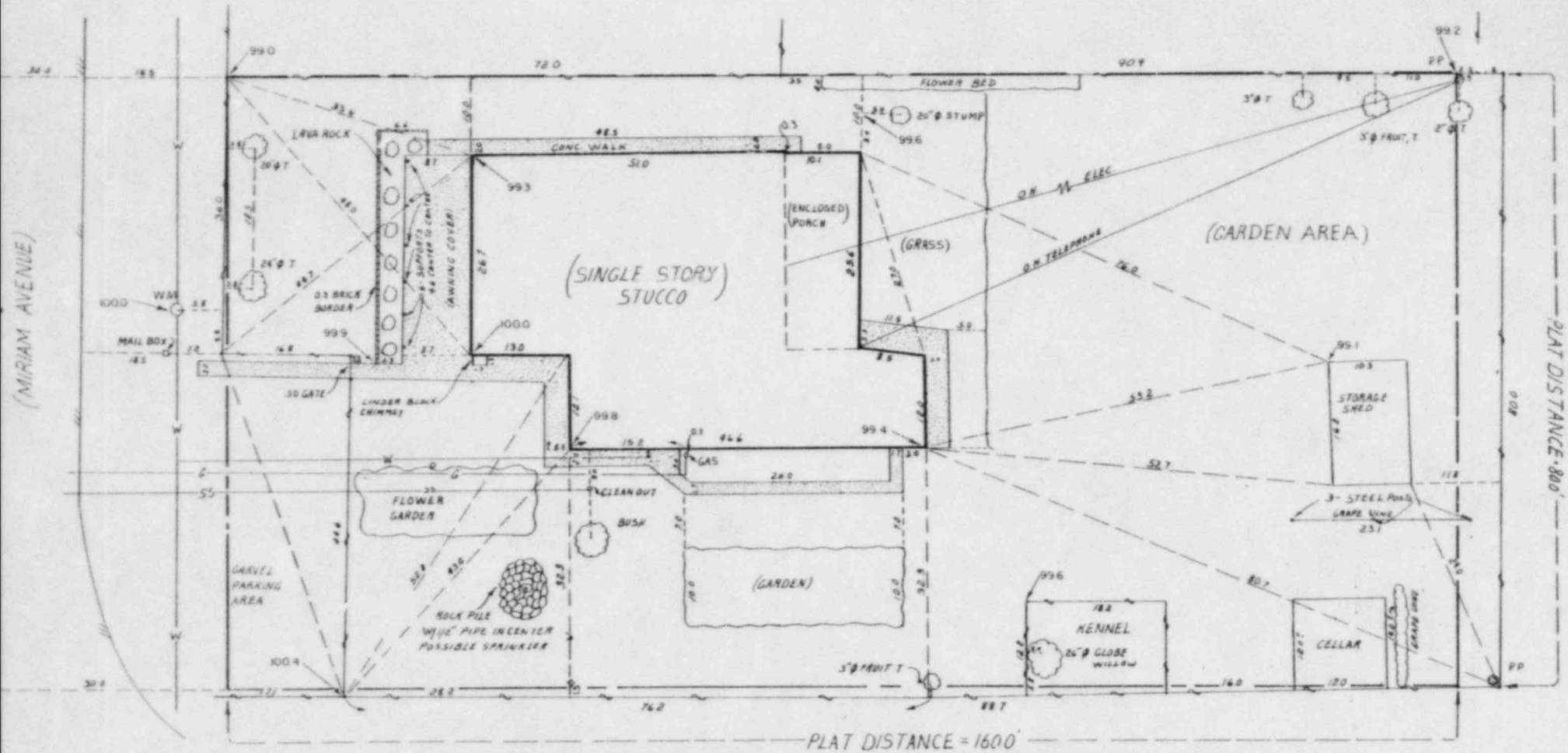


FIGURE 2.1
VICINITY MAP



LOT 7, BLK 5, ARTESIA HEIGHTS REPLAT, SEC 25, 1S, 1W

10' 5' 0 10' 20'

SCALE IN FEET

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.

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION AREA OFFICE, COLORADO		LOCATION NO. CJ-07866-RS
ADDRESS 134 MIRIAM AVE GRAND JUNCTION COLORADO		Rust Engineering Corporation Grand Junction Operations
OWNER ROBART D & K A HOGGE		TELE. 242-3089
TENENT "		TELE.
SURV. R L B	DRAFT. JAC	CK. CAF 3-1-85
DRAWING NO. 3-C-530-F1		SHEET 1 OF 1

FIGURE 2.2 SITE PLAN

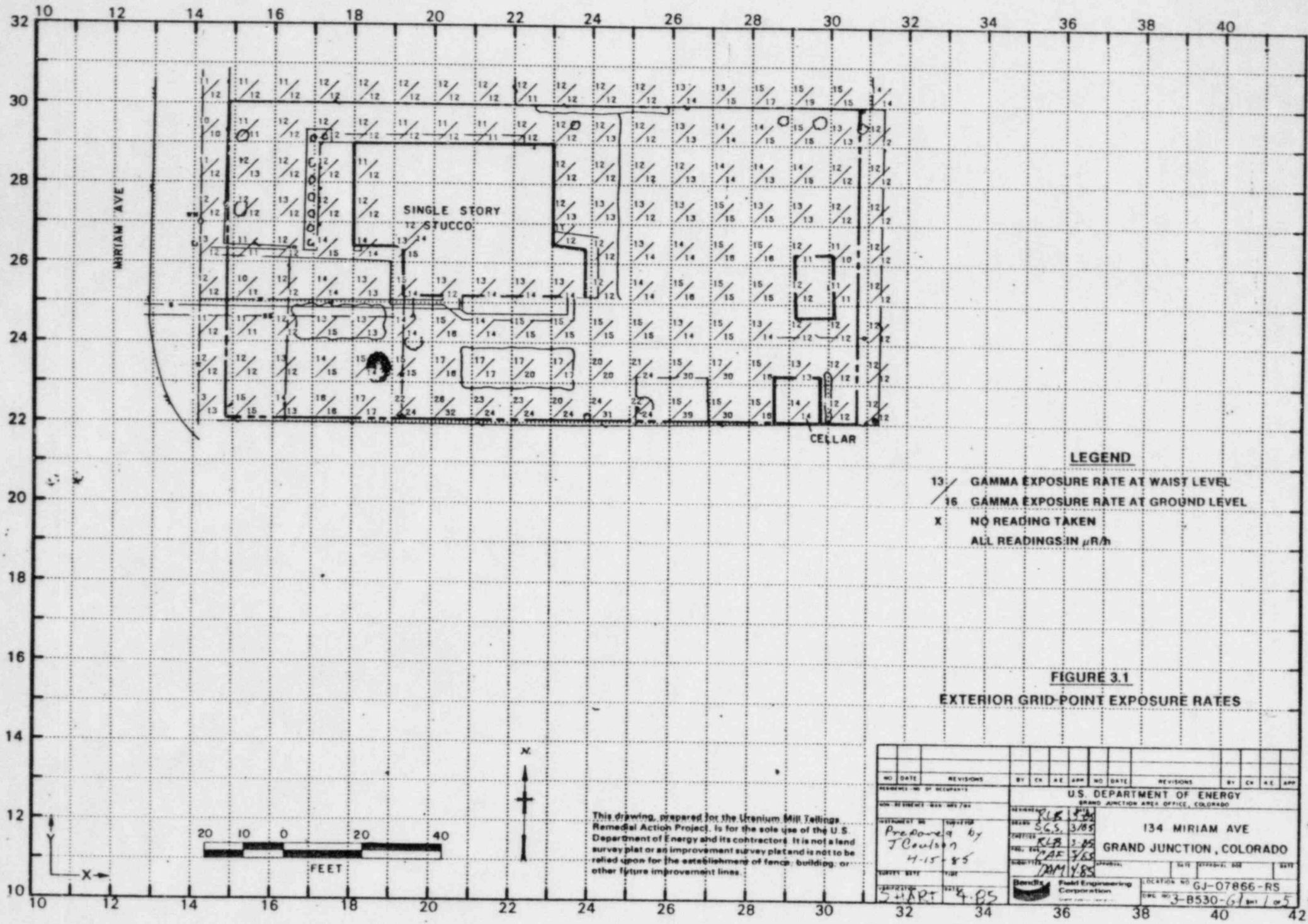


FIGURE 3.1

EXTERIOR GRID-POINT EXPOSURE RATES

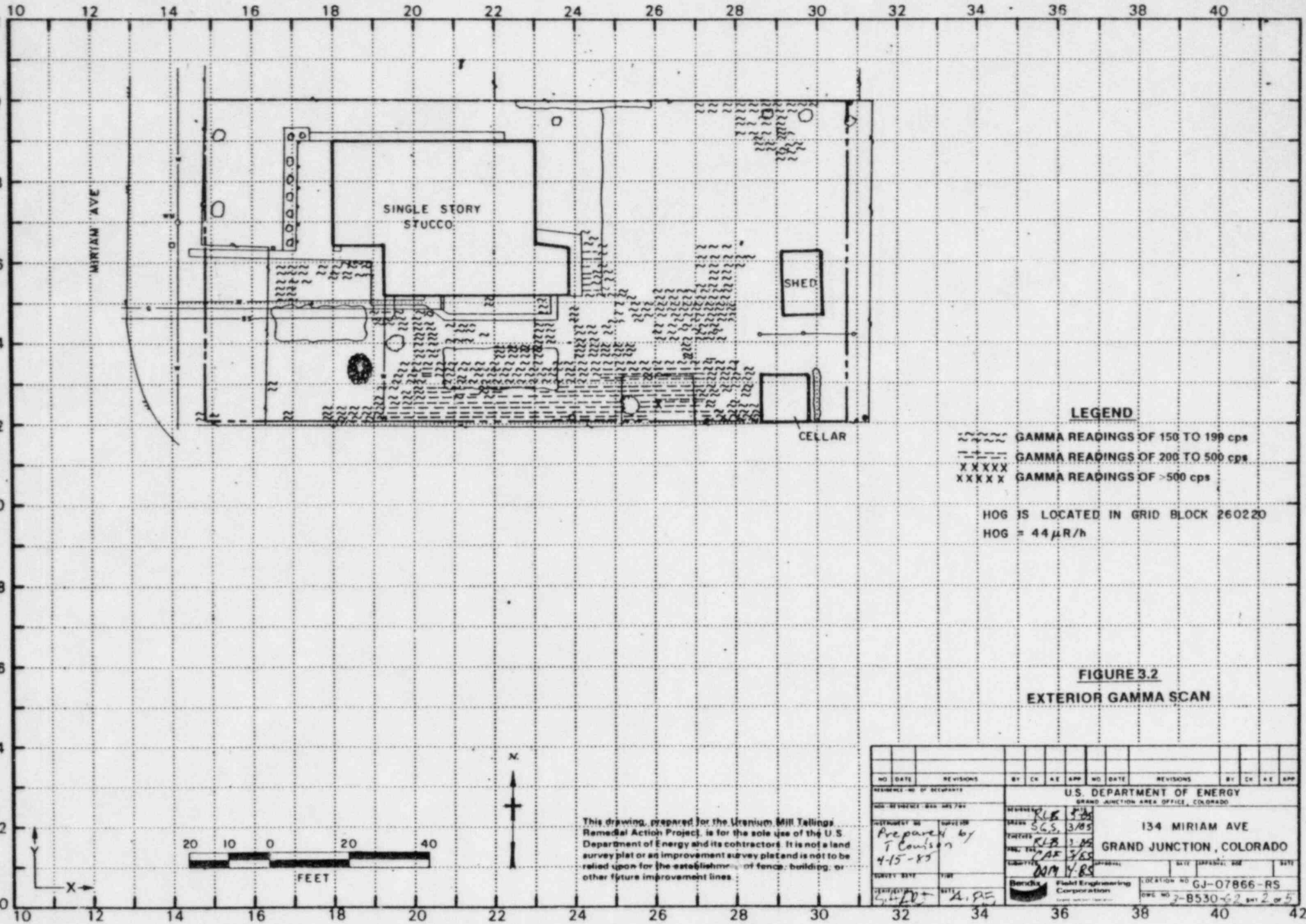


FIGURE 3.2

EXTERIOR GAMMA SCAN

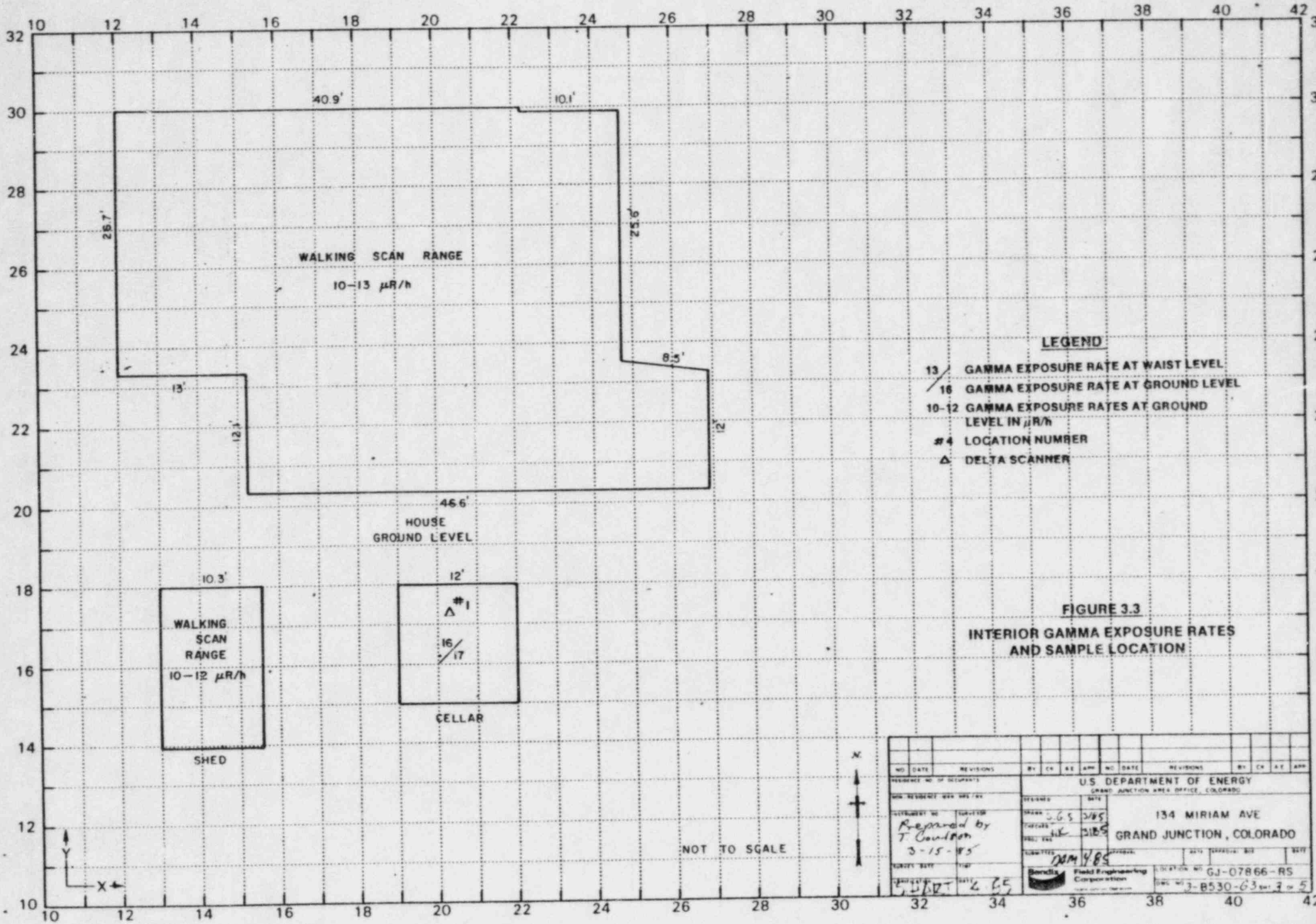


FIGURE 3.3

INTERIOR GAMMA EXPOSURE RATES AND SAMPLE LOCATION

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION AREA OFFICE, COLORADO

134 MIRIAM AVE
GRAND JUNCTION, COLORADO

Reviewed by T. Condron 3-15-85

Bendix Field Engineering Corporation

LOCATION NO. GJ-07866-RS

DWG NO. 3-B530-63 SHT 3 OF 5

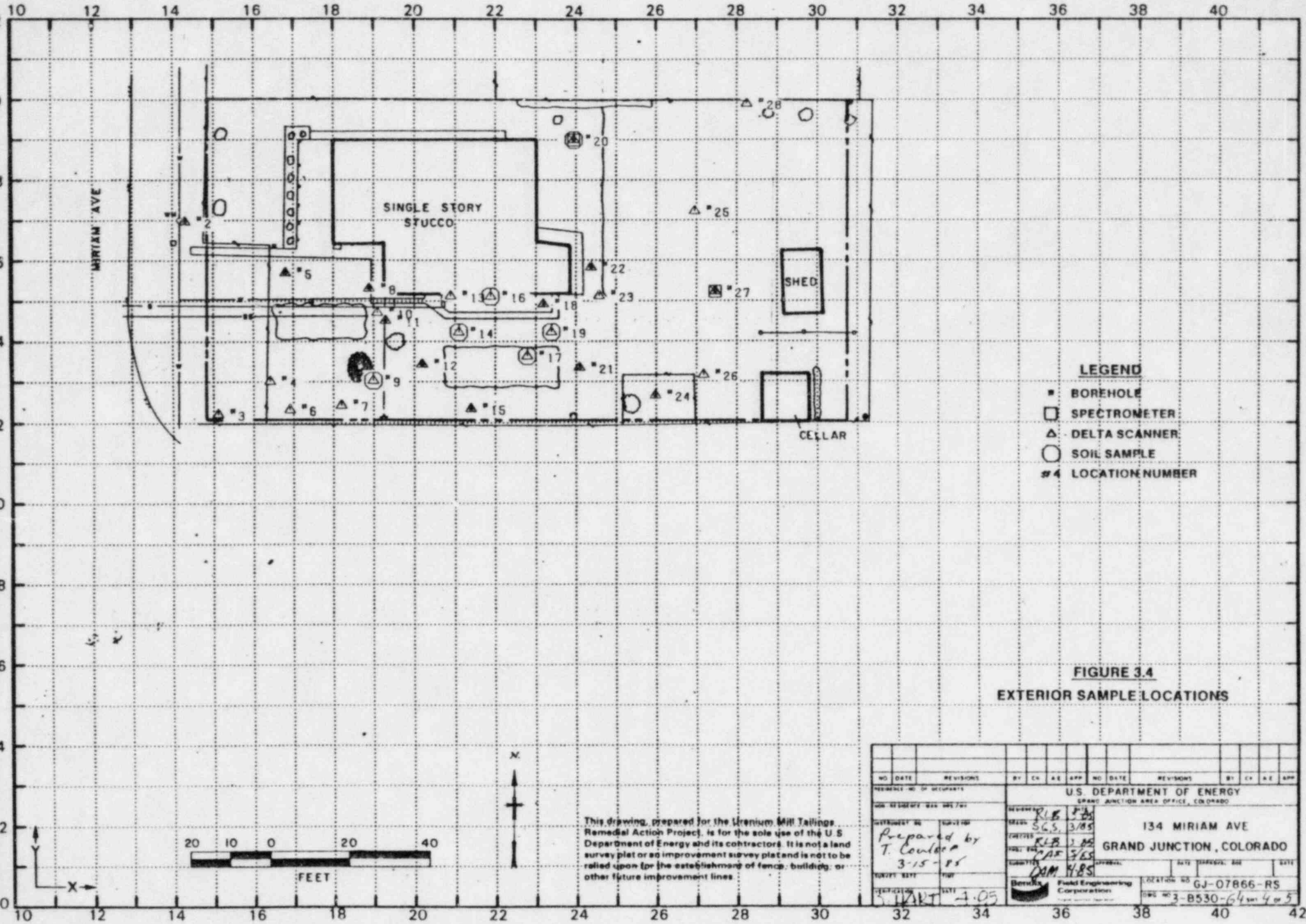


FIGURE 3.4

EXTERIOR SAMPLE LOCATIONS

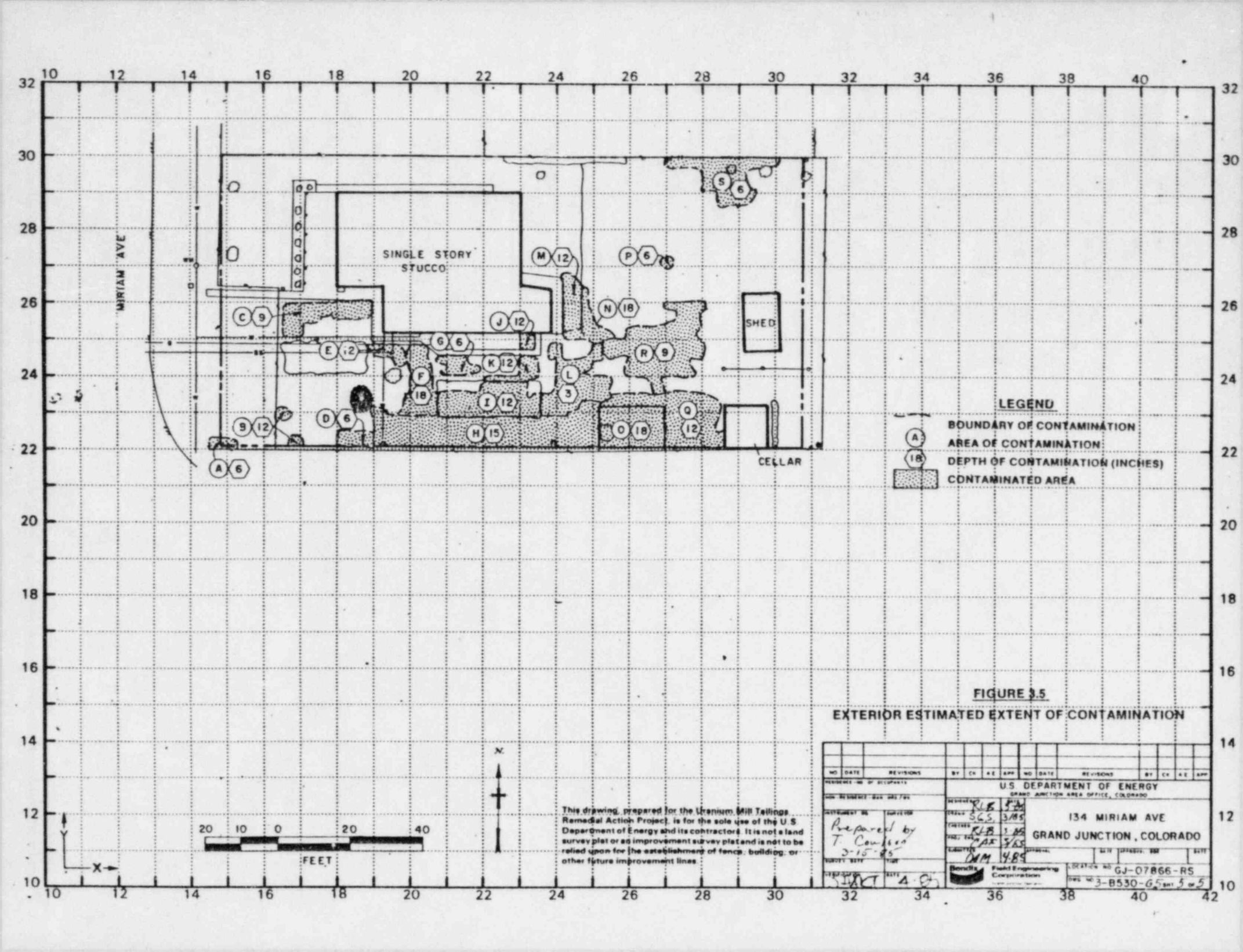


FIGURE 3.5

EXTERIOR ESTIMATED EXTENT OF CONTAMINATION

3/85

DOE ID NO. GJ-07866-RS Date April 15,1985

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

Official Survey Report

Property Address 134 Miriam Avenue

Property Owner Mr. and Mrs R.A. Hogge

Address of Owner (if different from above) _____

Report Prepared By T. Coulson

I. PRESENCE/ABSENCE OF RESIDUAL RADIOACTIVE MATERIALS

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

1 _X_ 1 Residual ractioactive materials found at the following locations:

1 _X_ 1 In open areas.

1 ___ 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 _X_ 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 = 17 uR/h
HOG = 44 uR/h

ALLIED Bendix Aerospace

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

April 23, 1985

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

Dear Jon:

This letter is a follow-up to the Technical Review on Department of Energy (DOE) Identification (ID) number GJ-07866-RS conducted on 28 March 1985.

The areas requiring additional work or comments are as follows:

1. The depth of contamination at Location 5, Area 'I', is 9-inches. This is based on the deconvolution graph.

2. The sign ">" (greater than) has been changed to "<" (lesser than) for Location 10.

3. The radium concentration table at Location 12 has been changed to read depth of contamination equals 18-inches.

4. This area is identified as Area 'B'. The garden in this area makes the outline confusing. I consulted with our technical advisor Dick Murri. Mr. Murri feels we are seeing shine on the deconvolution graph below 12-inches, therefore, the depth of contamination in Area 'B', has been determined to be 12-inches.

5. The radium concentration table has been changed to 12-inches for Location 17.

6. The depth of contamination in Area 'A' (232249), Estimated Extent of Contamination map is 12-inches based on the deconvolution graph.

7. In Area 'I' (283299), the depth of contamination is 6-inches.

8. Tailings have been rototilled into this garden area (270272). While investigating this area with a scintillometer, readings of 140 cps were obtained, however, a 3.2 pCi/g delta reading was obtained at surface.

9. Regarding Area 'C', again I consulted with our technical advisor Dick Murri. Mr. Murri feels we are seeing shine below the 15-inch level.

10. The septic tank was investigated with Location 12.

Sincerely,

Terry Coulson

Terry Coulson
RSD Survey Team

GJ-07866.TC:CDHLTR

INTERNAL
MEMORANDUM

Bendix Field Engineering Corporation
Grand Junction Projects Office

Date: March 12, 1985

To: Files

From: Terry Coulson

Subject: Team Leader Notes - GJ-07866-RS

Address: 134 Miriam Avenue

Homeowner: Mr. and Mrs. Robert D. Hogge

Occupancy: Two

Team Members

M. Heronema	C. Holmes
P. Hardy	B. Beltz
S. Larsen	S. Southern
M. Dexter	

Instruments

Delta Scintillometer - C-3935, C-3937
Total Count - C-3956, C-1062
Scintillometer - C-1208, C-1196, C-1127, C-1181, C-1185
Downhole Scintillometer - C-0498

Mr. and Mrs. Hogge are the present owners of this property and the sole residenets.

After gridding and scanning, contamination was found scattered throughout the southern half of this property with a small area on the northern border.

The utility lines were augered.

Scattered readings of 140 cps were received throughout the garden. The homeowner (Mr. Hogge) commented that they had used tailings as fill in the garden.

A walking scan was performed in the house, no high readings were obtained. A reading of 160 cps in the root cellar was investigated with a delta.

The technicians were reminded to use plastic bags on the probes.

Revisit

Date: March 12, 1985

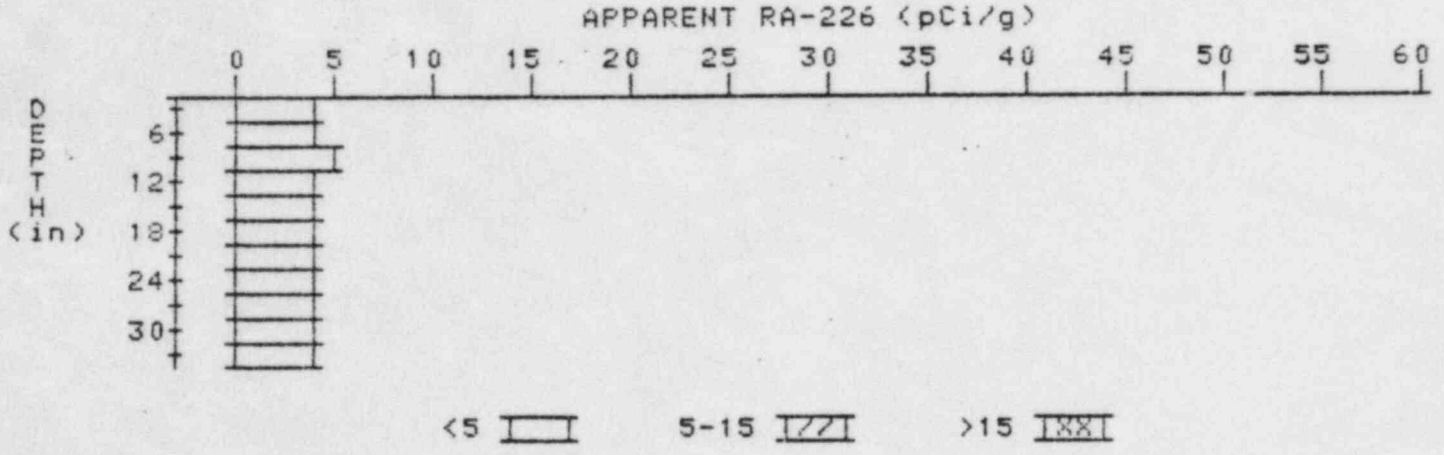
Additional data was taken in areas where readings of 140 cps were observed, and in a couple of areas where readings over 150 cps were found.

The data was added to the radium concentration table.

The homeowner (Mr. Hogge) indicated that the septic tank was located south of the house.

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-07866-RS
HOLE NUMBER: 2
LOCATION: 143270



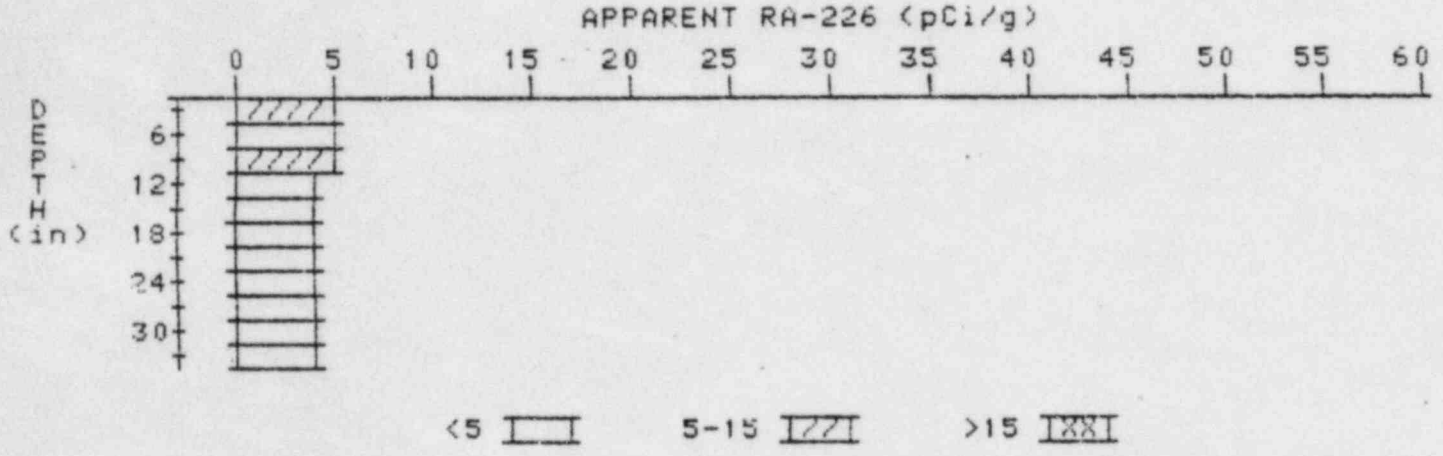
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.6	3.6
6	3.9	3.9
9	4.2	4.6
12	4.3	4.5
15	4.3	4.5
18	4.2	4.0
21	4.2	4.4
24	4.1	3.9
27	4.1	4.3
30	4.0	4.0
33	3.9	3.9

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

5

PROPERTY NUMBER: .GJ-07866-RS
HOLE NUMBER: 5
LOCATION: 168257

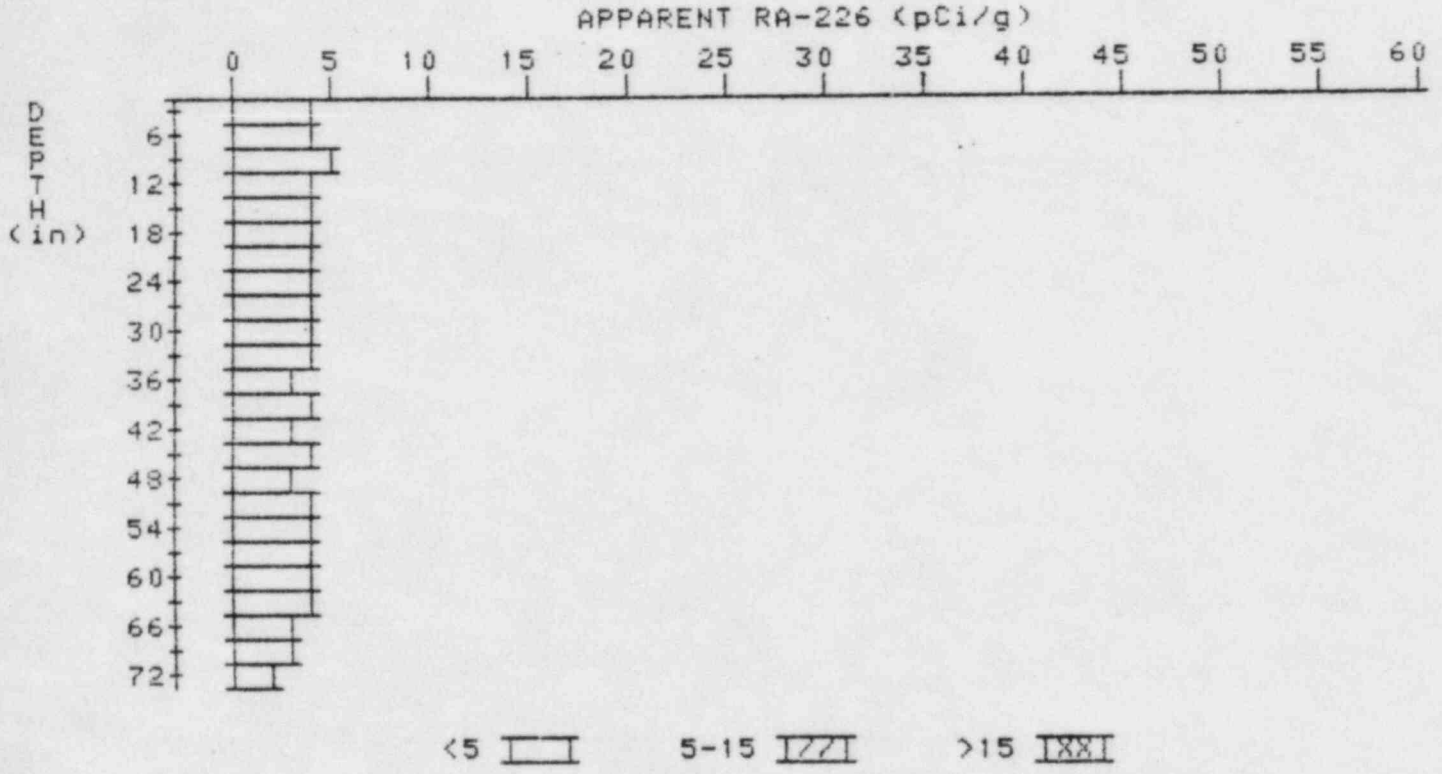


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.0	5.0
6	4.8	4.6
9	4.7	5.2
12	4.3	3.8
15	4.2	4.4
18	4.0	3.8
21	3.9	3.7
24	3.9	3.9
27	3.9	3.9
30	3.9	4.1
33	3.8	3.8

DECON V85.1(850117.1233)

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-07866-RS
HOLE NUMBER: 8
LOCATION: 189253

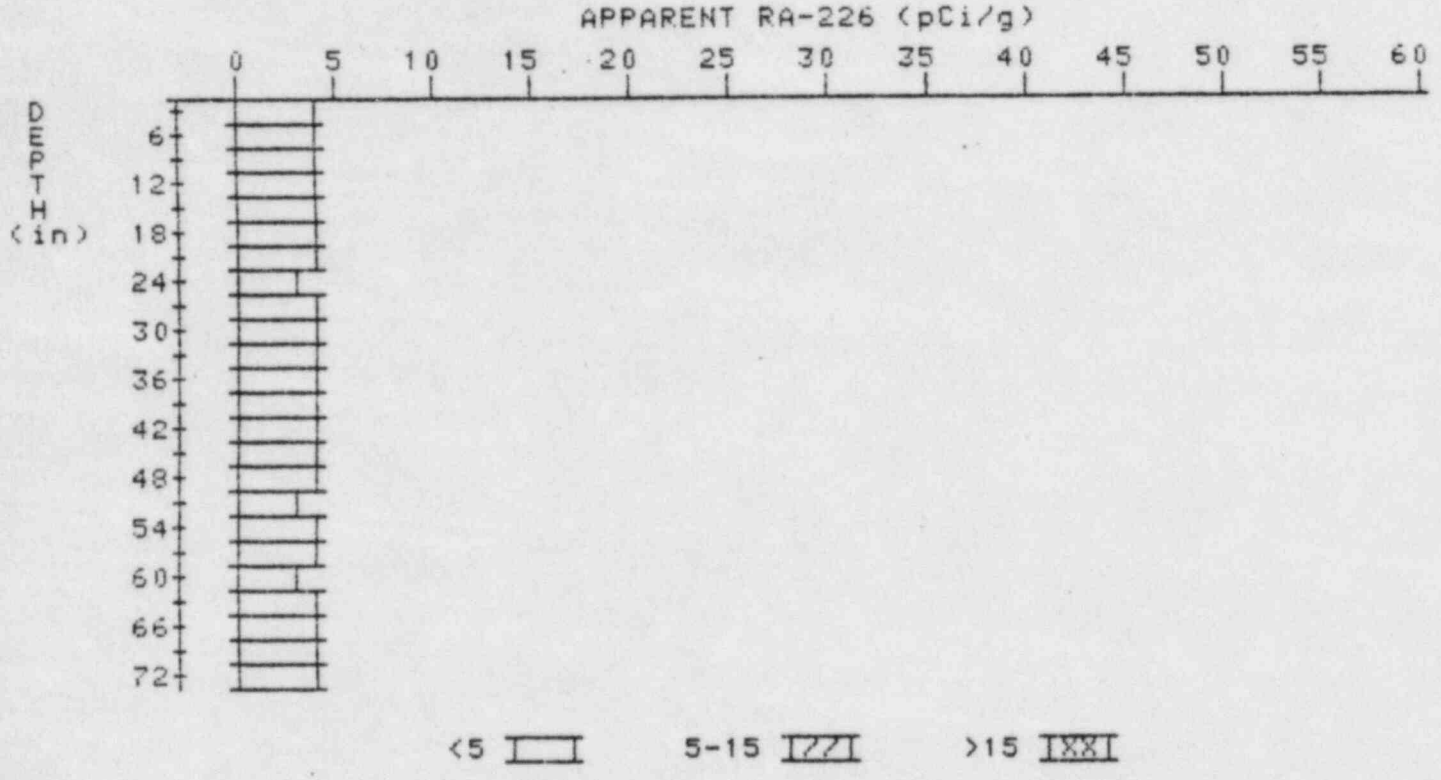


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.6	3.6
6	4.0	4.4
9	4.2	4.7
12	4.1	4.1
15	4.0	4.0
18	3.9	3.7
21	3.9	4.1
24	3.8	3.6
27	3.8	4.0
30	3.7	3.5
33	3.7	3.9
36	3.6	3.2
39	3.7	4.2
42	3.5	3.0
45	3.6	4.0

48	3.5	3.1
51	3.6	3.6
54	3.7	4.1
57	3.6	3.6
60	3.5	3.5
63	3.4	3.6
66	3.2	3.4
69	2.9	3.3
72	2.4	2.4

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-07866-RS
HOLE NUMBER: 11
LOCATION: 193245



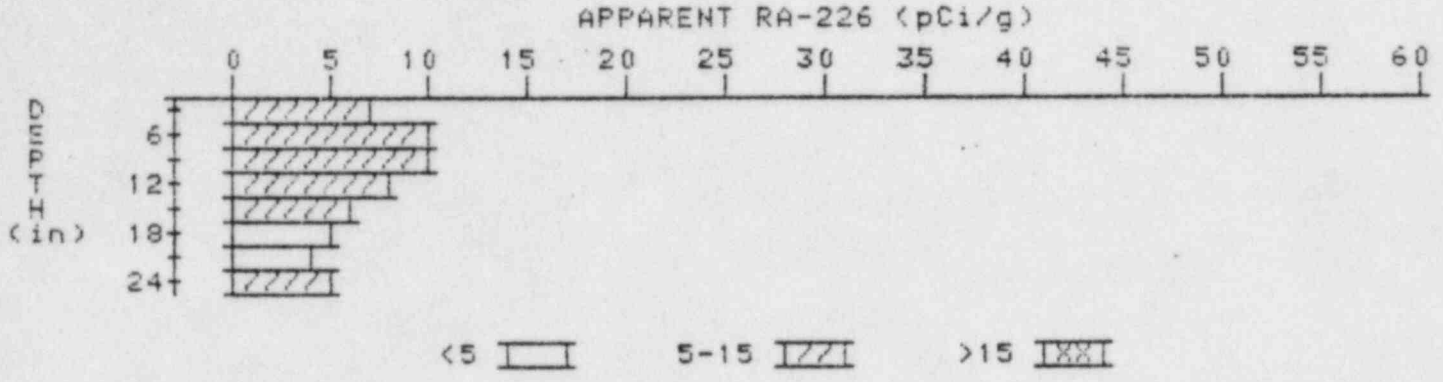
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.9	3.9
6	4.1	4.5
9	4.1	4.1
12	4.1	4.1
15	4.1	4.3
18	4.0	3.8
21	4.0	4.4
24	3.8	3.3
27	3.9	4.1
30	3.9	4.1
33	3.8	3.6
36	3.8	4.0
39	3.7	3.5
42	3.7	3.7
45	3.7	3.5

48	3.8	4.2
51	3.7	3.3
54	3.8	4.0
57	3.8	4.0
60	3.7	3.3
63	3.8	4.0
66	3.8	3.8
69	3.8	3.8
72	3.8	3.8

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 12

PROPERTY NUMBER: GJ-07866-RS
HOLE NUMBER: 12
LOCATION: 202234

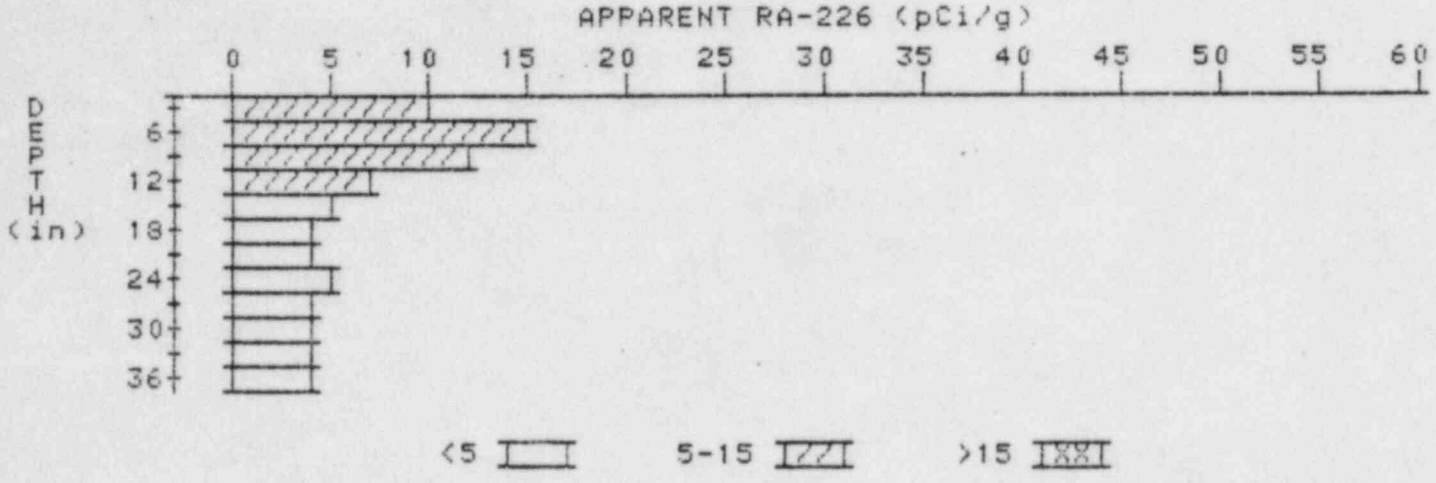


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	6.7	6.7
6	7.9	9.9
9	8.0	9.6
12	7.2	7.6
15	6.2	5.8
18	5.4	4.5
21	5.1	4.2
24	5.3	5.3

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 15

PROPERTY NUMBER: GJ-07866-RS
HOLE NUMBER: 15
LOCATION: 214223

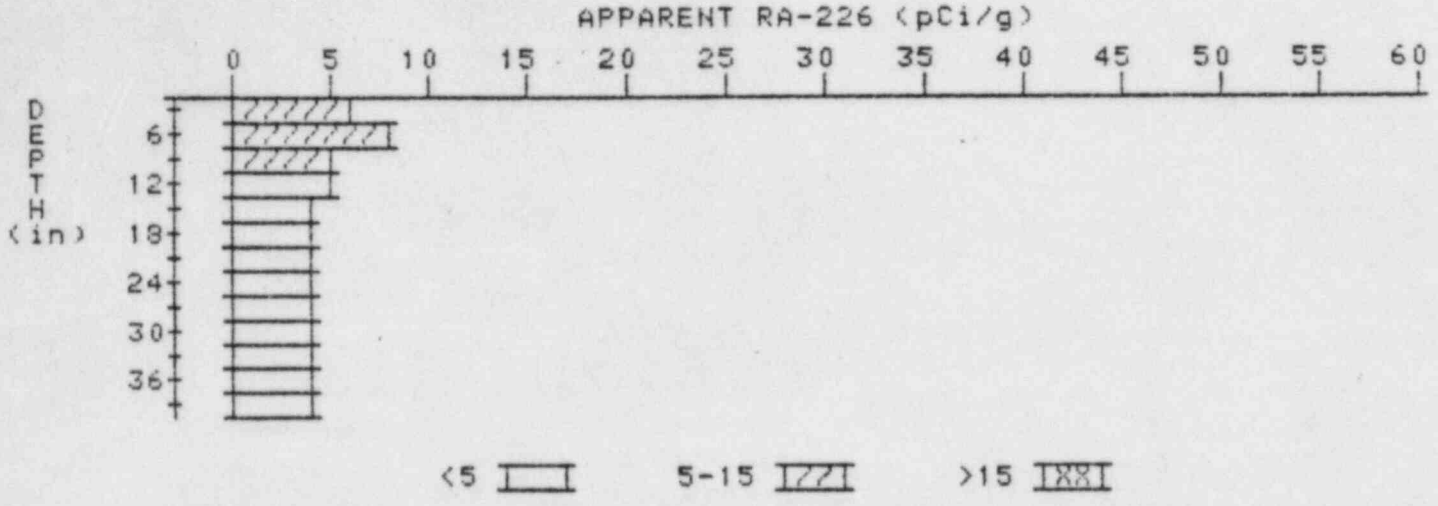


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	9.5	9.5
6	10.8	14.9
9	9.8	11.8
12	7.7	7.0
15	6.0	4.6
18	5.1	4.2
21	4.7	4.3
24	4.5	4.5
27	4.3	4.1
30	4.2	4.2
33	4.1	3.7
36	4.2	4.2

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 18

PROPERTY NUMBER: GJ-07866-RS
HOLE NUMBER: 18
LOCATION: 232249

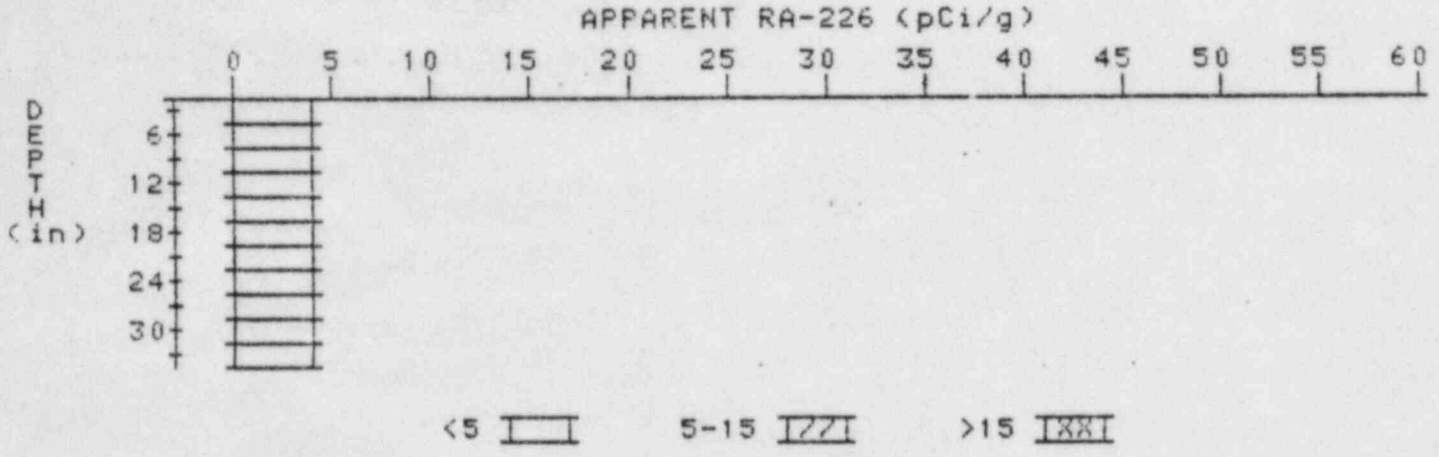


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	6.1	6.1
6	6.2	7.6
9	5.5	5.3
12	4.9	4.7
15	4.4	3.9
18	4.2	4.0
21	4.1	3.9
24	4.1	4.1
27	4.1	4.1
30	4.1	4.3
33	4.0	3.8
36	4.0	4.2
39	3.9	3.9

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION 20
DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-07866-RS
HOLE NUMBER: 20
LOCATION: 240290

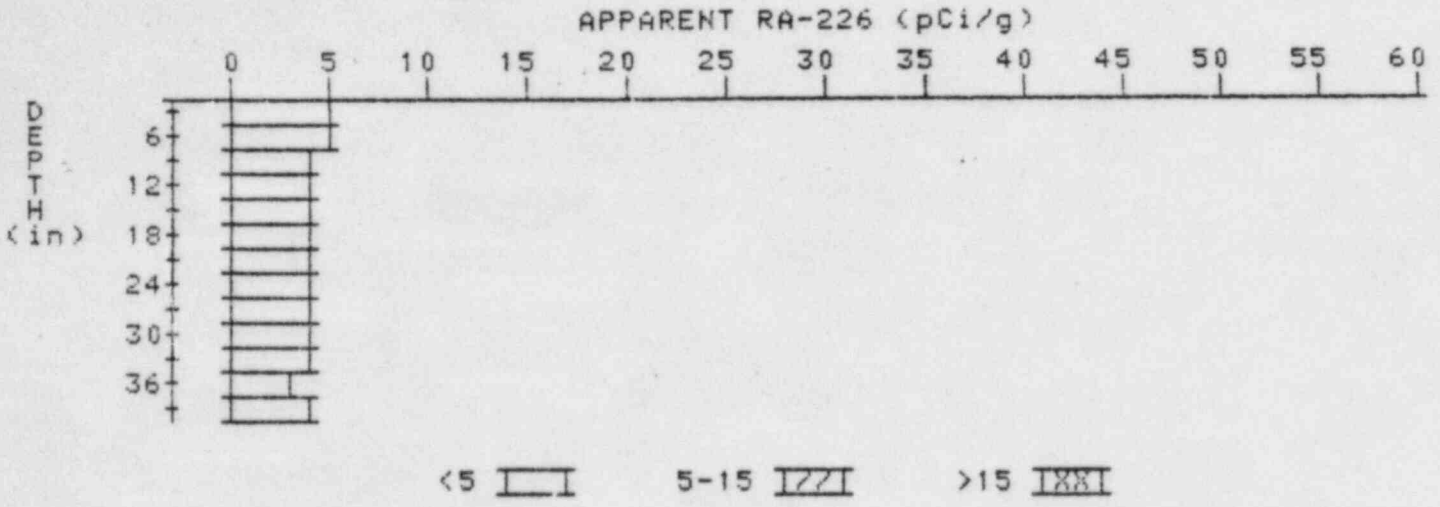


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.5	3.5
6	3.7	3.9
9	3.8	4.0
12	3.8	3.8
15	3.8	3.8
18	3.8	3.8
21	3.8	3.8
24	3.8	3.8
27	3.8	3.8
30	3.8	4.0
33	3.7	3.7

DECON V05.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 21

PROPERTY NUMBER: GJ-07866-RS
HOLE NUMBER: 21
LOCATION: 241233

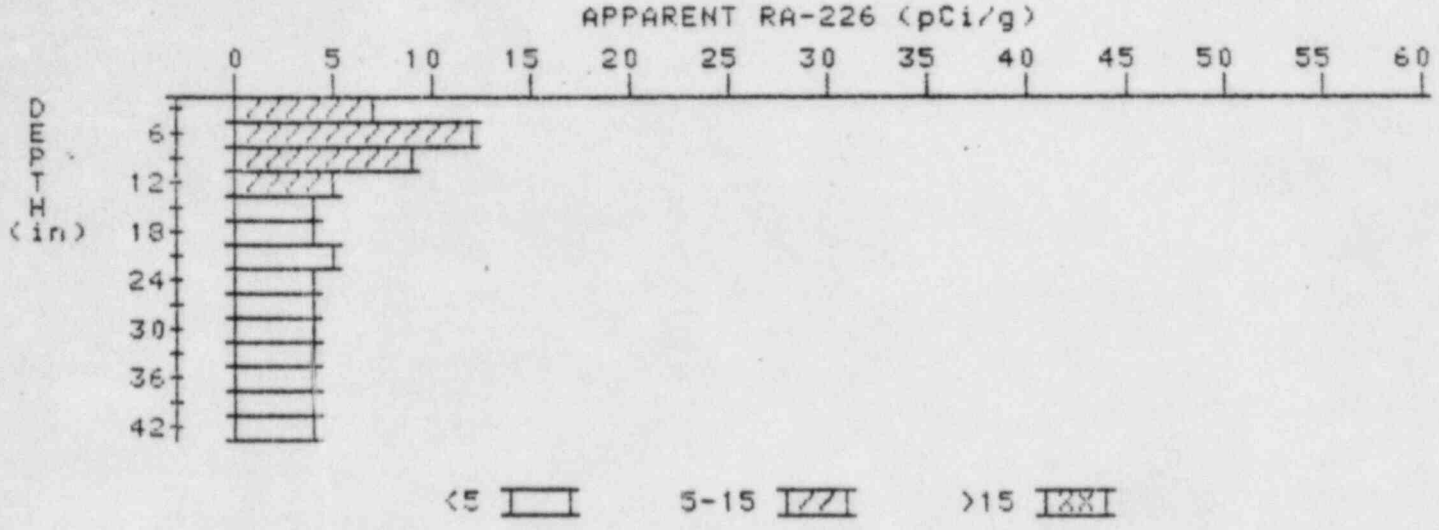


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.5	4.5
6	4.5	4.9
9	4.3	4.1
12	4.2	4.2
15	4.1	3.9
18	4.1	4.1
21	4.1	4.5
24	3.9	3.5
27	3.9	3.7
30	4.0	4.4
33	3.9	3.9
36	3.8	3.4
39	3.9	3.9

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 22

PROPERTY NUMBER: GJ-07866-RS
HOLE NUMBER: 22
LOCATION: 244258

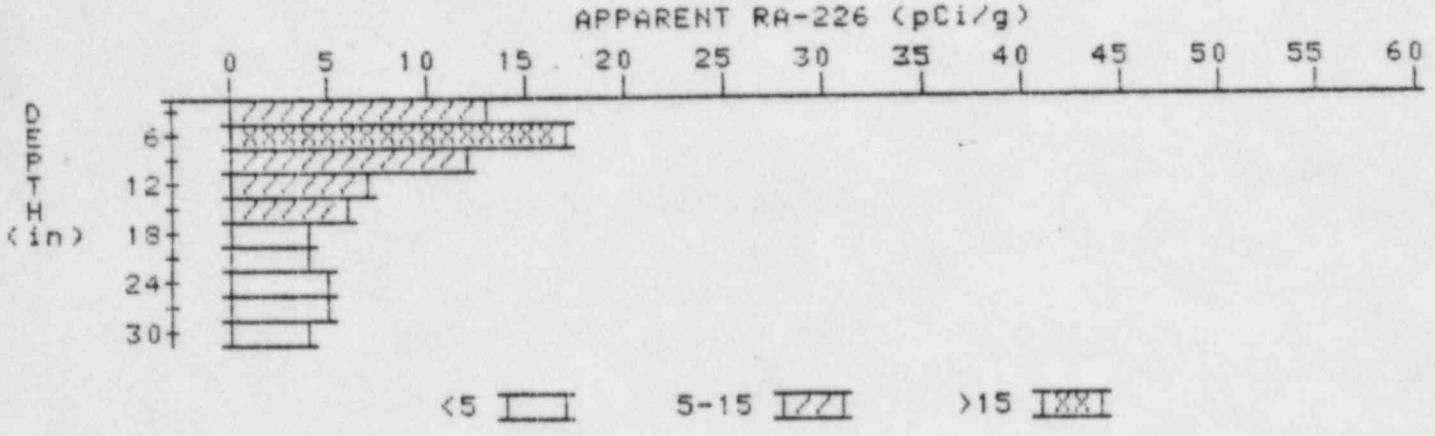


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	7.1	7.1
6	8.3	11.7
9	7.6	9.0
12	6.1	5.0
15	5.2	4.5
18	4.7	4.2
21	4.5	4.7
24	4.2	3.7
27	4.2	4.4
30	4.1	3.9
33	4.1	4.1
36	4.1	4.3
39	4.0	3.8
42	4.0	4.0

DECON V85.1(850117.1233)

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 24

PROPERTY NUMBER: GJ-07866-RS
HOLE NUMBER: 24
LOCATION: 260226

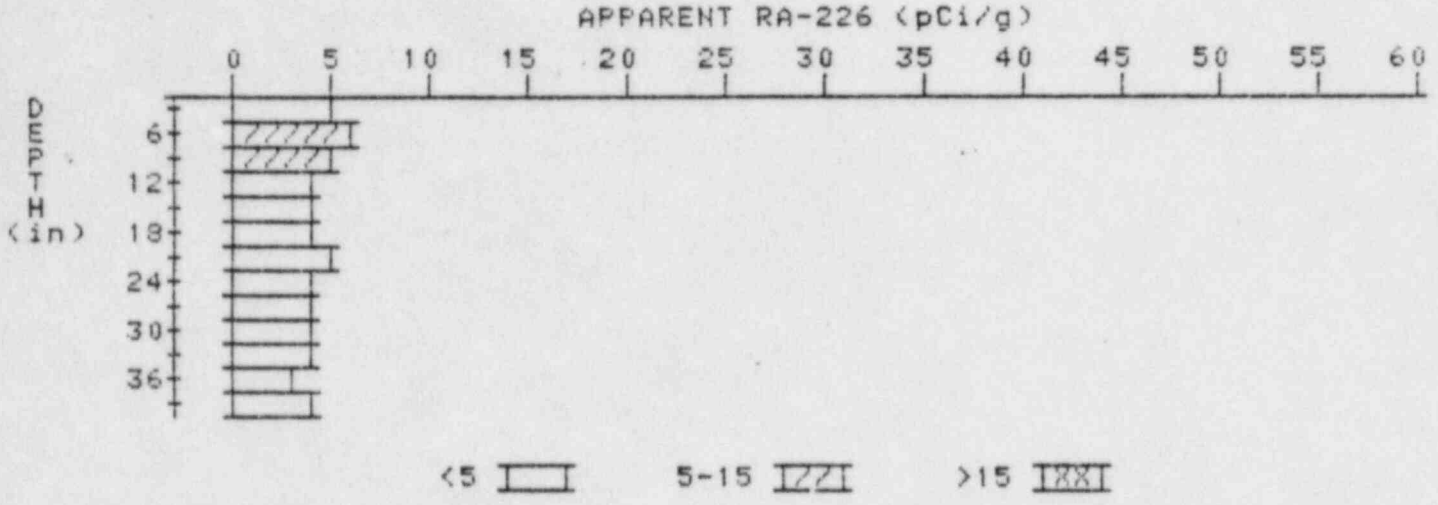


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	12.9	12.9
6	13.1	16.8
9	11.2	12.4
12	8.6	7.4
15	6.7	6.0
18	5.2	3.6
21	4.6	3.7
24	4.5	4.5
27	4.4	4.6
30	4.2	4.2

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 27

PROPERTY NUMBER: GJ-07866-RS
HOLE NUMBER: 27
LOCATION: 275252



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.8	4.8
6	5.1	6.0
9	4.9	5.3
12	4.5	4.1
15	4.3	4.1
18	4.2	4.0
21	4.2	4.6
24	4.0	3.6
27	4.0	3.8
30	4.1	4.3
33	4.1	4.5
36	3.9	3.4
39	4.0	4.0