

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-01376-RS
ADDRESS: 1360 NORTH 20TH STREET

AUGUST 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

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

APPROVED BY

Michael K. Tucker
M. TUCKER
DOE PROJECT ENGINEER

DATE

August 19, 1985

REA01376:REA-GE008

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 EXECUTIVE SUMMARY	1
1.1 Introduction	1
1.2 Evaluation and Recommendation	1
2.0 PROPERTY DESCRIPTION	2
2.1 General Description	2
2.2 Existing Facilities and Structures	2
3.0 RADIOLOGIC SURVEY	4
3.1 Introduction	4
3.2 Gamma Exposure-Rate Surveys	4
3.2.1 Exterior Findings	4
3.2.2 Interior Findings	4
3.3 Boreholes, Soil Samples, and Other Measurements	5
3.4 Radon/Radon Daughter Concentration	5
3.5 Extent of Contamination	5
4.0 RECOMMENDED REMEDIAL ACTION	7
4.1 Decontamination and Restoration	7
4.2 Evaluation of Recommended Remedial Action	7
5.0 REFERENCES	8
6.0 APPENDIX	9

1.0 EXECUTIVE SUMMARY

1.1 Introduction

The location, DOE ID No. GJ-01376-RS, is a single-family residence located at 1360 North 20th Street, Grand Junction, Colorado.

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

1.2 Evaluation and Recommendation

The action recommended is the removal of contaminated material and restoration of the property to its original condition. The identified residual radioactive material found on this property is tailings; the estimated volume is: exterior, 30 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is \$1,803. Remedial action on this property will take approximately 10 days to complete.

Area A will not be included in this remedial action as discussed in section 4.0 of this REA.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 1360 North 20th Street, Grand Junction, Colorado

Zoning: Residential (RSF-80)

Lot Size: Approximately 6,652 sf (0.15 acre)

Legal Description: South 14 feet of Lot 2 and north 39 feet of Lot 3, Block 4, Arcadia Village Refile, City of Grand Junction, County of Mesa, State of Colorado.

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

Utilities: Utility locations are shown in Appendix Figure 2.2.

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

Bordering Properties:

North:	Single-family residence
South:	Single-family residence
East:	Alley
West:	North 20th Street

2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-family residence
Size:	Approximately 854 sf
Construction Date:	1954
Construction:	Wood-frame with wood siding
Foundation:	Concrete stem wall and footing
Footing Depth:	Approximately 42" to bottom of footing from grade
Basement:	None
Crawl Space:	Yes
Condition:	Good

Other Structures:

Type:	Stone-and-log building
Size:	Approximately 294 sf
Construction:	Log-frame with stone veneer and wood siding
Foundation:	Concrete slab-on-grade
Condition:	Good

General Remarks:

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

Historical Data:

This structure is not over 50 years old. Therefore, it does not meet the eligibility criteria for consideration of inclusion on the National Register of Historic Places.

3.0 RADIOLOGIC SURVEY

3.1 Introduction

Radiologic data were collected by Bendix at DOE ID No. GJ-01376-RS on May 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 in the shed and along the east property boundary.

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: 15 to 17 uR/h
Highest Outside Gamma Reading (HOG): 64 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: 14 to 16 uR/h
Highest Inside Gamma Reading (HIG): 16 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 Figures 3.3a and 3.3b show 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 3.3a, 3.3b, 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 Figures 3.5a and 3.5b show identified areas and estimated depths of contamination on this property, based on assessments of all measurements taken. As noted in these figures, areas recommended for remedial action that contain identified residual radioactive materials are:

- (AREA A) The 5-inch-thick concrete floor of the stone and log building is contaminated (approximately 295 sf; this area is excluded from remedial action).
- (AREA B) An isolated deposit in the lawn adjacent to the city sidewalk is contaminated to a depth of 12 inches (approximately 20 sf).
- (AREA C) A small lawn-covered area by the west steps has contamination extending to a depth of 6 inches (approximately 12 sf).
- (AREA D) A small deposit of contamination in the west flower bed is 6 inches deep (approximately 4 sf).
- (AREA E) A small deposit west of the stone-and-log building is contaminated to a depth of 6 inches (approximately 9 sf).
- (AREA F) East of the stone-and-log building, contamination extends to a depth of 12 inches (approximately 558 sf).
- (AREA G) In the southeast corner of the yard, contamination extends to a depth of 9 inches (approximately 32 sf).
- (AREA H) Between the east fence line and the alley, contamination extends to a depth of 15 inches (approximately 120 sf).
- (AREA I) A small deposit of contamination along the east property line is 6 inches deep (approximately 40 sf).

- (AREA J) A deposit in the gravelled alley is contaminated to a depth of 3 inches (approximately 51 sf).
- (AREA K) A small deposit south of the stone-and-log building is contaminated to a depth of 6 inches (approximately 20 sf).

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-01376-RS, includes removal of select areas identified as containing radioactive material (as discussed in Section 3.5 and shown in Appendix Figure 3.5b) and transport of removed material to the disposal site.

Area A, as discussed in Section 3.5 and shown on Appendix Figure 3.5a, will not be included in this remedial action because interior gamma does not exceed EPA Standard.

An indoor RDC measurement will be completed on this property. If the RDC measurement exceeds EPA Standards, then the REA will be revised and remedial action accomplished in accordance with the Vicinity Property Management and Implementation Manual. If EPA Standards are not exceeded, then the recommendation of exclusion of Area A will be considered valid, and a Property Completion Report will be prepared for DOE certification.

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 \$1,803.

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

There is no owner preference with respect to remedial action and no legal or other complications are foreseen at this time.

5.0 REFERENCES

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

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

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

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

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

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

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

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

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

6.0 APPENDIX

This Appendix contains the following:

Appendix Tables:

Table 3.1	Radium Concentrations at Exterior Locations
Table 3.2	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 3.3a	Interior Gamma Exposure Rates and Sample Locations
Figure 3.3b	Interior Gamma Exposure Rates and Sample Location
Figure 3.4	Exterior Sample Locations
Figure 3.5a	Interior Estimated Extent of Contamination
Figure 3.5b	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

DOE ID #GJ-01376-RS

1360 North 20th Street

Page 1 of 6

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
4	157239	00	DS	<1.0		*	Background
		00-06	SS			2.3	By the water meter
		03	TC	2.8		*	DC = 0 inches
		06	TC	3.1		*	
		09	TC	3.3		*	
		12	TC	3.5		*	
		15	TC	3.5		*	
		18	TC	3.5		*	
		21	TC	3.6		*	
		24	TC	3.5		*	
		27	TC	3.6		*	
		30	TC	3.6		*	
		33	TC	3.6		*	
		36	TC	3.6		*	
5	157262	00	DS	6.9		*	Northwest corner of
		06	DS	4.0		*	the lot
		12	DS	1.7		*	
		06-12	SS			10.3	
6	185236	00	DS	6.0		*	By the west step
		06	DS	1.9		*	
7	187228	00	DS	3.4		*	West flower bed
		06	DS	1.3		*	
8	189236	03	TC	4.0		*	Water line
		06	TC	4.3		*	DC = 0 inches
		09	TC	4.1		*	
		12	TC	3.7		*	
		15	TC	3.6		*	
		18	TC	3.6		*	
		21	TC	3.6		*	
		24	TC	3.7		*	
		27	TC	3.7		*	
		30	TC	3.6		*	
		33	TC	3.7		*	
		36	TC	3.6		*	
		39	TC	3.6		*	
		42	TC	3.7		*	
		45	TC	3.8		*	
		48	TC	3.9		*	
		51	TC	4.0		*	
		54	TC	3.9		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-01376-RS

1360 North 20th Street

Page 2 of 6

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
8	189236	57	TC	4.0		*	
		60	TC	4.0		*	
		63	TC	4.0		*	
9	191260	[2]	DS	<1.0		*	Foundation
10	191261	00	DS	1.6		*	East foundation
11	200261	03	TC	3.3		*	North of the primary structure DC = 0 inches
		06	TC	3.6		*	
		09	TC	3.8		*	
		12	TC	3.9		*	
		15	TC	3.8		*	
		18	TC	3.8		*	
		21	TC	3.9		*	
		24	TC	3.9		*	
		27	TC	3.9		*	
		30	TC	4.0		*	
		33	TC	4.1		*	
		36	TC	4.1		*	
		39	TC	4.1		*	
		42	TC	4.1		*	
		45	TC	4.0		*	
		48	TC	3.9		*	
		51	TC	3.9		*	
		54	TC	4.0		*	
		57	TC	4.0		*	
		60	TC	4.1		*	
		63	TC	4.0		*	
12	216240	00	DS	1.7		*	Gr. line
		24	DS	1.4		*	
13	216247	03	TC	3.6		*	East of the primary structure DC = 0 inches
		06	TC	3.8		*	
		09	TC	3.9		*	
		12	TC	4.0		*	
		15	TC	4.0		*	
		18	TC	3.9		*	
		21	TC	4.0		*	
		24	TC	4.0		*	
		27	TC	3.9		*	
		30	TC	3.9		*	
		33	TC	3.8		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-01376-RS

1360 North 20th Street

Page 3 of 6

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
13	216247	36	TC	3.8		*	
		39	TC	3.8		*	
		42	TC	3.8		*	
		45	TC	3.8		*	
		48	TC	3.9		*	
		51	TC	4.1		*	
		54	TC	4.2		*	
		57	TC	4.1		*	
		60	TC	4.2		*	
14	218255	00	DS	1.4		*	Crawl space entrance
15	249261	00	DS	2.7		*	West end of the
		06	DS	2.7		*	stone-and-log
		12	DS	1.7		*	building
16	256254	03	TC	3.5		*	South of the stone-
		06	TC	4.0		*	and-log building
		09	TC	4.0		*	DC = 0 inches
		12	TC	3.9		*	
		15	TC	3.9		*	
		18	TC	4.0		*	
		21	TC	4.0		*	
		24	TC	4.0		*	
		27	TC	4.1		*	
		30	TC	4.1		*	
		33	TC	4.1		*	
		36	TC	4.0		*	
		39	TC	4.2		*	
17	268248	00	DS	10.6		*	South of the stone-
		06	DS	1.9		*	and-log building
18	268270	00	DS	1.4		*	North of the stone-
		06	DS	1.1		*	and-log building
19	270242	00	DS	2.3		*	South of the stone-
		06	DS	1.1		*	and-log building
20	270248	03	TC	3.6		*	South of the stone-
		06	TC	3.7		*	and-log building
		09	TC	3.7		*	DC = 6 inches
		12	TC	3.8		*	Based on all
		15	TC	3.8		*	data available

Radium Concentrations at Exterior Locations

DOE ID #GJ-01376-RS

1360 North 20th Street

Page 4 of 6

Loc	Grid	Depth	Meas.	In Situ Ra-226 (pCi/g)	Chem Ra-226	
20	270248	18	TC	3.8	*	
		21	TC	3.9	*	
		24	TC	3.8	*	
		27	TC	3.9	*	
		30	TC	3.8	*	
		33	TC	3.9	*	
		36	TC	3.9	*	
		39	TC	3.8	*	
21	281257	03	TC	16.1	*	East of the stone-
		06	TC	16.7	*	and-log building
		09	TC	11.8	*	DC = 12 inches
		12	TC	7.9	*	Based on the
		15	TC	5.8	*	deconvolution graph
		18	TC	4.7	*	
		21	TC	4.1	*	
		24	TC	3.7	*	
		27	TC	3.6	*	
		30	TC	3.6	*	
		33	TC	3.7	*	
		36	TC	3.8	*	
		39	TC	4.0	*	
22	287244	03	TC	18.4	*	By the alley
		06	TC	18.2	*	DC = 12 inches
		09	TC	12.1	*	Based on the
		12	TC	8.0	*	deconvolution graph
		15	TC	5.8	*	
		18	TC	4.9	*	
		21	TC	4.4	*	
		24	TC	4.1	*	
		27	TC	4.0	*	
		30	TC	3.9	*	
		33	TC	3.9	*	
		36	TC	3.9	*	
23	288225	03	TC	5.1	*	East of the dog
		06	TC	5.0	*	pen
		09	TC	4.5	*	DC = 9 inches
		12	TC	4.1	*	Based on the
		15	TC	3.9	*	deconvolution graph
		18	TC	3.7	*	
		21	TC	3.8	*	
		24	TC	3.9	*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-01376--RS

1360 North 20th Street

Page 5 of 6

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
23	288225	27	TC	3.8		*	
		30	TC	3.8		*	
		33	TC	3.7		*	
		36	TC	3.8		*	
		39	TC	3.7		*	
24	288254	03	TC	13.7		*	East fence line
		06	TC	17.0		*	DC = 15 inches
		09	TC	13.7		*	Based on the
		12	TC	9.4		*	deconvolution graph
		15	TC	6.8		*	
		18	TC	5.2		*	
		21	TC	4.6		*	
		24	TC	4.3		*	
		27	TC	4.0		*	
		30	TC	4.0		*	
		33	TC	3.9		*	
		36	TC	4.0		*	
		39	TC	4.2		*	
25	291235	00	DS	5.0		*	Alley
		06	DS	1.5		*	
		12	DS	1.5		*	
26	294265	00	DS	2.6		*	Alley
		03	TC	3.7		*	DC = 3 inches
		06	TC	3.7		*	Based on all
		09	TC	3.8		*	data available
		12	TC	3.7		*	
		15	TC	3.8		*	
		18	TC	3.9		*	
		21	TC	3.7		*	
		24	TC	3.6		*	
		27	TC	3.6		*	
		30	TC	3.6		*	
		33	TC	3.7		*	
		36	TC	3.8		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-01376-RS

1360 North 20th Street

Page 6 of 6

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
27	295245	00	DS	2.1		*	Alley
		06	DS	1.6		*	
		00-06	SS			2.4	

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 = 05-07-85
 Team Leader = TC

Radium Concentrations at Interior Locations

DOE ID #GJ-01376-RS

1360 North 20th Street

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		[24]	DS	1.1		*	On the stemwall
		00	DS	2.0		*	On the footing
		06	DS	1.5		*	On the dirt
2		[24]	DS	<1.0		*	On the stemwall
		00	DS	1.3		*	On the footing
		00	DS	1.1		*	On the dirt
3		00-05	SS			6.1	Concrete core
		05-11	SS			1.3	Soil under core
		03	TC	5.0		*	In the stone-and-
		06	TC	5.1		*	log building
		09	TC	4.8		*	DC = 5 inches
		12	TC	4.7		*	Based on all
		15	TC	4.5		*	data available
		18	TC	4.5		*	
		21	TC	4.4		*	
		24	TC	4.3		*	
		27	TC	4.1		*	
		30	TC	4.1		*	
		33	TC	4.1		*	
		36	TC	4.1		*	

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 = 05-07-85
Team Leader = TC

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)
-----	-----	-----	-----	-----	-----	-----
CRAWL SPACE	09	16-17	16	09	16-20	18
GROUND FLOOR	*	*	*	*	14-16	*
STONE-AND-LOG BUILDING	08	17-20	19	08	20-22	21
=====	=====	=====	=====	=====	=====	=====

* The historical data indicate the absence of interior contamination at this property. This information was investigated by performing a walking gamma scan. The areas and ranges of gamma measurements are shown in Appendix Figure 3.3b. Exposure rates in the crawl space and stone-and-log building are shown in Appendix Figures 3.3a and 3.3b.

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-01376-RS

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					
Contaminated Fill					
B	5 x 4 =	20	x 1.0 =	20	
C	4 x 3 =	12	x 0.5 =	6	
D	2 x 2 =	4	x 0.5 =	2	
E	3 x 3 =	9	x 0.5 =	5	
F	15 x 5 =	75			
	18 x 14 =	252			
	16 x 11 =	176			
	5 x 8 =	40			
	3 x 5 =	15			
		<u>558</u>	x 1.0 =	558	
G	4 x 8 =	32	x 0.8 =	26	
H	5 x 24 =	120	x 1.3 =	156	
I	4 x 10 =	40	x 0.5 =	20	
J	3 x 17 =	51	x 0.3 =	15	
K	4 x 5 =	20	x 0.5 =	10	
Volume of Contaminated Fill				= 818	= 818/27 = 30
TOTAL VOLUME - EXTERIOR					= 30

Note - Area A is excluded from this remedial action.

See Appendix Figure 3.5b For Areas

=====

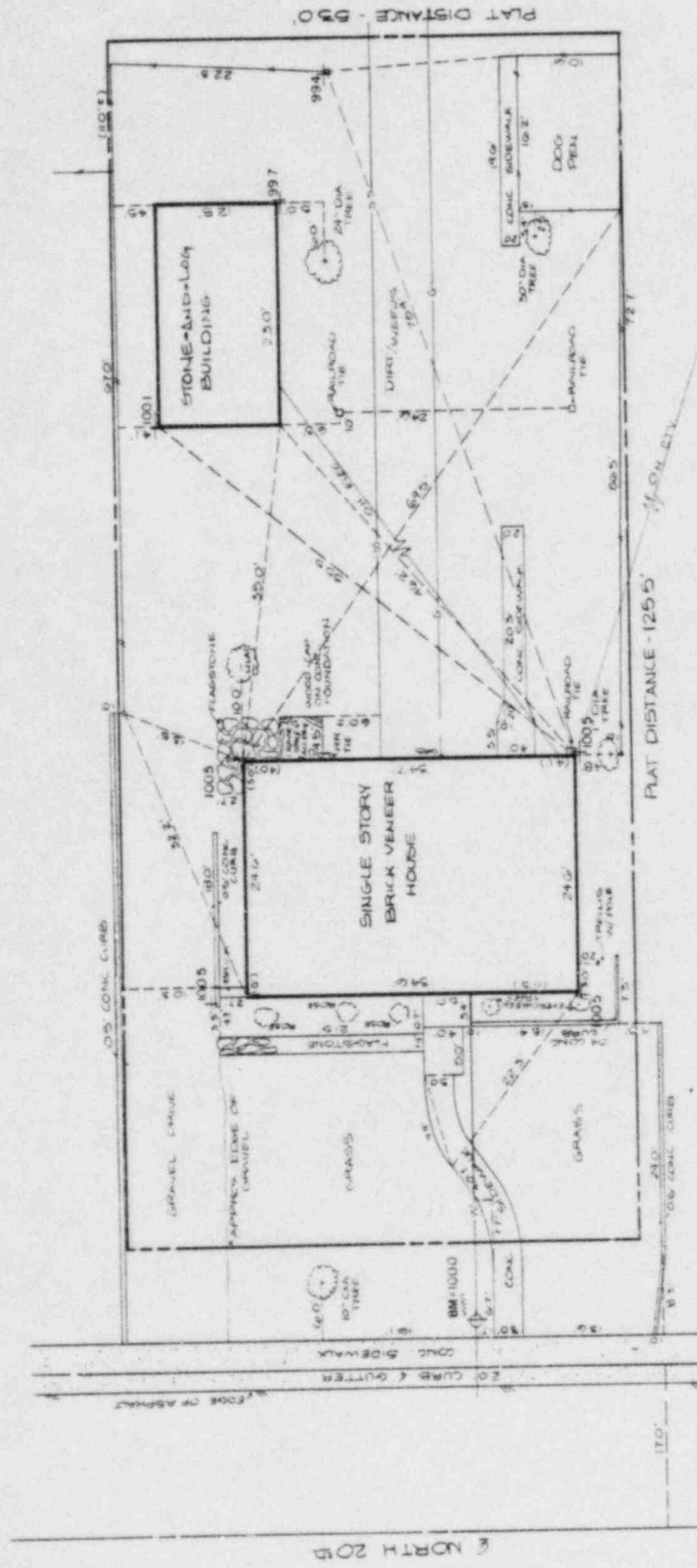
Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-01376-RS

Page 1 of 1

Remove and replace fence		
50 lf @ \$2/lf	\$	100
Remove identified residual radioactive material (exterior machine)		
29 cy @ \$14.50/cy		421
Remove identified residual radioactive material (manual-open)		
1 cy @ \$44/cy		44
Replace roadbase		
2 cy @ \$11.50/cy		23
Place topsoil		
28 cy @ \$9.50/cy		266
Place sod		
32 sf @ \$.50/sf		16
		<hr/>
TOTAL EXTERIOR	\$	870
TOTAL INTERIOR		0
ACCESS CONTROL		250
		<hr/>
SUBTOTAL	\$	1,120
CONTINGENCY @ 15%		168
		<hr/>
SUBTOTAL	\$	1,288
CONTRACTOR OVERHEAD & PROFIT @ 40%		515
		<hr/>
GRAND TOTAL	\$	1,803

=====

RDJ081385
REA01376:GE008:AP



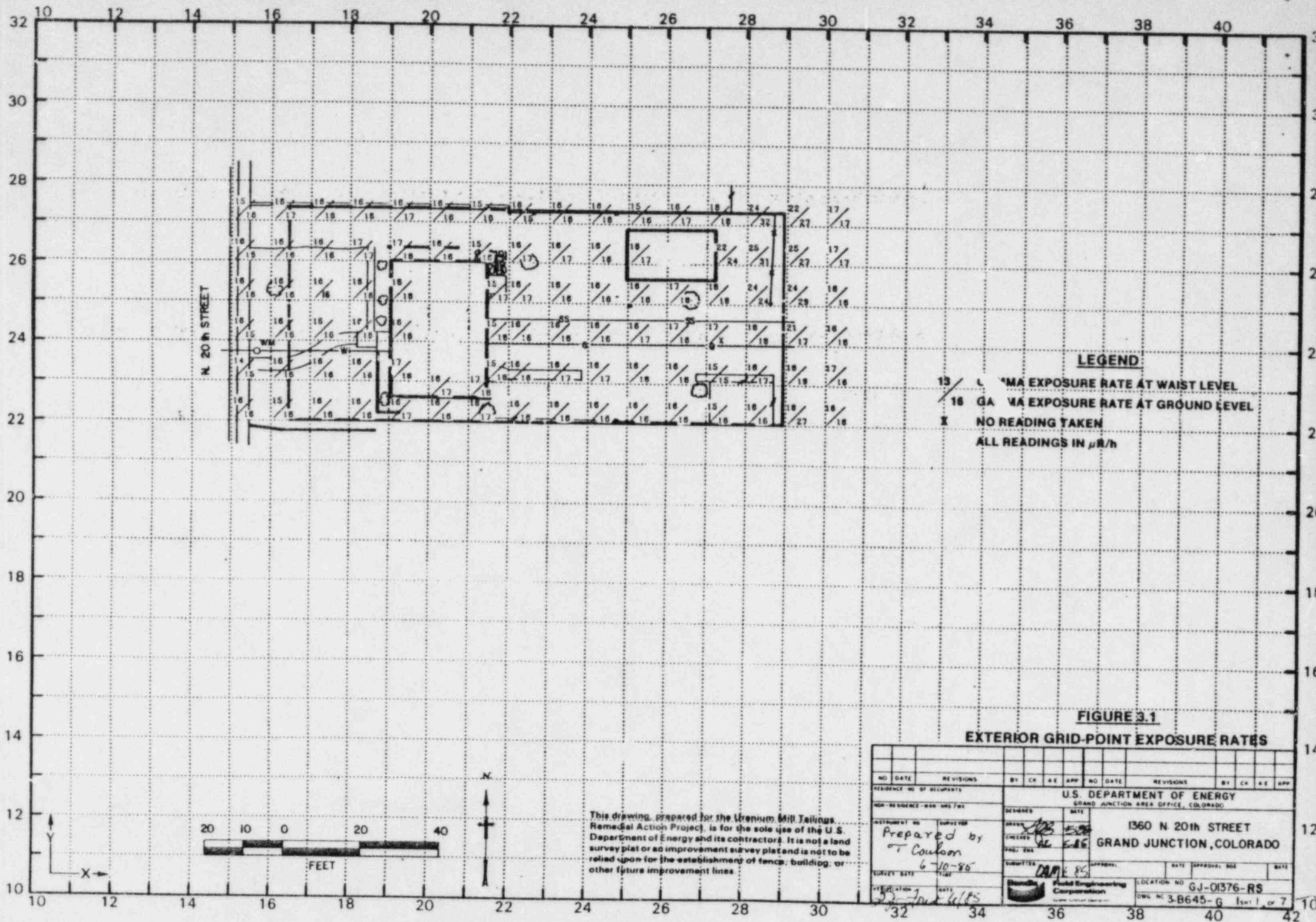
SOUTH 14 FEET OF LOT 2 AND NORTH 39 FEET
OF LOT 3 OF BLOCK 4 OF THE ARCADIA VILLAGE
SUBDIVISION - REFILE
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

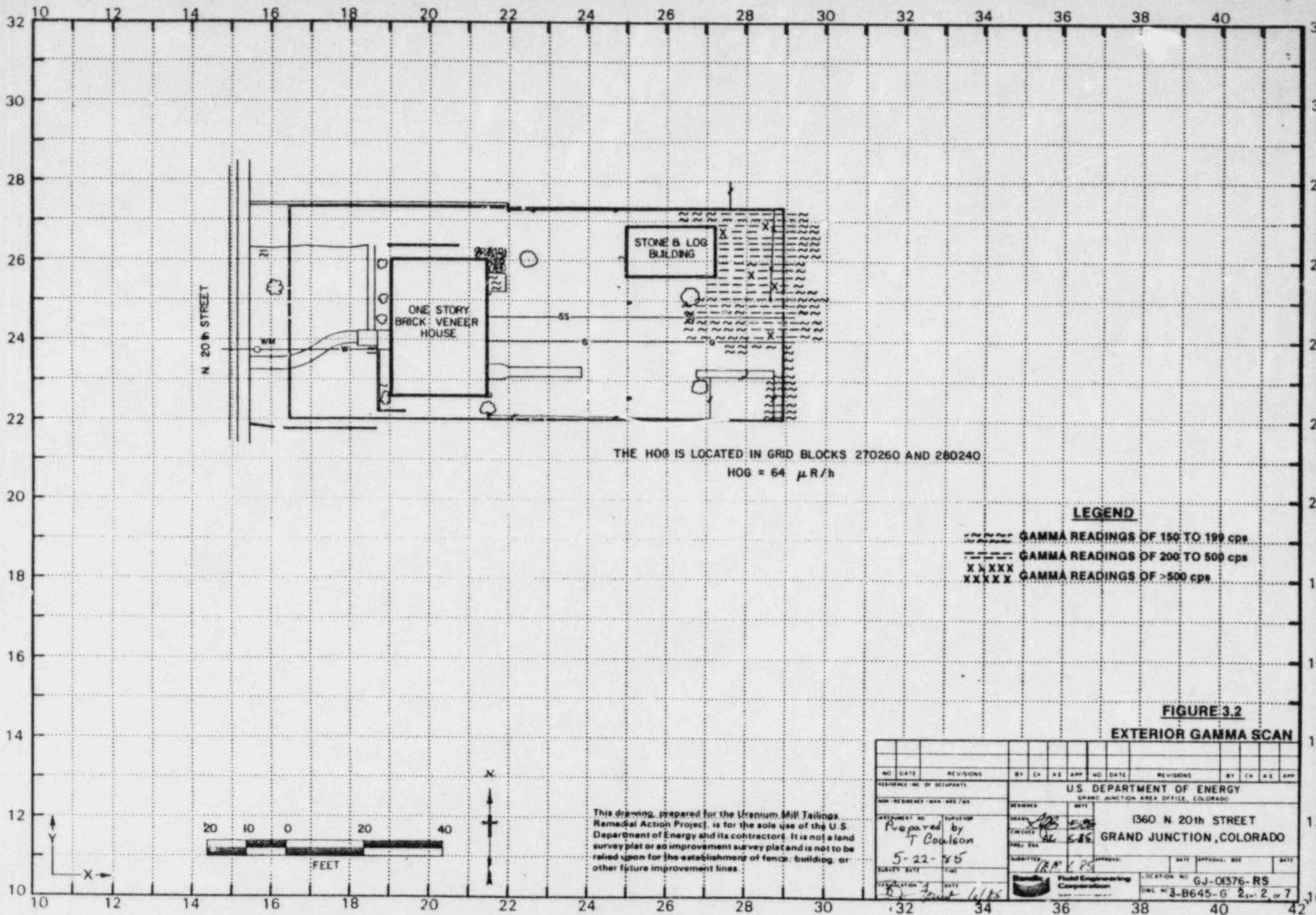


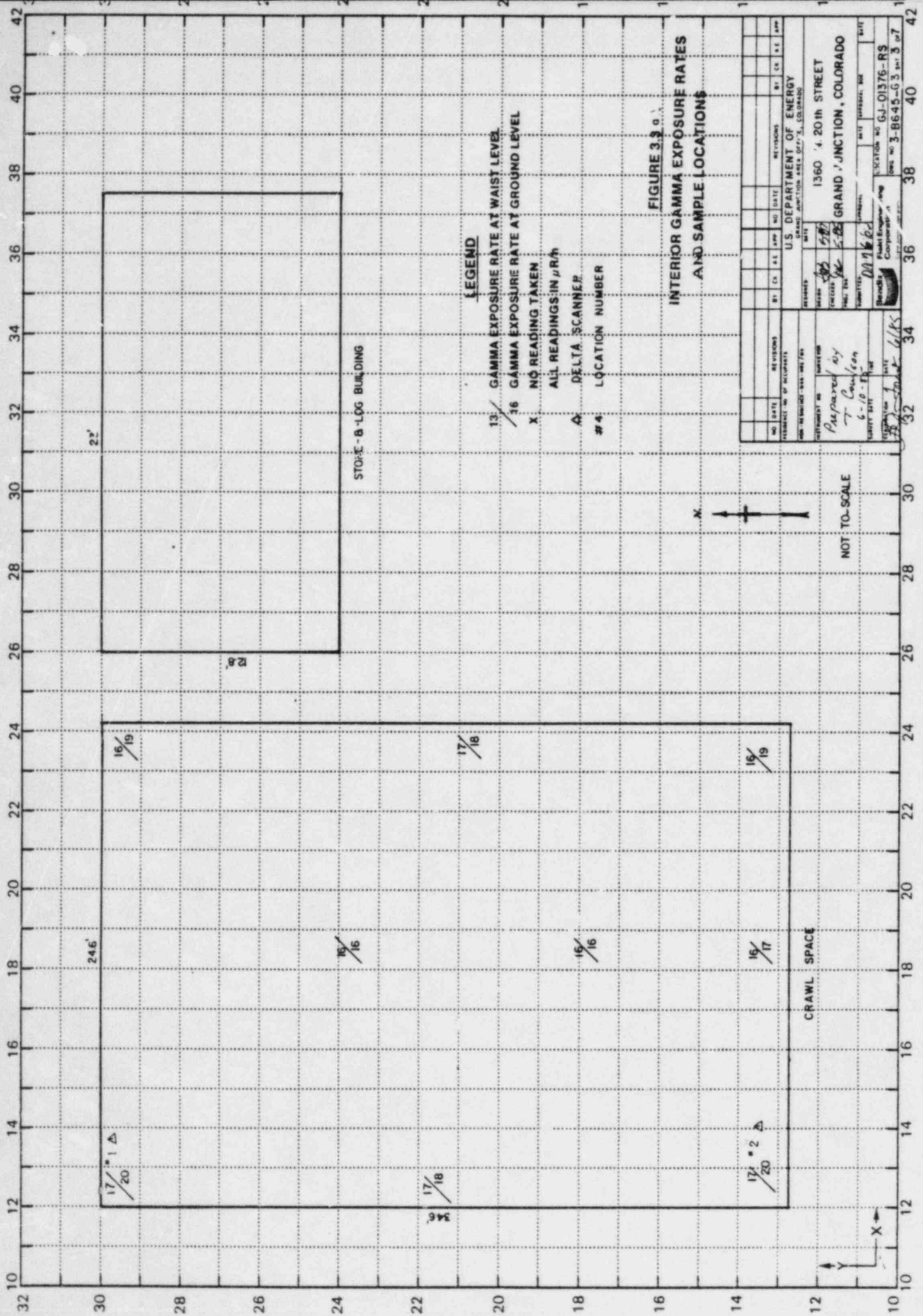
FIGURE 2.2 SITE PLAN

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION PROJECT OFFICE, COLORADO	DOE ID NO GJO1376 RS
ADDRESS 1360 NORTH 20TH GRAND JUNCTION, COLO.	Grand Junction Engineering Corporation Grand Junction, Colorado
SURV PLB/4-25-85 DRAWING NO 3-C645-F1	DATE KAS/5-1-86 SHEET 1 OF 1

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.







NO DATE	REVIEWS	BY	CR	A.E.	APR	NO	DATE	REVIEWS	BY	CR	A.E.	APR
REFERENCE NO. OF RECORDS				U.S. DEPARTMENT OF ENERGY								
DATE - 10 APRIL 1968 - 100 740				GRAND JUNCTION AREA OFFICE, COLORADO								
INVESTMENT NO				1360 '4. 20 TH STREET								
Prepared by				GRAND JUNCTION, COLORADO								
T. Carlson												
6-10-68												
CLASSY 231												
REVISIONS				REVISIONS								
DATE				DATE								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								
REVIEWS				REVIEWS								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								
REVIEWS				REVIEWS								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								
REVIEWS				REVIEWS								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								
REVIEWS				REVIEWS								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								
REVIEWS				REVIEWS								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								
REVIEWS				REVIEWS								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								
REVIEWS				REVIEWS								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								
REVIEWS				REVIEWS								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								
REVIEWS				REVIEWS								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								
REVIEWS				REVIEWS								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								
REVIEWS				REVIEWS								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								
REVIEWS				REVIEWS								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								
REVIEWS				REVIEWS								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								
REVIEWS				REVIEWS								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								
REVIEWS				REVIEWS								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								
REVIEWS				REVIEWS								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								
REVIEWS				REVIEWS								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								
REVIEWS				REVIEWS								
BY				BY								
CR				CR								
A.E.				A.E.								
APR				APR								
NO				NO								
DATE				DATE								

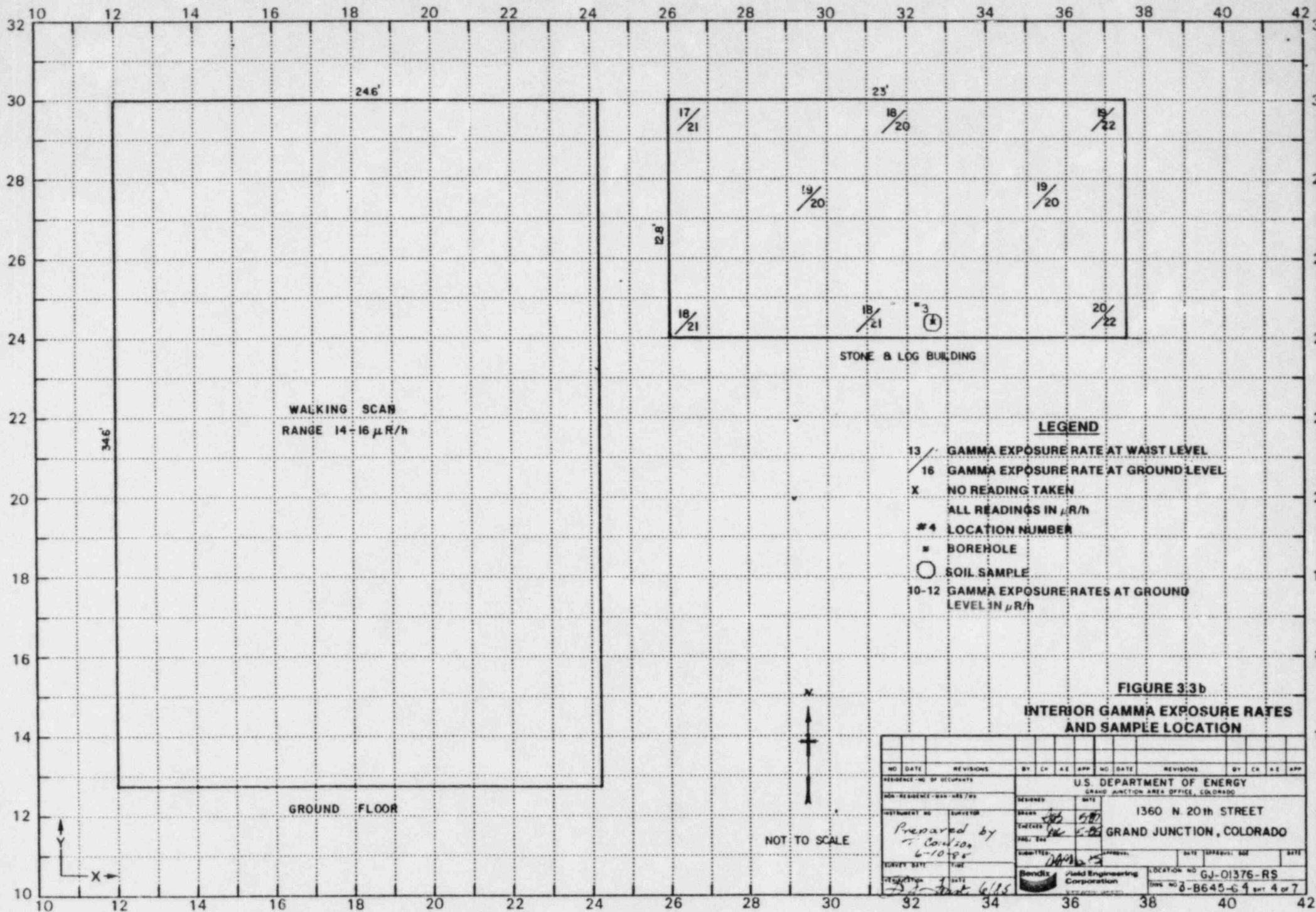
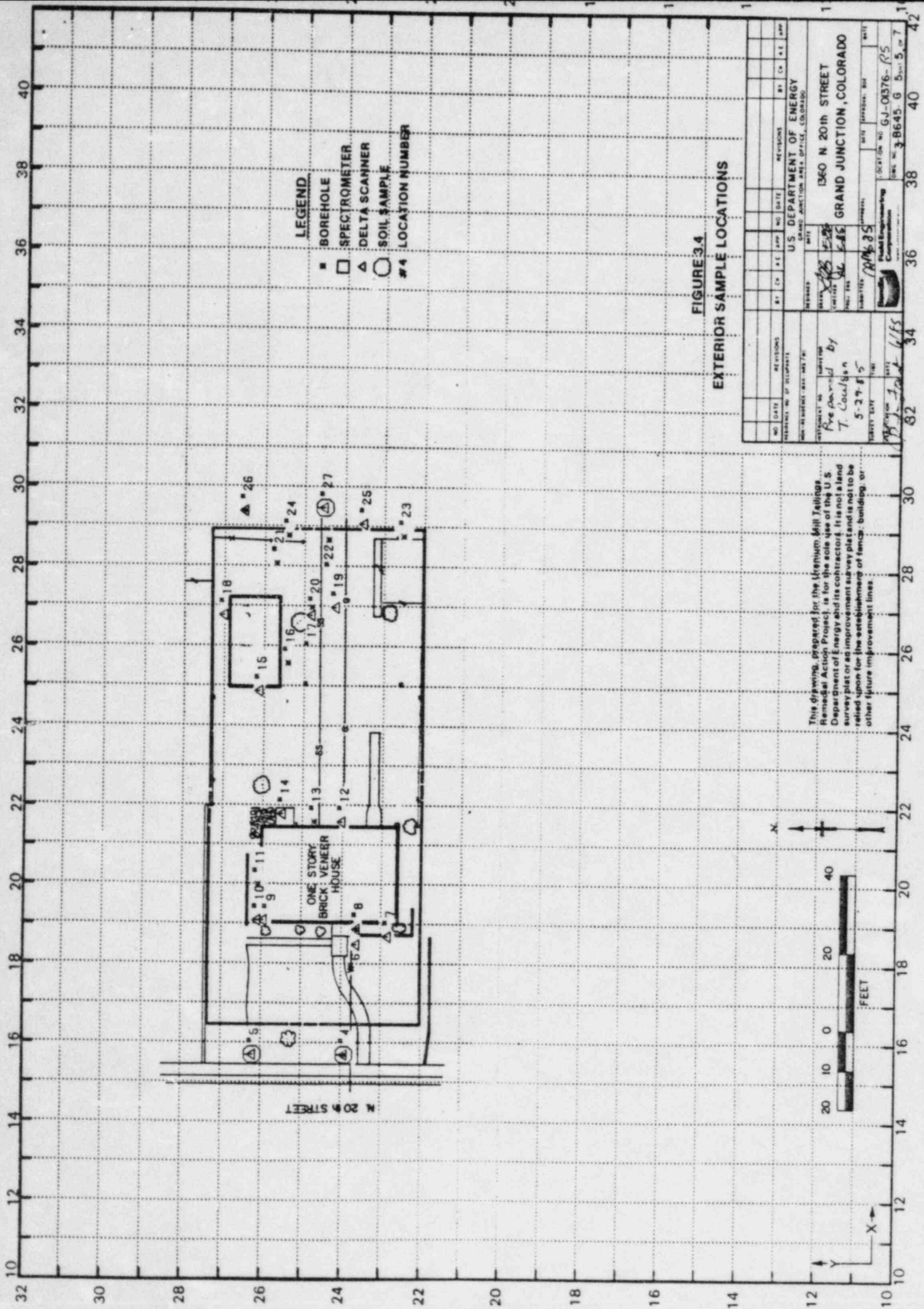
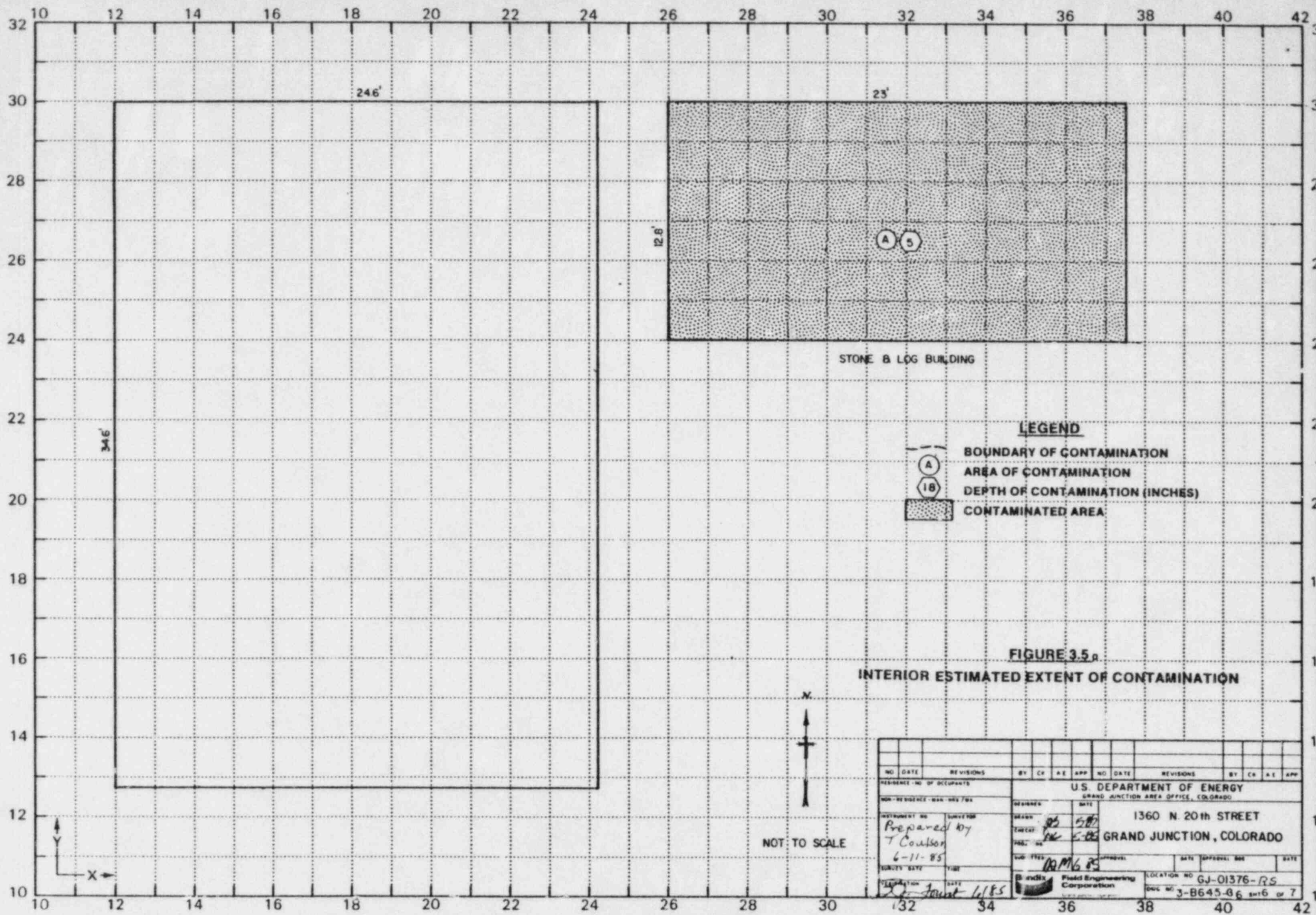


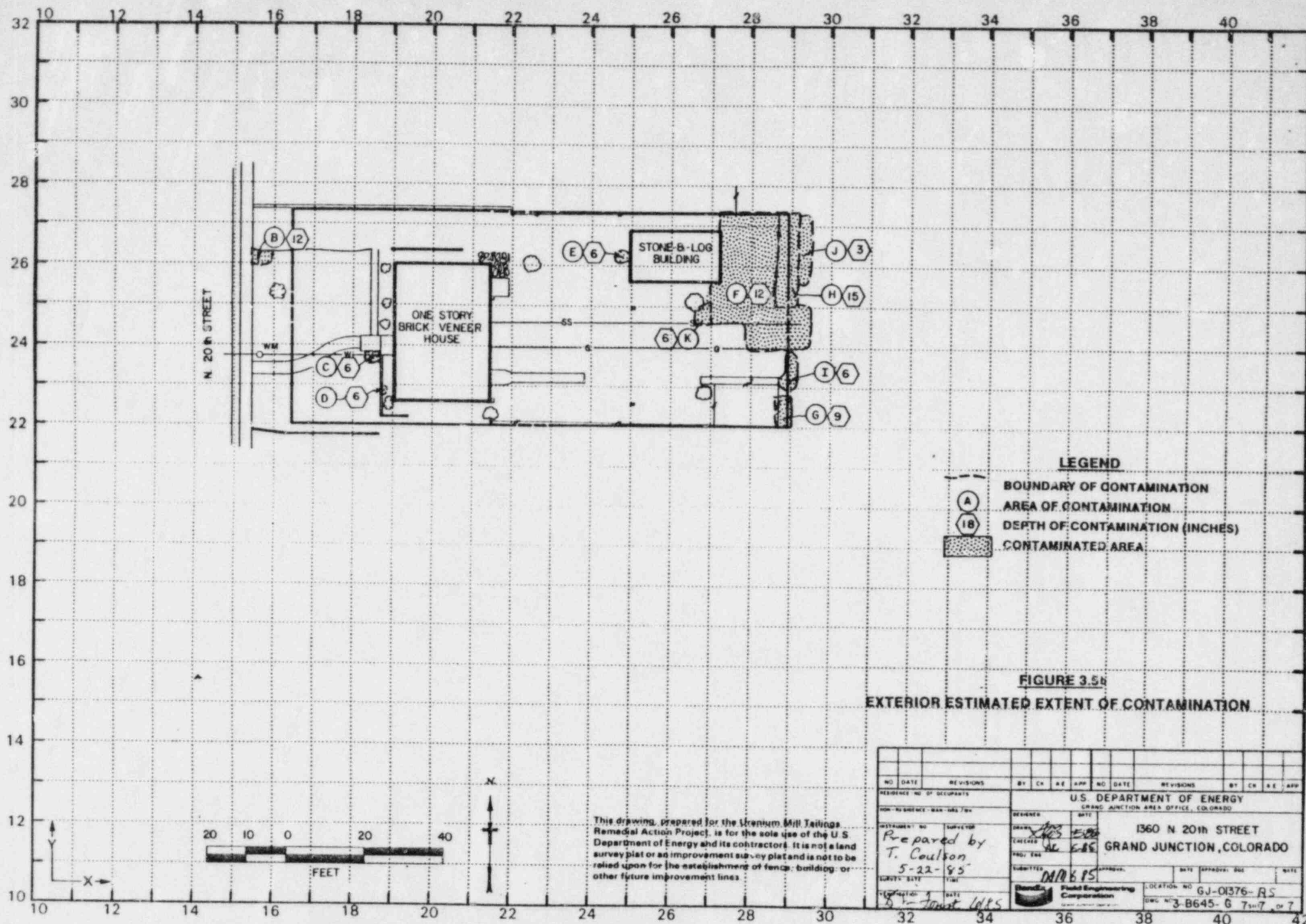
FIGURE 3:3b
INTERIOR GAMMA EXPOSURE RATES
AND SAMPLE LOCATION

[illegible]





NO. DATE REVISIONS				BY CR A-E APP NO. DATE REVISIONS				BY CR A-E APP							
RESIDENT NO. OF OCCUPANTS								U.S. DEPARTMENT OF ENERGY							
NON-RESIDENCE MAN-HRS / Wk								GRAND JUNCTION AREA OFFICE, COLORADO							
INSTRUMENT NO.				SURVEYOR				REMARKS				DATE			
Prepared by				T. Coulson				5-85				5-85			
6-11-85								10/16/85							
EQUIPMENT				TYPE				APPROVAL				DATE			
Field Engineering Corporation								GJ-01376-RS				3-B645-B6 SH-6 OF 7			



NO. DATE REVISIONS BY CH AE APP NO. DATE REVISIONS BY CH AE APP									
RESIDENCE NO. OF OCCUPANTS									
U.S. DEPARTMENT OF ENERGY GRAND JUNCTION AREA OFFICE, COLORADO									
1360 N 20th STREET GRAND JUNCTION, COLORADO									
DESIGNED BY: <i>[Signature]</i> DATE: <i>[Date]</i>					DRAWN BY: <i>[Signature]</i> DATE: <i>[Date]</i>				
CHECKED BY: <i>[Signature]</i> DATE: <i>[Date]</i>					FIELD ENG. DATE: <i>[Date]</i>				
QUANTITIES: <i>[Signature]</i> APPROVAL: <i>[Signature]</i> DATE: <i>[Date]</i>					DATE: <i>[Date]</i> APPROVAL: <i>[Signature]</i> DATE: <i>[Date]</i>				
Field Engineering Corporation					LOCATION NO. GJ-01376-RS				
3-B645-G 7					3-B645-G 7				

3/85

DOE ID NO. GJ-01376-RS

Date June 11, 85

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

Official Survey Report

Property Address 1360 North 20th. Street

Property Owner Jewel Butler

Address of Owner (if different from above) 506 North 6th Street

Report Prepared By Terry Coulson

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 1 Under or around exterior improvements.

1 XX 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 = 16 uR/h
HOG = 64 uR/h

May 24, 1985

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

ATTN: Elaine Brummett

Dear Elaine:

The following is in response to your questions and comments during the Technical Review concerning Department of Energy (DOE) Identification (ID) number GJ-01376-RS.

The areas that require additional comments are as follows:

1. Location 19 will be closely monitored during remedial action, since the delta reading was 2.3 pCi/g.
2. The homes in this tract were never on a septic system.
3. Utility-line positions were confirmed in the crawl space.

Thank you for your time and cooperation. If you should have additional questions or comments you may contact me at 242-8621, extension 433.

Very truly yours,

Terry Coulson

Terry Coulson
RSD Survey Team Leader

TC:pr

ALLIED Bendix
Aerospace

Bendix Field Engineering Corporation
Grand Junction Operations
Grand Junction, Colorado

Date: May 23, 1985

To: Files

From: Terry Coulson

Subject: Team Leader Notes - GJ-01376-RS

Address: 1360 North 20th

Owner: Jewel Butler

Team Members

T. Coulson (Team Leader)	A. Raabe
P. Hardy	V. Young
S. Larsen	M. Dexter
R. Schouten	L. Kula
D. Dow	N. Wallace
A. Quintana	C. Adams

Instrument

Crutch Scintillometer - C-1196, C-1149, C-1127
Total Count - C-3957, C-3573
Delta Scintillometer - C-3943, C-3938

This property is a rental owned by Jewel Butler, new tenants were moving in the day we performed our survey.

The shed had some fairly high readings. A core, soil sample, and auger hole were done in the shed. The eastern portion is contaminated.

The crawl space had some higher readings. The probable cause being geometry.

All team members were frisked before leaving the property.

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

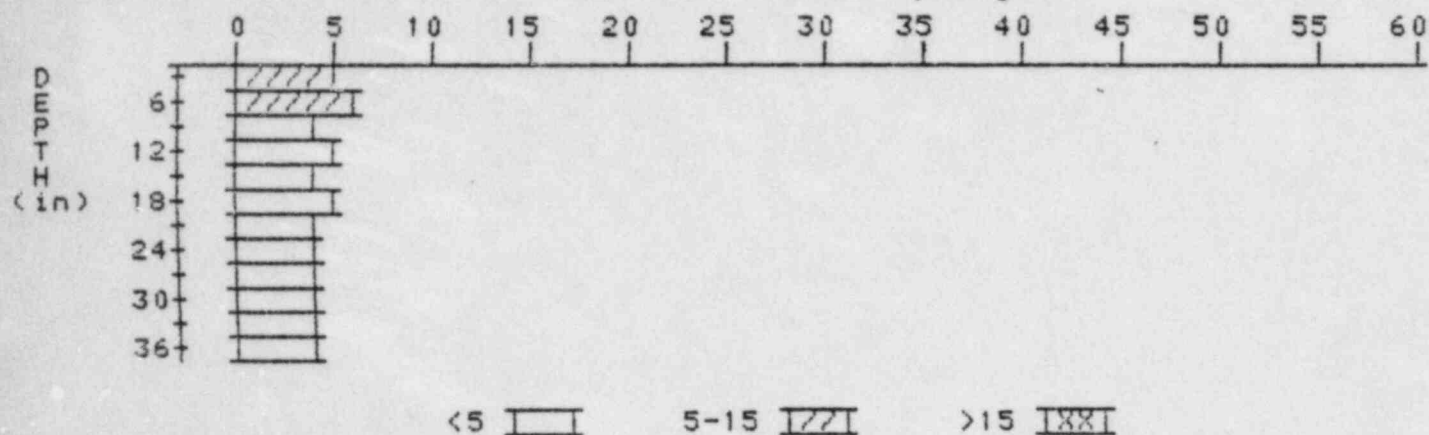
3

PROPERTY NUMBER: GJ-01376-RS

HOLE NUMBER: 3

LOCATION:

APPARENT RA-226 (pCi/g)



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.0	5.0
6	5.1	5.8
9	4.8	4.4
12	4.7	4.9
15	4.5	4.1
18	4.5	4.7
21	4.4	4.4
24	4.3	4.5
27	4.1	3.7
30	4.1	4.1
33	4.1	4.1
36	4.1	4.1

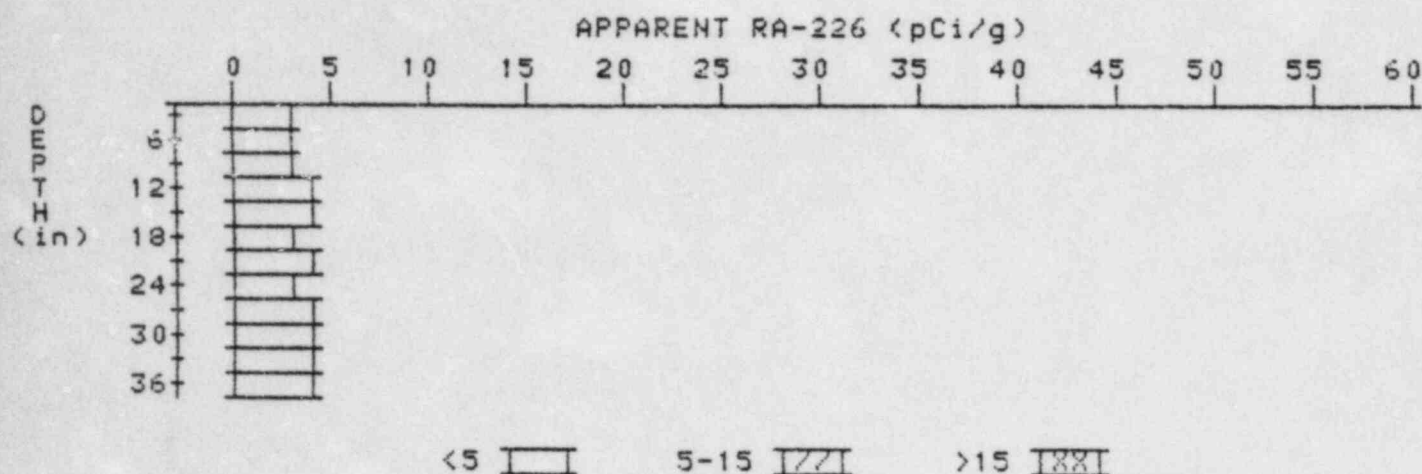
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

4

PROPERTY NUMBER: GJ-01376-RS

HOLE NUMBER: 4

LOCATION: 157239



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.8	2.8
6	3.1	3.3
9	3.3	3.3
12	3.5	3.9
15	3.5	3.5
18	3.5	3.3
21	3.6	4.0
24	3.5	3.1
27	3.6	3.8
30	3.6	3.6
33	3.6	3.6
36	3.6	3.6

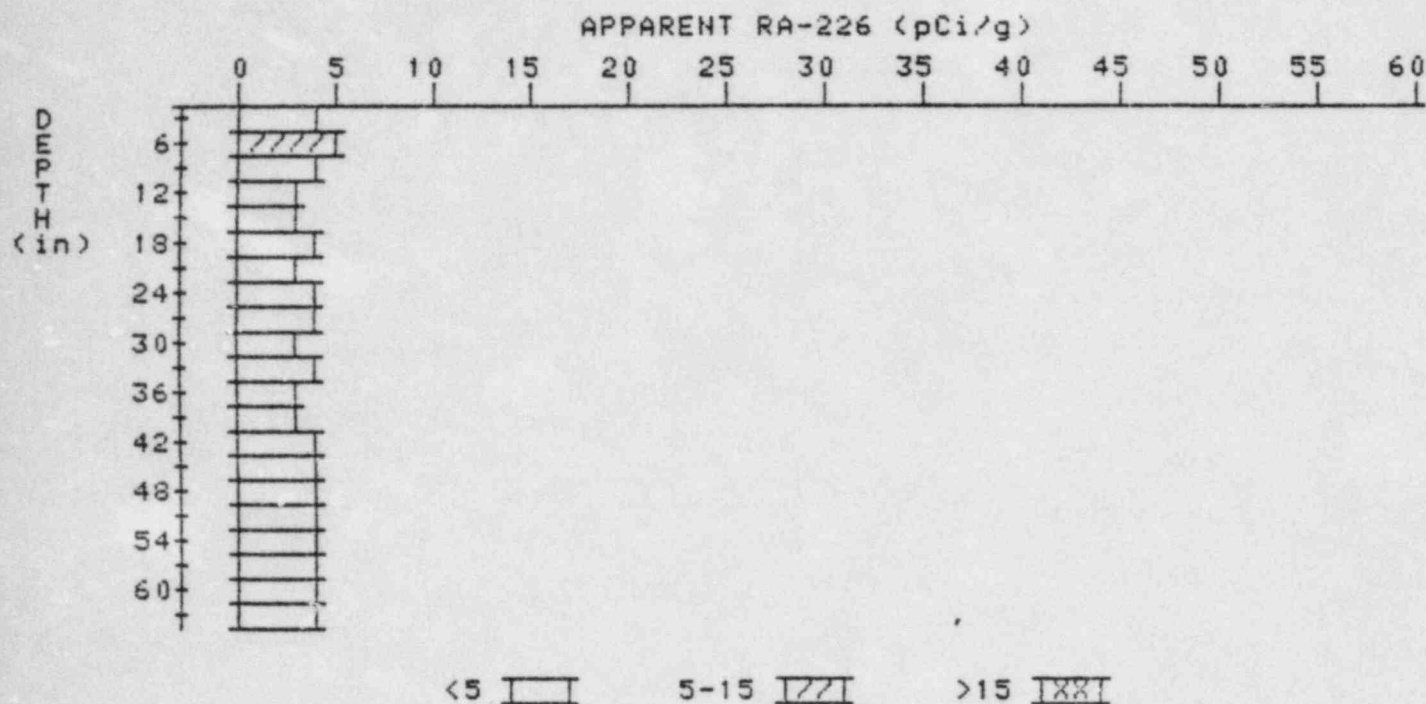
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

8

PROPERTY NUMBER: GJ-01376-RS

HOLE NUMBER: 8

LOCATION: 189236



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.0	4.0
6	4.3	5.2
9	4.1	4.5
12	3.7	3.2
15	3.6	3.4
18	3.6	3.6
21	3.6	3.4
24	3.7	3.9
27	3.7	3.9
30	3.6	3.2
33	3.7	4.1
36	3.6	3.4
39	3.6	3.4
42	3.7	3.7
45	3.8	3.8
48	3.9	3.9
51	4.0	4.4

54
57
60
63

3.9
4.0
4.0
4.0

3.5
4.2
4.0
4.0

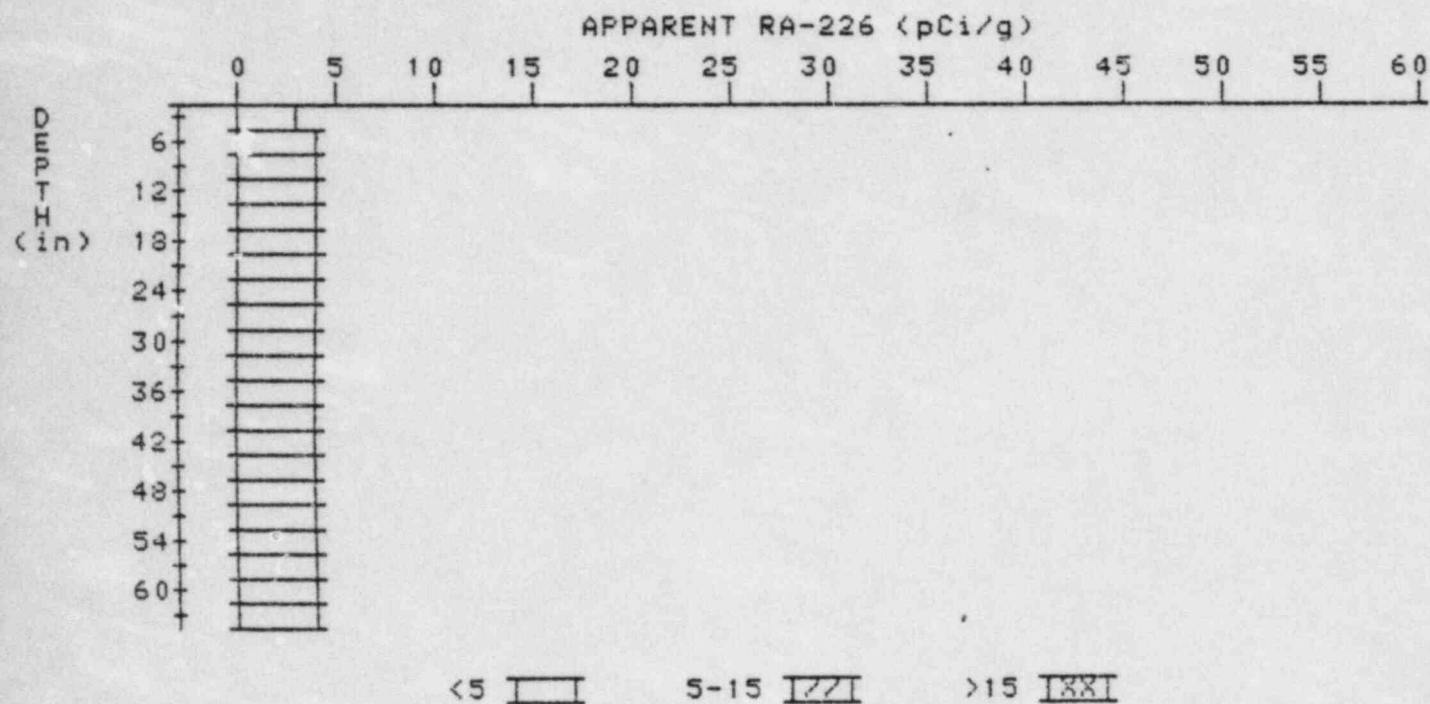
APPARENT RADIUM-226 CONCENTRATION 11

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01376-RS

HOLE NUMBER: 11

LOCATION: 200261



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.3	3.3
6	3.6	3.8
9	3.8	4.0
12	3.9	4.3
15	3.8	3.6
18	3.8	3.6
21	3.9	4.1
24	3.9	3.9
27	3.9	3.7
30	4.0	4.0
33	4.1	4.3
36	4.1	4.1
39	4.1	4.1
42	4.1	4.3
45	4.0	4.0
48	3.9	3.7
51	3.9	3.7

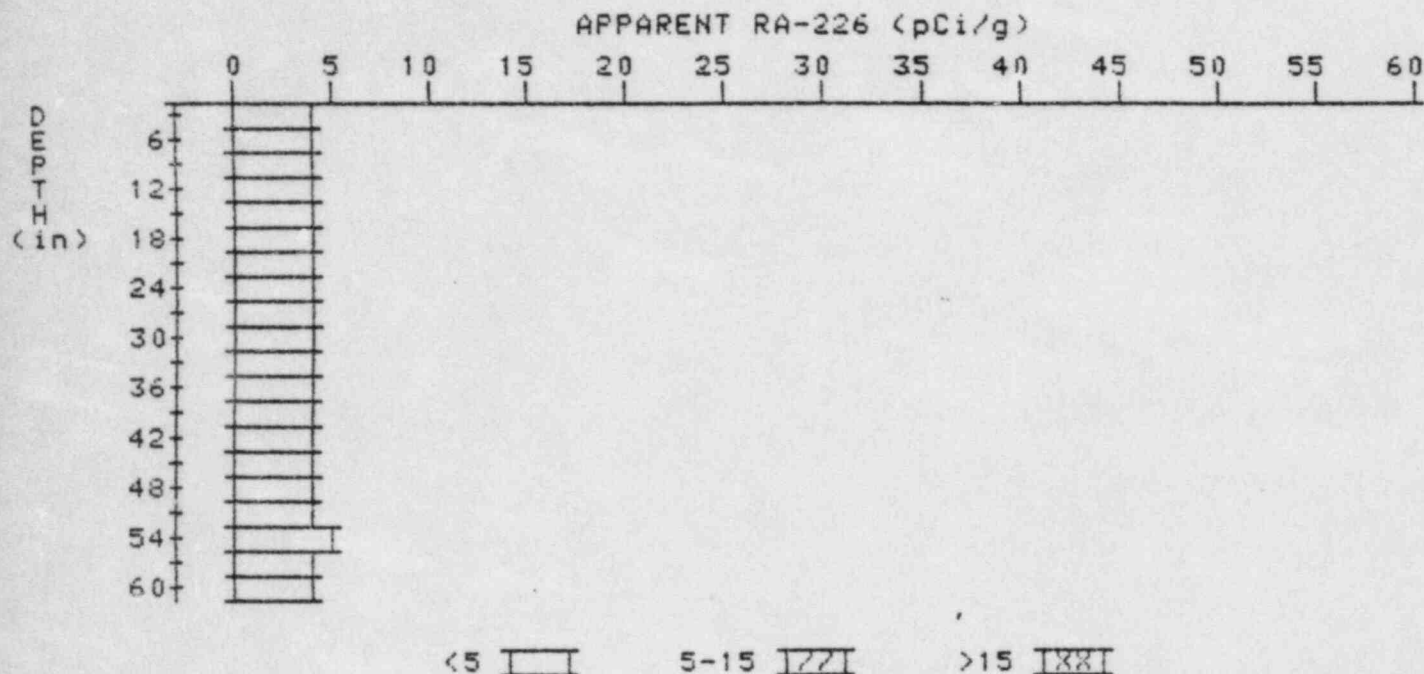
54
57
60
63

4.0
4.0
4.1
4.0

4.2
3.8
4.5
4.0

APPARENT RADIUM-226 CONCENTRATION 13 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01376-RS
HOLE NUMBER: 13
LOCATION: 215247



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.6	3.6
6	3.8	4.0
9	3.9	3.9
12	4.0	4.2
15	4.0	4.0
18	3.9	4.0
21	4.0	4.0
24	4.0	4.0
27	3.9	4.0
30	3.9	4.0
33	3.8	4.0
36	3.8	4.0
39	3.8	4.0

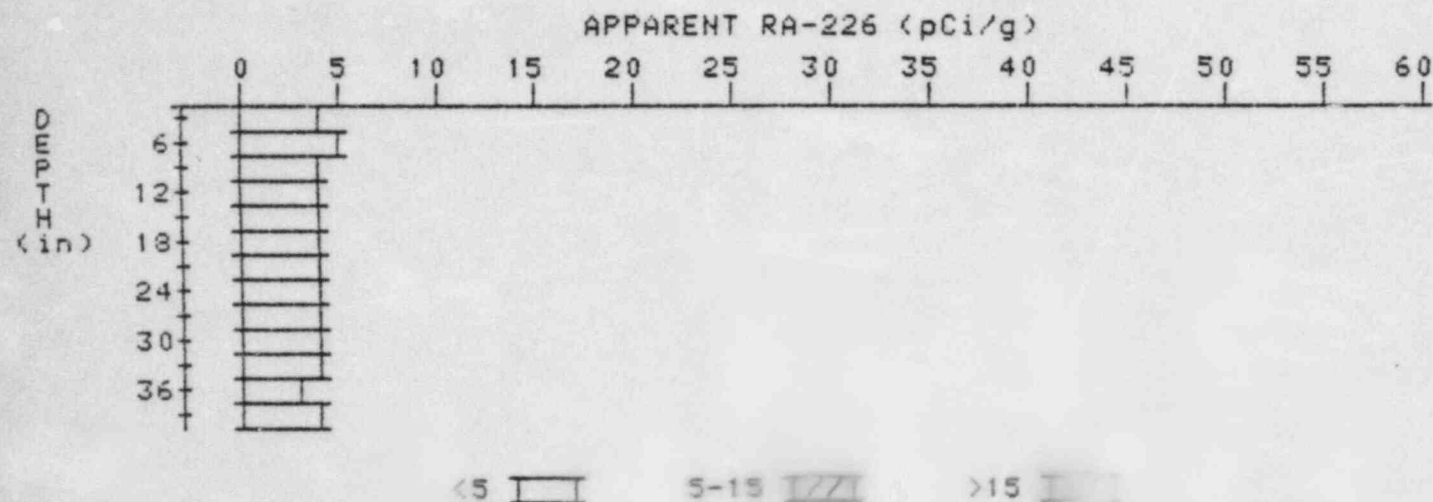
57
60

4.1
4.2

3.7
4.2

APPARENT RADIUM-226 CONCENTRATION 16 DECONVOLUTION GRAPH

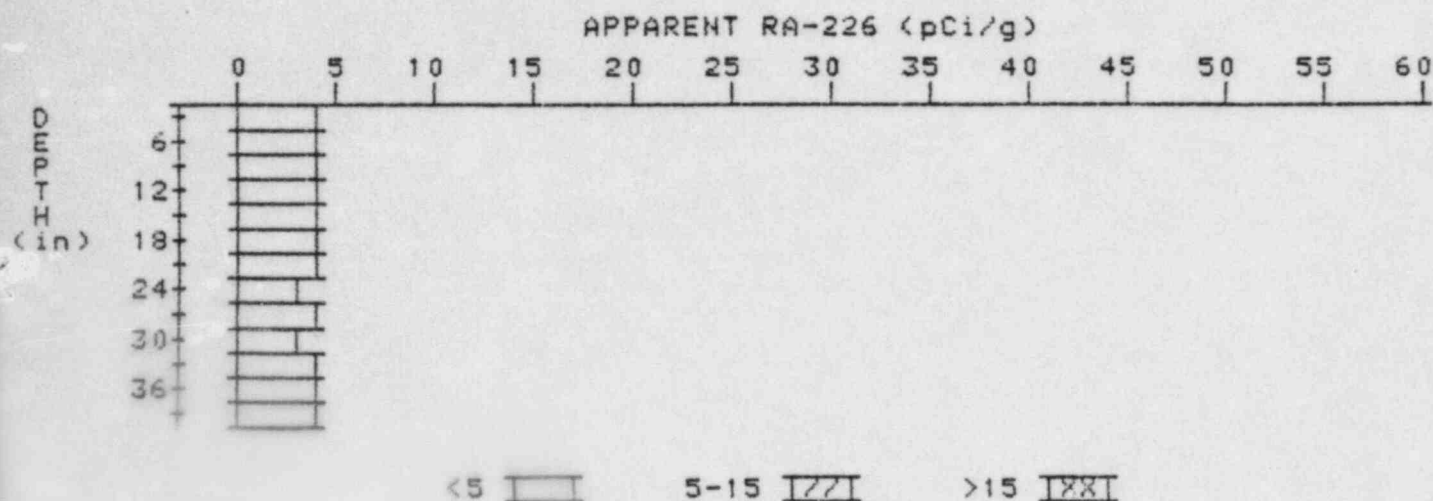
PROPERTY NUMBER: GJ-01376-RS
HOLE NUMBER: 16
LOCATION: 256254



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

APPARENT RADIUM-226 CONCENTRATION 20 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01376-RS
HOLE NUMBER: 20
LOCATION: 270248



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.6	3.6
6	3.7	3.9
9	3.7	3.5
12	3.8	4.0
15	3.8	3.8
18	3.8	3.6
21	3.9	4.3
24	3.8	3.4
27	3.9	4.3
30	3.8	3.4
33	3.9	4.1
36	3.9	4.1
39	3.8	3.8

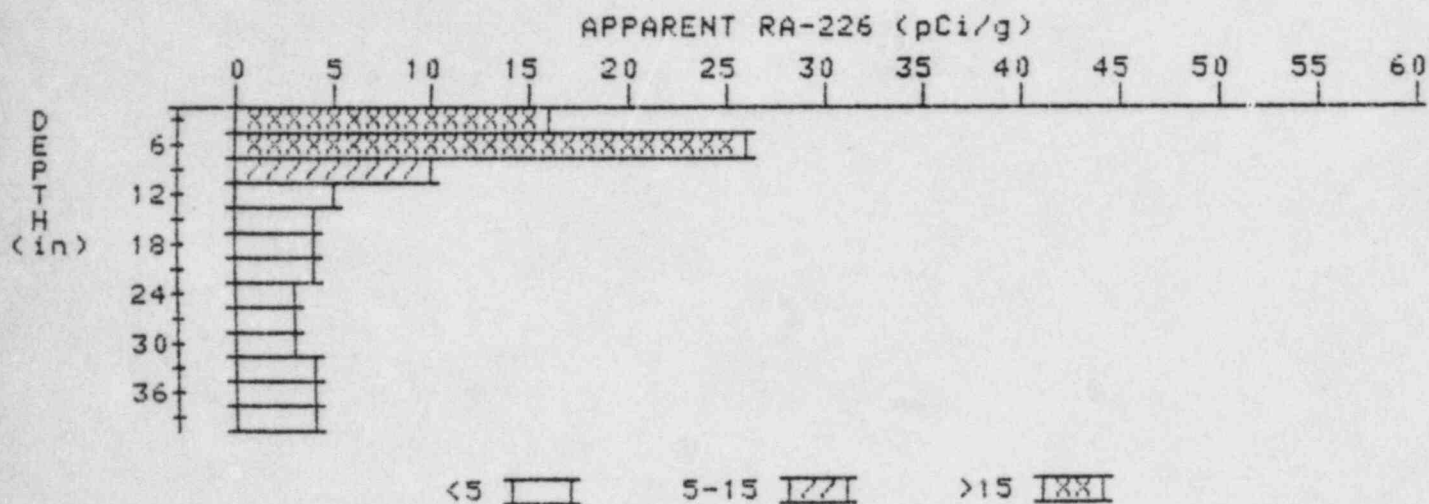
APPARENT RADIUM-226 CONCENTRATION 21

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01376-RS

HOLE NUMBER: 21

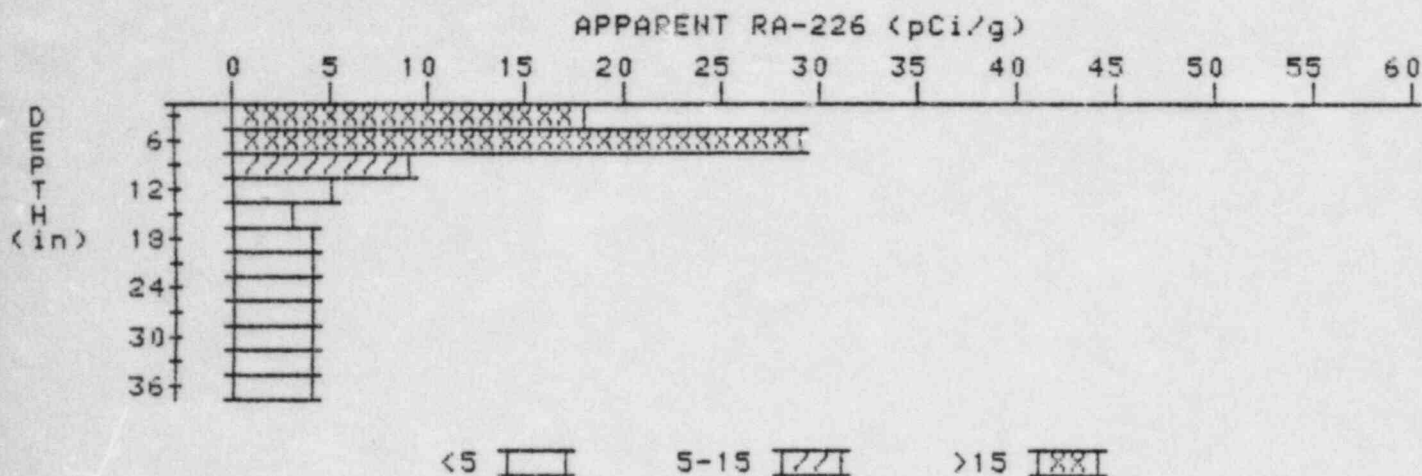
LOCATION: 281257



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	16.1	16.1
6	16.7	26.5
9	11.8	10.0
12	7.9	4.7
15	5.8	4.0
18	4.7	3.8
21	4.1	3.7
24	3.7	3.2
27	3.6	3.4
30	3.6	3.4
33	3.7	3.7
36	3.8	3.6
39	4.0	4.0

APPARENT RADIUM-226 CONCENTRATION 22 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01376-RS
HOLE NUMBER: 22
LOCATION: 287244



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	18.4	18.4
6	18.2	28.7
9	12.1	8.5
12	8.0	4.6
15	5.8	3.5
18	4.9	4.2
21	4.4	4.0
24	4.1	3.7
27	4.0	4.0
30	3.9	3.7
33	3.9	3.9
36	3.9	3.9

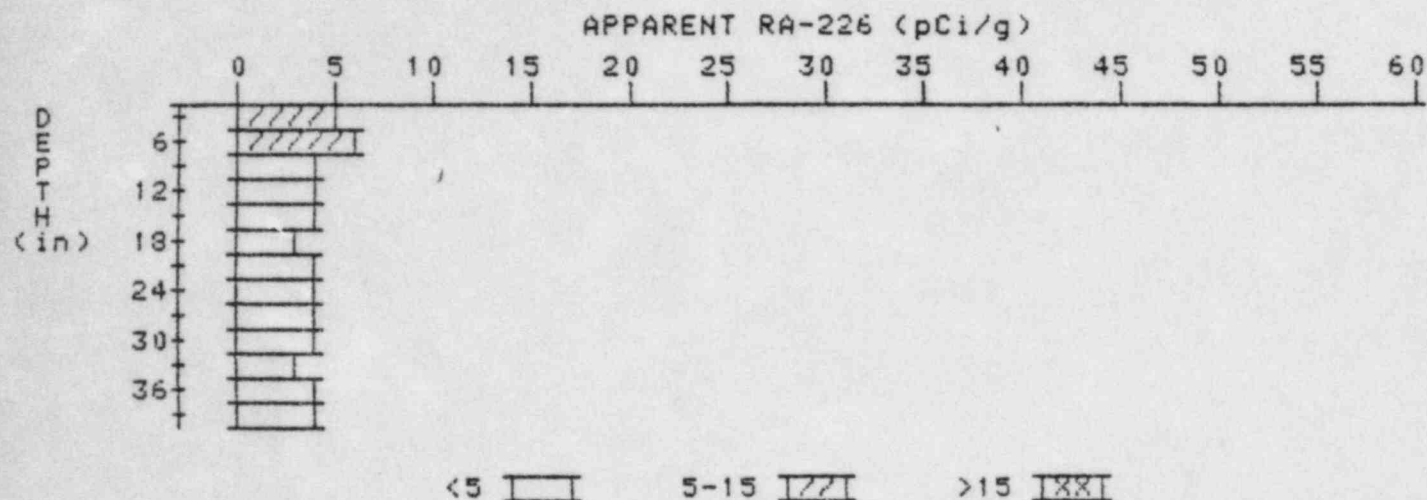
APPARENT RADIUM-226 CONCENTRATION 23

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01376-RS

HOLE NUMBER: 23

LOCATION: 288225



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.1	5.1
6	5.0	5.7
9	4.5	4.3
12	4.1	3.7
15	3.9	3.9
18	3.7	3.2
21	3.8	3.8
24	3.9	4.3
27	3.8	3.6
30	3.8	4.0
33	3.7	3.3
36	3.8	4.2
39	3.7	3.7

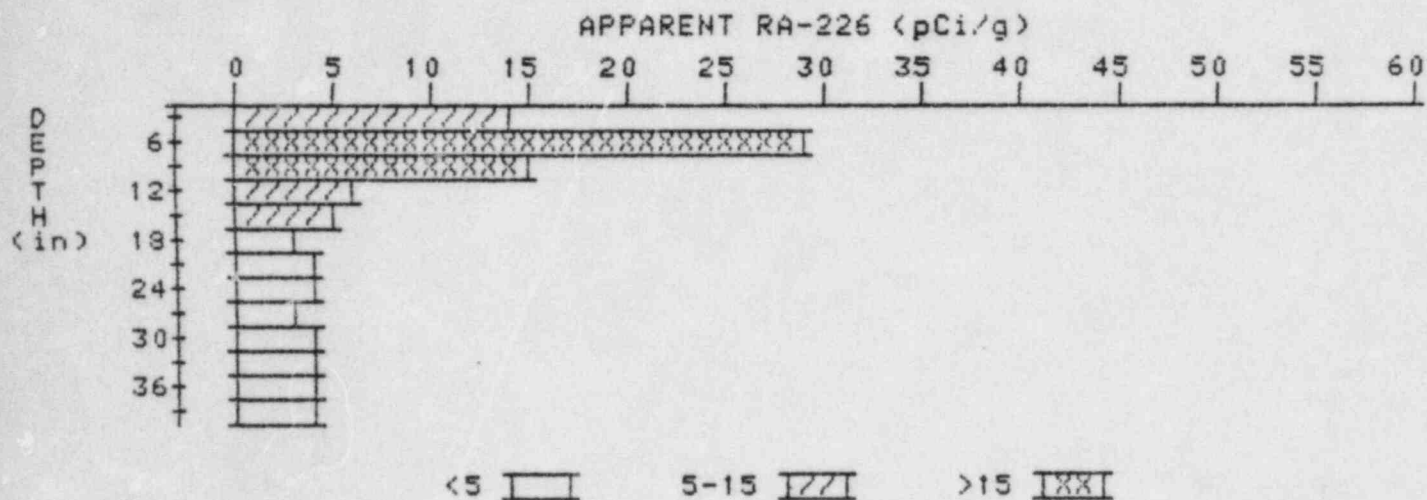
APPARENT RADIUM-226 CONCENTRATION 24

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01376-RS

HOLE NUMBER: 24

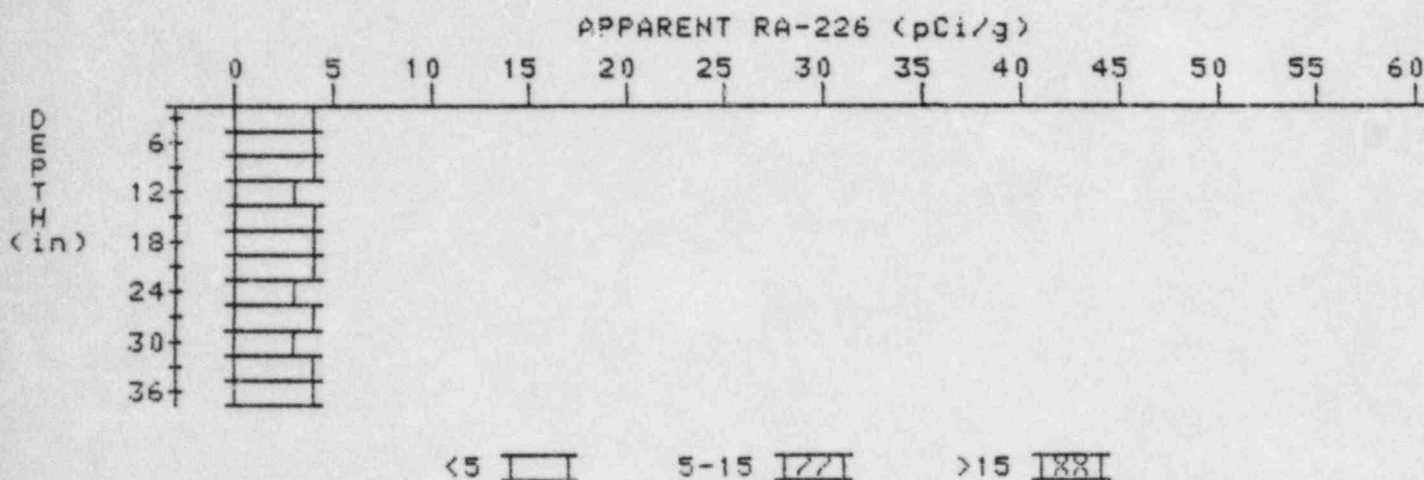
LOCATION: 288254



Depth (in)	Apparent Radium-226 (pCi/g)	Apparent Radium-226 (pCi/g)
	Undeconvolved	Deconvolved
3	13.7	13.7
6	17.0	28.7
9	13.7	15.5
12	9.4	6.4
15	6.8	5.0
18	5.2	3.4
21	4.6	4.1
24	4.3	4.3
27	4.0	3.5
30	4.0	4.2
33	3.9	3.5
36	4.0	3.8
39	4.2	4.2

APPARENT RADIUM-226 CONCENTRATION 26 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01376-RS
HOLE NUMBER: 26
LOCATION: 294265



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.7	3.7
6	3.7	3.5
9	3.8	4.2
12	3.7	3.3
15	3.8	3.8
18	3.9	4.4
21	3.7	3.5
24	3.6	3.4
27	3.6	3.6
30	3.6	3.4
33	3.7	3.7
36	3.8	3.8