

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-00316-RS
ADDRESS: 2428 HALL AVENUE

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 ^{SS} _{CDH}

M. TUCKER
DOE PROJECT ENGINEER

DATE

August 13, 1985

REA00316:REA-707

8508300064 850814
PDR WASTE
WM-54 PDR

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-00316-RS, is a single-family residence located at 2428 Hall Avenue, Grand Junction, Colorado.

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

1.2 Evaluation and Recommendation

The action recommended is the removal of contaminated material and restoration of the property to its original condition. The identified residual radioactive material found on this property is tailings; the estimated volume is: exterior, 159 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is \$9,258. Remedial action on this property will take approximately 21 days to complete.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 2428 Hall Avenue, Grand Junction, Colorado

Zoning: Residential (RSF-8)

Lot Size: Approximately 8,960 sf (0.21 acres)

Legal Description: Lot 3 plus east 4 feet of Lot 4 of Block 1 of the Regent Subdivision, City of Grand Junction, County of Mesa, State of Colorado.

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

Utilities: Utility locations are shown in Appendix Figure 2.2.

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

Bordering Properties:

North:	Alley (asphalt)
South:	Hall Avenue (asphalt)
East:	Single-family residence
West:	Single-family residence

2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-story residence
Size:	Approximately 1,334 sf
Construction Date:	1958
Construction:	Wood-frame with brick veneer
Foundation:	Concrete stemwall on spread footing
Footing Depth:	Approximately 27" to bottom of footing from grade
Basement:	Yes - partial
Crawl Space:	Yes - partial
Condition:	Good

Other Structures:

Type:	Shed
Size:	Approximately 90 sf
Construction:	Prefabricated metal
Foundation:	2 x 4 stud and plywood
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-00316-RS on June 28, 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) was conducted. These records indicate elevated gamma levels associated with the northwest corner of the primary structure, the entire north yard, and in areas of the south yard.

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

3.2 Gamma Exposure-Rate Surveys

3.2.1 Exterior Findings

Background Readings: 15 to 17 uR/h
Highest Outside Gamma Reading (HOG): 188 uR/h

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

3.2.2 Interior Findings

Background Readings: 14 to 16 uR/h
Highest Inside Gamma Reading (HIG): 23 uR/h

Interior radium-concentration measurements are presented in Appendix Table 3.2. Interior gamma exposure-rate measurements are summarized in Appendix Table 3.3. Appendix Figure 3.2 shows interior exposure rates in the shed 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 3.2 and 3.3. Data from these investigations are included in Appendix Tables 3.1 and 3.2.

3.4 Radon/Radon Daughter Concentration (RDC)

Determined by CDH: 0.008 gross working level (WL). No additional RDC measurements were taken by Bendix.

3.5 Extent of Contamination

Appendix Figures 3.4a and 3.4b show identified areas and estimated depths of contamination on this property, based on assessments of all measurements taken. As noted in these figures, areas recommended for remedial action that contain identified residual radioactive materials are:

- (Area A) Surface Material: Wood
 Direction From Primary Structure: North
 Other Directions: Under the shed
 Total Depth of Contamination: Estimated at 12 inches
 Other (height or thickness): 3/8-inch-thick plywood
 Comments: The depth of contamination is based on data collected in Area B. The shed is metal, erected on a wood floor. There is a mudsill foundation.
 Approximate Square Footage: 90
- (Area B) Surface Material: Lawn
 Direction From Primary Structure: North
 Total Depth of Contamination: 12 inches
 Comments: The lawn is in poor condition and consists mainly of weeds. There are several mature trees in this area.
 Approximate Square Footage: 2,693
- (Area C) Surface Material: Soil
 Direction From Primary Structure: North
 Other Directions: Along north property line
 Total Depth of Contamination: 12 inches
 Approximate Square Footage: 360
- (Area D) Surface Material: Concrete
 Direction From Primary Structure: North and west
 Other Directions: North sidewalk
 Total Depth of Contamination: Estimated at 12 inches
 Other (height or thickness): 4-inch-thick concrete
 Comments: The depth of contamination is based on data collected in Area B.
 Approximate Square Footage: 553

- (Area E) Surface Material: Soil
Direction From Primary Structure: North
Other Directions: Adjacent to north foundation
Total Depth of Contamination: Estimated at 12 inches
Comments: This area contains a rose bush. The depth of contamination is based on data collected in Area B.
Approximate Square Footage: 75
- (Area F) Surface Material: Lawn
Direction From Primary Structure: South
Total Depth of Contamination: 9 inches
Comments: This area consists of 7 deposits.
Approximate Square Footage: 394
- (Area G) Surface Material: Concrete
Direction From Primary Structure: South
Other Directions: Sidewalk near south entryway
Total Depth of Contamination: Estimated at 9 inches
Other (height or thickness): 4-inch-thick concrete
Comments: The depth of contamination is based on data collected in Area F.
Approximate Square Footage: 30
- (Area H) Surface Material: Soil
Direction From Primary Structure: South
Other Directions: Adjacent to south foundation
Total Depth of Contamination: 9 inches
Comments: This area contains several mature juniper bushes. It is likely that the contamination will be deeper than 9 inches around their roots.
Approximate Square Footage: 140
- (Area I) Surface Material: Soil
Direction From Primary Structure: East
Other Directions: Adjacent to east foundation
Total Depth of Contamination: Estimated at 12 inches
Comments: The depth of contamination is based on data collected in Area B.
Approximate Square Footage: 60

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-00316-RS, includes removal of all areas identified as containing radioactive material (as discussed in Section 3.5 and shown in Appendix Figures 3.4a and 3.4b) and transport of removed material to the disposal site.

After remedial action is completed, the areas involved will be restored to original condition in accordance with the Bendix drawings, Vicinity Properties General Construction Specification (Bendix Field Engineering Corporation, 1984), and Statement of Work for Construction Subcontractor.

Dislocation of the occupants will not be required for this remedial action.

4.2 Evaluation of Recommended Remedial Action

Volume calculations of the areas included for remedial action are presented in Appendix Table 4.1. Cost estimates are presented in Appendix Table 4.2.

Estimated cost of remedial action is \$9,258.

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	Interior Gamma Exposure Rates and Sample Locations
Figure 3.3	Exterior Sample Locations
Figure 3.4a	Interior Estimated Extent of Contamination
Figure 3.4b	Exterior Estimated Extent of Contamination

Official Survey Report

Memo of Understanding

Team Leader Notes

Deconvolution Graphs (Apparent Radium-226 Concentration)

Exterior Gamma Scan Map

Radium Concentrations at Exterior Locations

DOE ID #GJ-00316-RS

2428 Hall Avenue

Page 1 of 5

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
2	130270	00	DS	<1.0		*	Asphalt in alley
3	140240	00	DS	71.2		*	North yard
		03	TC	54.3		*	
		06	TC	53.7		*	
		09	TC	35.6		*	DC = 12 inches
		12	TC	20.4		*	Based on the
		15	TC	12.6		*	deconvolution graph
		18	TC	8.6		*	
		21	TC	6.2		*	
		24	TC	5.4		*	
		27	TC	4.6		*	
		30	TC	4.6		*	
		33	TC	4.5		*	
4	145275	00	DS	74.8		*	North yard
		03	TC	46.6		*	
		06	TC	32.6		*	DC = 12 inches
		09	TC	19.7		*	Based on the
		12	TC	12.3		*	deconvolution graph
		15	TC	8.7		*	
		18	TC	6.7		*	
		21	TC	5.7		*	
		24	TC	5.2		*	
		27	TC	4.9		*	
		30	TC	4.9		*	
		33	TC	5.1		*	
5	174263	00	DS	<1.0		*	North yard
6	180230	00	DS	23.5		*	West fence line
		03	TC	14.8		*	
		06	TC	12.2		*	
		09	TC	9.2		*	DC = 12 inches
		12	TC	6.7		*	Based on the
		15	TC	5.2		*	deconvolution graph
		18	TC	4.6		*	
		21	TC	4.3		*	
		24	TC	4.0		*	
		27	TC	3.9		*	
		30	TC	3.8		*	
		33	TC	3.7		*	
		36	TC	3.7		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-00316-RS

2428 Hall Avenue

Page 2 of 5

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
7	185265	00	DS	<1.0		*	
		03	TC	3.1		*	North yard
		06	TC	3.3		*	Background location
		09	TC	3.4		*	
		12	TC	3.4		*	DC = 0 inches
		15	TC	3.4		*	
		18	TC	3.4		*	
		21	TC	3.4		*	
		24	TC	3.4		*	
		27	TC	3.5		*	
		30	TC	3.5		*	
		33	TC	3.5		*	
		36	TC	3.5		*	
8	190290	00	DS	22.2		*	East fence line
		03	TC	10.9		*	
		06	TC	8.1		*	DC = 12 inches
		09	TC	6.2		*	Based on the
		12	TC	4.9		*	deconvolution graph
		15	TC	4.5		*	
		18	TC	4.2		*	
		21	TC	4.2		*	
		24	TC	4.2		*	
		27	TC	4.3		*	
		30	TC	4.2		*	
		33	TC	4.3		*	
9	200249	00	DS	6.7		*	On sidewalk
10	200250	12	DS	2.2		*	Horizontally under sidewalk
11	203273	00	DS	1.5		*	North yard
12	209256	00	DS	19.2		*	Sewer line
		03	TC	8.7		*	DC = 12 inches
		06	TC	7.0		*	Based on the
		09	TC	5.9		*	deconvolution graph

Radium Concentrations at Exterior Locations

DOE ID #GJ-00316-RS

2428 Hall Avenue

Page 3 of 5

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
12	209256	12	TC	5.2		*	
		15	TC	4.8		*	
		18	TC	4.8		*	
		21	TC	4.7		*	
		24	TC	4.6		*	
		27	TC	4.2		*	
		30	TC	4.0		*	
		33	TC	4.0		*	
		36	TC	3.8		*	
		39	TC	3.9		*	
13	213243	00	DS	5.9		*	Sidewalk
14	223232	00	DS	5.9		*	Sidewalk
15	225288	03	TC	3.2		*	East foundation
		06	TC	3.4		*	
		09	TC	3.5		*	
		12	TC	3.5		*	DC = 0 inches
		15	TC	3.5		*	
		18	TC	3.5		*	
		21	TC	3.6		*	
		24	TC	3.5		*	
		27	TC	3.5		*	
		30	TC	3.5		*	
16	230230	00	DS	1.9		*	
		03	TC	4.1		*	West side of
		06	TC	4.1		*	primary structure
		09	TC	4.0		*	by sidewalk
		12	TC	3.9		*	
		15	TC	3.7		*	DC = 0 inches
		18	TC	3.7		*	
		21	TC	3.8		*	
		24	TC	3.8		*	
		27	TC	3.9		*	
		30	TC	3.8		*	
		33	TC	3.9		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-00316-RS

2428 Hall Avenue

Page 4 of 5

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
17	237287	00	DS	1.6		*	Gas line
		18	DS	1.2		*	
18	239233	00	DS	2.8		*	West of garage
19	239259	00	DS	8.2		*	Water line
		03	TC	7.0		*	South side of house
		06	TC	6.9		*	
		09	TC	5.7		*	
		12	TC	4.9		*	DC = 9 inches Based on the deconvolution graph
		15	TC	4.4		*	
		18	TC	4.0		*	
		21	TC	4.0		*	
		24	TC	3.9		*	
		27	TC	3.9		*	
		30	TC	4.0		*	
20	240285	00	DS	8.9		*	Under shrubs
21	240287	00	DS	2.3		*	Southeast corner of primary structure
		03	TC	3.8		*	
		06	TC	3.3		*	
		09	TC	3.4		*	
		12	TC	3.5		*	DC = 0 inches
		15	TC	3.6		*	
		18	TC	3.6		*	
		21	TC	3.7		*	
		24	TC	3.7		*	
		27	TC	3.7		*	
		30	TC	3.6		*	
		33	TC	3.8		*	
22	245266	00	DS	7.1		*	Sidewalk
23	260234	00	DS	2.7		*	South of primary structure
		03	TC	5.4		*	
		06	TC	5.3		*	
		09	TC	4.6		*	DC = 9 inches Based on the deconvolution graph
		12	TC	4.1		*	
		15	TC	3.7		*	
		18	TC	3.5		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-00316-RS

2428 Hall Avenue

Page 5 of 5

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
23	260234	21	TC	3.7		*	
		24	TC	3.6		*	
		27	TC	3.6		*	
		30	TC	3.7		*	
		33	TC	3.7		*	
		36	TC	3.6		*	
24	260240	00	DS	<1.0		*	Concrete driveway
25	266276	00	DS	17.7		*	South yard
26	275230	00	DS	4.9		*	By city sidewalk
27	275290	00	DS	27.2		*	By city sidewalk
		03	TC	18.7		*	DC = 9 inches
		06	TC	11.2		*	Based on all
		09	TC	7.4		*	available data
		12	TC	5.5		*	
		15	TC	4.6		*	
		18	TC	4.1		*	
		21	TC	4.0		*	
		24	TC	4.0		*	
		27	TC	4.1		*	
		30	TC	4.0		*	
		33	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 = 06-28-85
Team Leader = CRK

Radium Concentrations at Interior Locations

DOE ID #GJ-00316-RS

2428 Hall Avenue

Page 1 of 1

=====						
In Situ Ra-226						
Loc	Grid	Depth	Meas.	(pCi/g)		Chem Ra-226
#	Location	(in.)	Type	Tot. Ct	Spectr.	(pCi/g)

1		00	DS	45.1		*
						Inside shed

=====

Measurement	GB = GAD-6 Borehole	Notes:	DC = Depth of Contamination
Types:	GS = GAD-6 Surface		* = No Soil Sample Taken
	DS = Delta Scintillometer		[n] = Reading Taken n-Inches
	TC = Total Count Borehole		Above Floor or Ground
	SS = Soil Sample		Date of Survey = 06-28-85
	BH = Combined GAD-6 and		Team Leader = CRK
	Total Count Borehole		

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	00	00	00	18	15-18	17
Ground floor	*	*	*	*	14-16	*
Northwest Bedroom	05	14-23	18	05	15-22	18
Garage	08	13-16	15	07	14-16	15
Shed	05	38-51	45	05	40-96	71

=====

* A walking gamma scan was performed on the ground floor to confirm the absence of interior contamination. Exposure rates in the shed are shown in Appendix Figure 3.2.

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-00316-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>
EXTERIOR					
Concrete					
D	170 x 2.5 =	425			
	4 x 2.5 =	10			
	18 x 2.5 =	45			
	25 x 2.5 =	63			
	4 x 2.5 =	10			
		553	x 0.3 =	166	
G	10 x 3 =	30	x 0.3 =	10	
	Volume of Concrete			= 176	= 176/27 = 7
Contaminated Fill					
A*	9 x 10 =	90	x 1.0 =	90	
B	70 x 10 =	700			
	25 x 25 =	625			
	76 x 18 =	1,368			
		2,693	x 1.0 =	2,693	
C	60 x 6 =	360	x 1.0 =	360	
D	221 x 2.5 =	553	x 0.7 =	387	
E	5 x 15 =	75	x 1.0 =	75	
F	25 x 5 =	125			
	13 x 8 =	104			
	15 x 5 =	75			
	5 x 9 =	45			
	15 x 3 =	45			
		394	x 0.8 =	315	

*NOTE: Area A is under a prefabricated shed that is easily movable.
Therefore, it is considered an exterior area.

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-00316-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>
G	10 x 3 =	30	x 0.5 =	15	
H	5 x 28 =	140	x 0.8 =	112	
I	12 x 5 =	60	x 1.0 =	60	
Volume of Fill				= 4,107	= 4,107/27 = 152
TOTAL VOLUME - EXTERIOR					= 159

See Appendix Figures 3.4.a and 3.4b For Areas

=====

Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-00316-RS

Page 1 of 2

EXTERIOR

Remove/replace metal shed	
Lump sum	\$ 60
Remove identified residual radioactive material	
142 cy @ \$14.50/cy (machine-open)	2,059
10 cy @ \$44/cy (manual-open)	440
Remove/replace 4" concrete sidewalks	
583 sf @ \$3/sf	1,749
Remove existing/place new 6 bushes	
6 each @ \$35/each	210
Remove existing/place new cactus garden	
Lump sum	100
Remove/replace 42" chainlink fencing	
210 lf @ \$2.60/lf	546
Move/replace personal property items	
Lump sum	60
Replace areas with compacted roadbase	
7 cy @ \$11.50/cy	81
Replace areas with topsoil	
145 cy @ \$9.50/cy	1,378
Replace areas with sod	
400 sf @ \$.30/sf	120
	<hr/>
OT EXTERIOR	\$ 6,803

Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-00316-RS

Page 2 of 2

TOTAL EXTERIOR	\$	6,803
TOTAL INTERIOR		0
ACCESS CONTROL		250
		<hr/>
SUBTOTAL	\$	7,053
CONTINGENCY @ 5%		353
		<hr/>
SUBTOTAL	\$	7,406
CONTRACTOR OVERHEAD & PROFIT @ 25%		1,852
		<hr/>
GRAND TOTAL	\$	9,258

=====

JF081285
REA00316/REA-707/AP

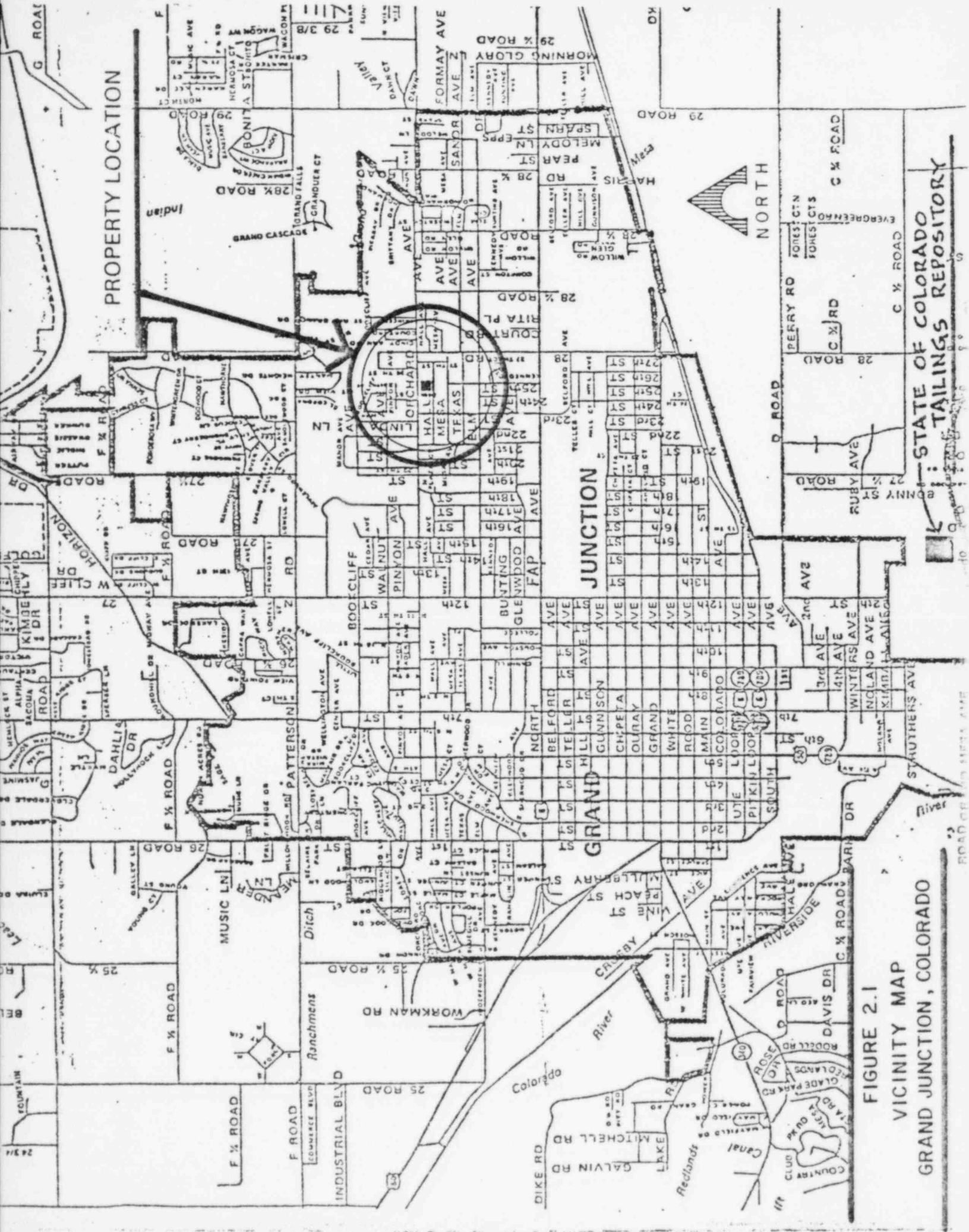
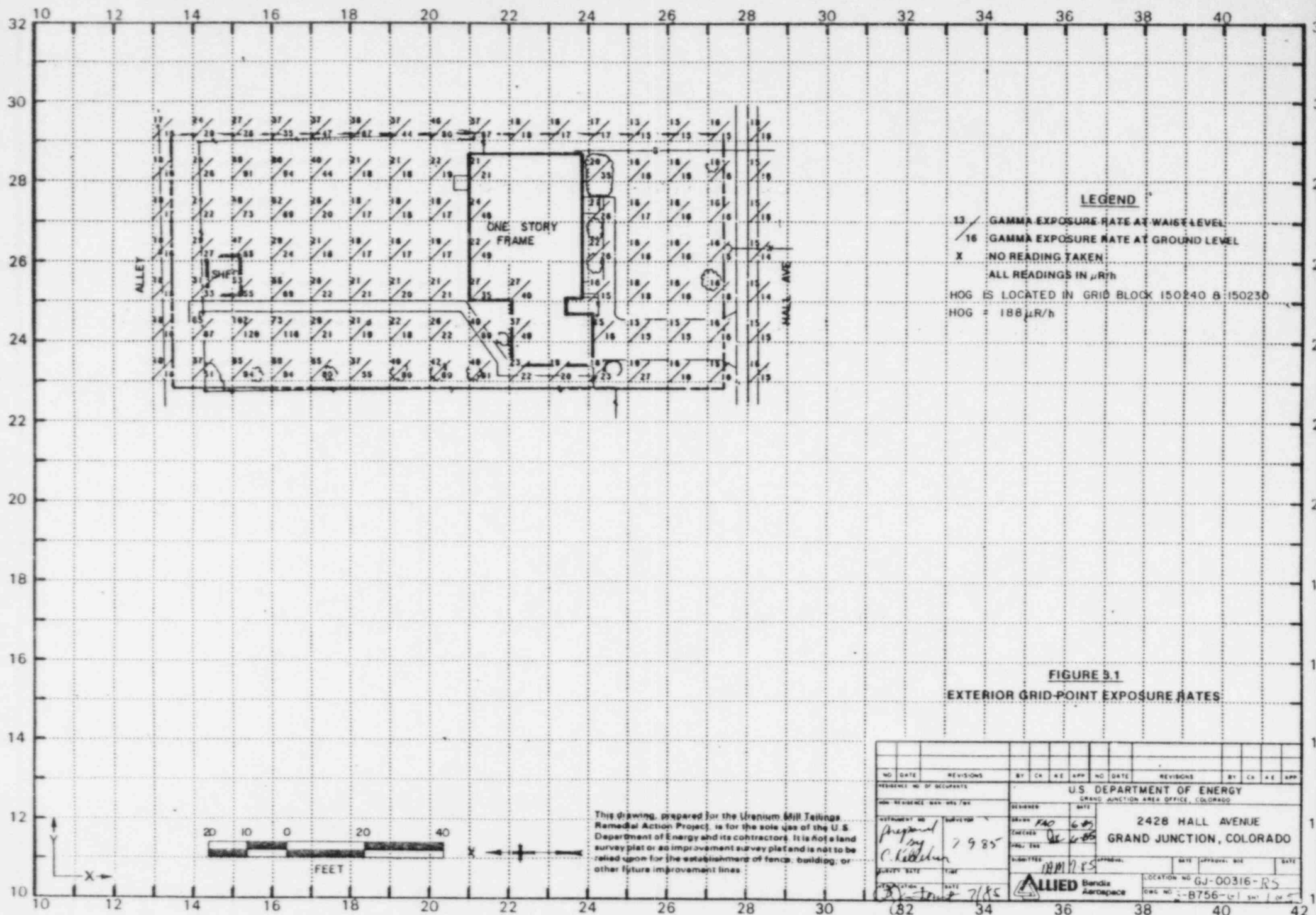
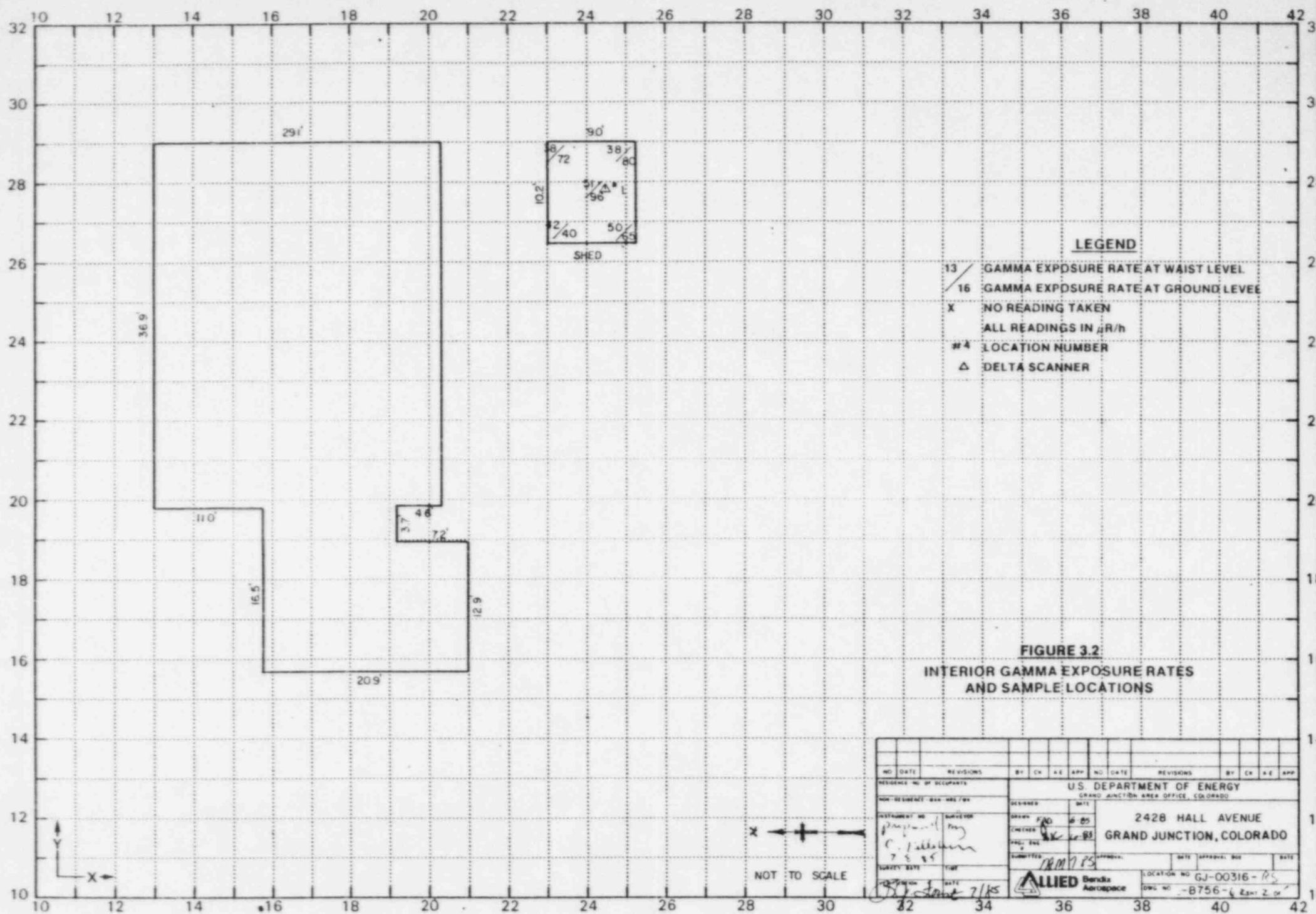


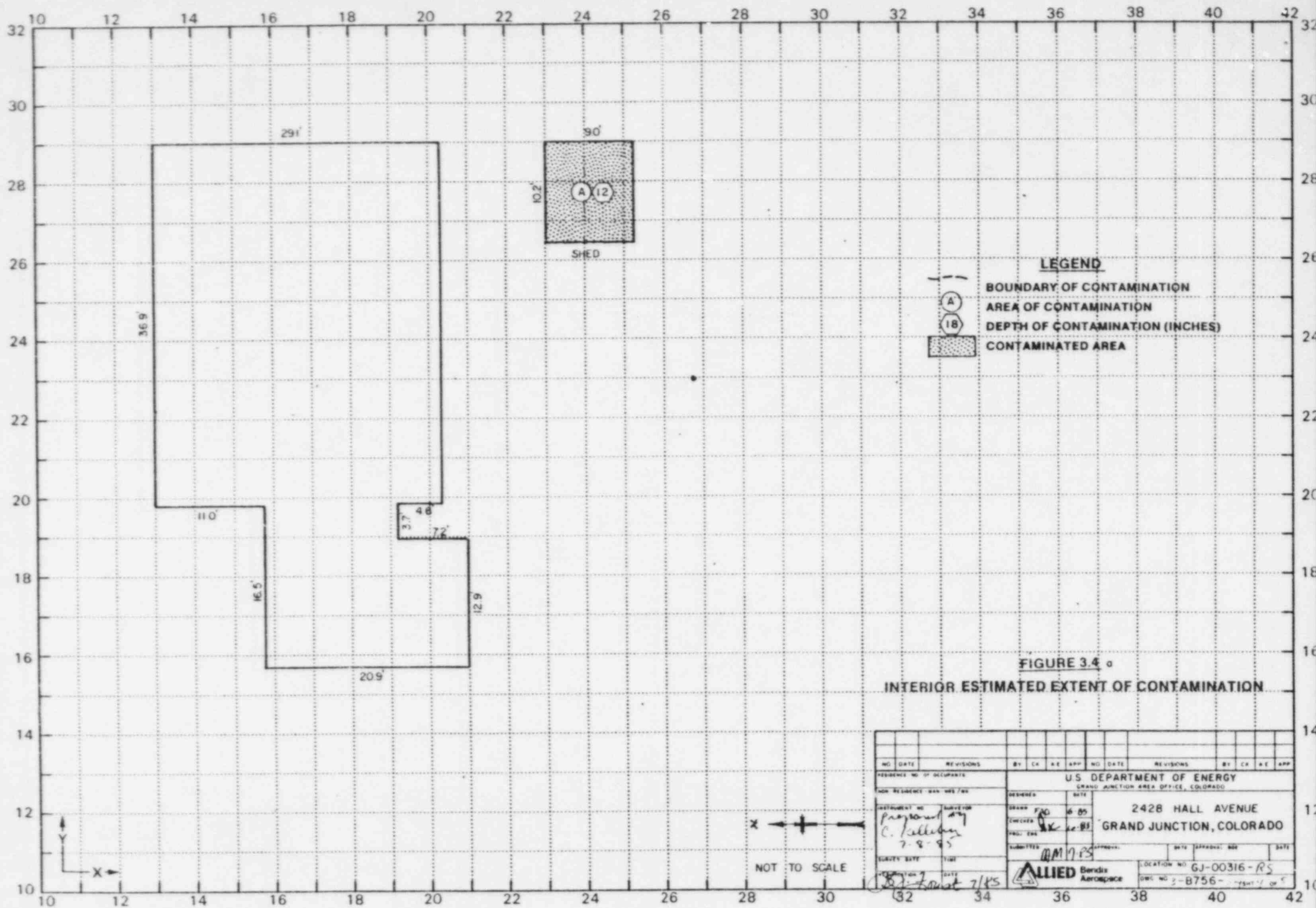
FIGURE 2.1
VICINITY MAP
GRAND JUNCTION, COLORADO

STATE OF COLORADO
TAILINGS REPOSITORY





NO		DATE		REVISIONS		BY		CN		AE		APP		NO	
RESIDENCE NO OF OCCUPANTS						U.S. DEPARTMENT OF ENERGY									
AOM RESIDENCE MAX WRTN						GRAND JUNCTION AREA OFFICE, COLORADO									
INSTRUMENT NO		SERIAL NO		DESIGNED		DATE		2428 HALL AVENUE GRAND JUNCTION, COLORADO							
DRAWN		CHECKED		NO		6-85									
C. J. Johnson		7-8-85		NO		6-85									
7-8-85				NO											
LUNARY DATE		TIME		SUBMITTED		APPROVED		DATE		APPROVE. BUS		DATE			
7-8-85				ARMPS											
LOCATION NO		DATE		ALLIED		Bendix Aerospace		LOCATION NO		6J-00316-1/5					
7-8-85								OWN		-B756-6		2 of 2			



3/85

DOE ID NO. GJ-00316-RS

Date 7-8-85

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

Official Survey Report

Property Address 2428 Hall Ave

Property Owner P.E. Connolly

Address of Owner (if different from above) same

Report Prepared By Cathy Kelleher

I. PRESENCE/ABSENCE OF RESIDUAL RADIOACTIVE MATERIALS

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

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

1 xxxx 1 In open areas.

1 xxxx 1 Under or around exterior improvements.

1 xxxx 1 Under or around a typically nonoccupied structure.

1 xxxx 1 Under or around a typically occupied structure.

II. RESULTS OF RADIOLOGIC ASSESSMENT

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

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

cc:

G. A. Franz, III, GJ/CDE

J. Themelis, Mgr. UMTRA Proj. Off.

HIG = 23 uR/h
HOG = 188 uR/h

July 17, 1985

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

ATTN: Elaine Brummett

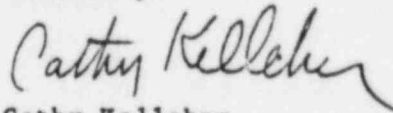
Dear Elaine:

The following is in response to your questions and comments concerning Department of Energy (DOE) Identification (ID) number GJ-00316.

This area will be checked further at the time of remedial action. We are currently averaging to within plus or minus 3 inches, if there are multiple depths of contamination for a given area. If the depth of contamination is more than 3 inches different than the average, it will be called out as a separate area.

Thank you for your time and cooperation. If you should have additional questions or comments you may contact me at 242-8621, extension 432.

Sincerely,



Cathy Kelleher
RSD Survey Team Leader

CK:pr

MEMORANDUM

ALLIED Bendix
Aerospace

Bendix Field Engineering Corporation
Grand Junction Operations
Grand Junction, Colorado

Date: June 28, 1985

To: Files

From: Cathy Kelleher

Subject: Team Leader Notes - GJ-00316-RS

Address: 2428 Hall Avenue

Owner: P.E. Connolly

Occupancy: Four

Weather: Sunny and hot

Team Members

C. Kelleher (Team Leader)
G. Larsen
A. Raabe

P. Tuhey
S. Garcia
S. Southern

Instruments

See Equipment Summary sheet. No equipment malfunctions occurred.

Utilities

A delta reading was taken over the gas line at 18-inches deep.

The sewer and water lines were located in the crawl space. Holes were drilled adjacent to the foundation where they exited from the house.

Team Leader Notes
Cathy Kelleher
GJ-00316-RS
June 28, 1985
Page 2

Interior: The background data from the Colorado Department of Health (CDH) showed elevated gamma levels in one corner (northwest) of the interior. A series of readings were taken in the crawl space, which showed no contamination. On the ground floor, a walking scan was done. Elevated readings were found in the northwest corner. The readings appear to be due to shine from the exterior contamination, since the crawl space underneath this room was clean.

Readings taken in the garage were background. Surveying was difficult because of large piles of boxes that blocked access to some areas.

Readings in the metal storage shed showed contamination underneath it. The floor is made of wood and there is no foundation.

Exterior: The majority of the north lawn was contaminated. The contamination did not extend underneath the north sidewalk or into the paved alley. Delta readings were taken to confirm this. Contamination in the front yard was spotty and discontinuous.

Background Information: There was no Oak Ridge National Laboratory (ORNL) data available in the foilo. The CDH data showed elevated gamma levels in the northwest corner of the house. The CDH data also shows contamination of the north lawn, and some minor contamination of the south lawn.

Spillover: The contamination spilled over onto the properties to the west and to the east. The property to the west is shown in the folio plat map as an included property, DOE ID No. GJ-03936. The property to the east (GJ-02724) was also contaminated. The owner signed a consent form. ORNL says the property is in their system but they are unsure of its status. The homeowner indicated ORNL had performed a survey.

Team Leader Notes
Cathy Kelleher
GJ-00316-RS
July 2, 1985
Page 3

Revisit

Date: July 2, 1985

A revisit was made to this location to obtain more information on possible sidewalk contamination. A series of delta readings indicated the sidewalk was elevated. It is not evident whether the contamination is in the concrete, or underneath it, or both. Since I do not want to core the sidewalk, the depth of contamination will be based on data from the adjacent lawn.

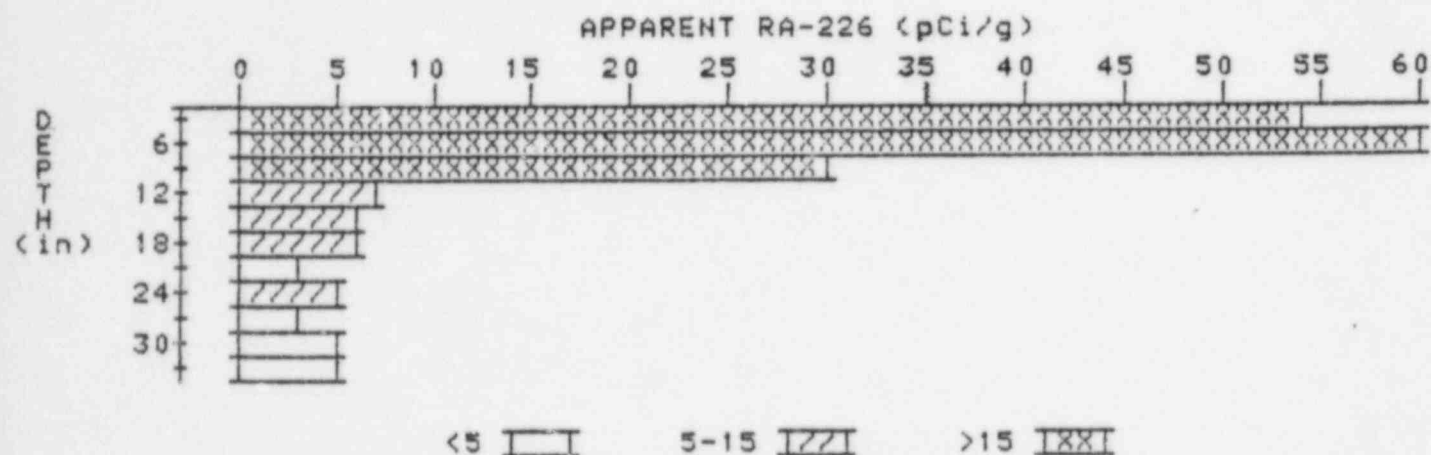
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

3

PROPERTY NUMBER: GJ-00316-RS

HOLE NUMBER: 3

LOCATION: 140240



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	54.3	54.3
6	53.7	34.8
9	35.6	30.4
12	20.4	7.2
15	12.6	5.8
18	8.6	5.8
21	6.2	3.4
24	5.4	5.4
27	4.6	3.2
30	4.6	4.3
33	4.5	4.5

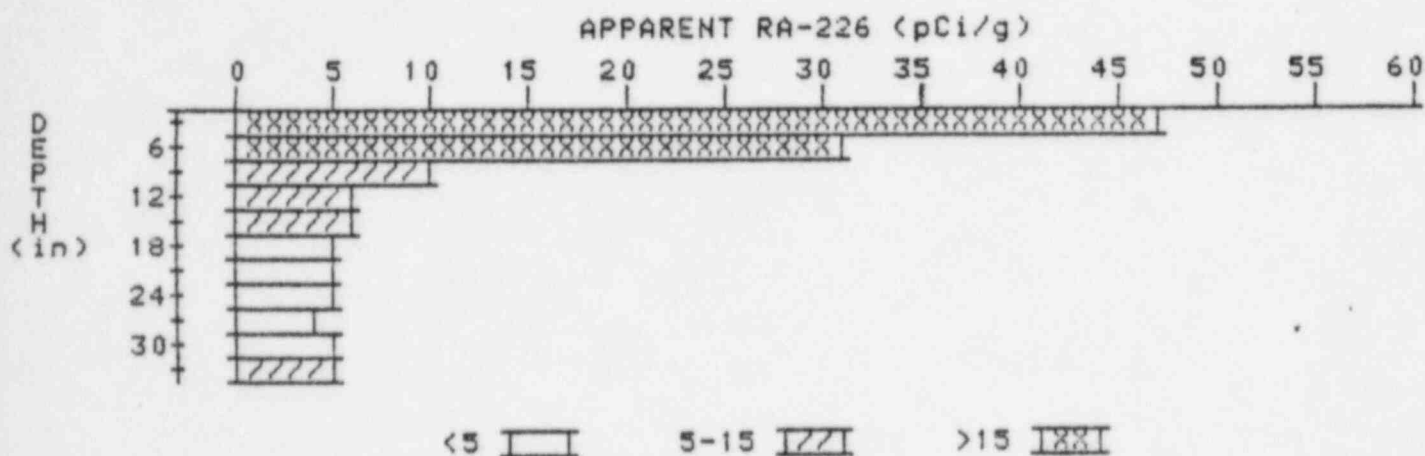
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

4

PROPERTY NUMBER: GJ-00316-RS

HOLE NUMBER: 4

LOCATION: 145275



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	46.6	46.6
6	32.6	30.6
9	19.7	9.9
12	12.3	5.5
15	8.7	5.9
18	6.7	4.9
21	5.7	4.3
24	5.2	4.3
27	4.9	4.4
30	4.9	4.5
33	5.1	5.1

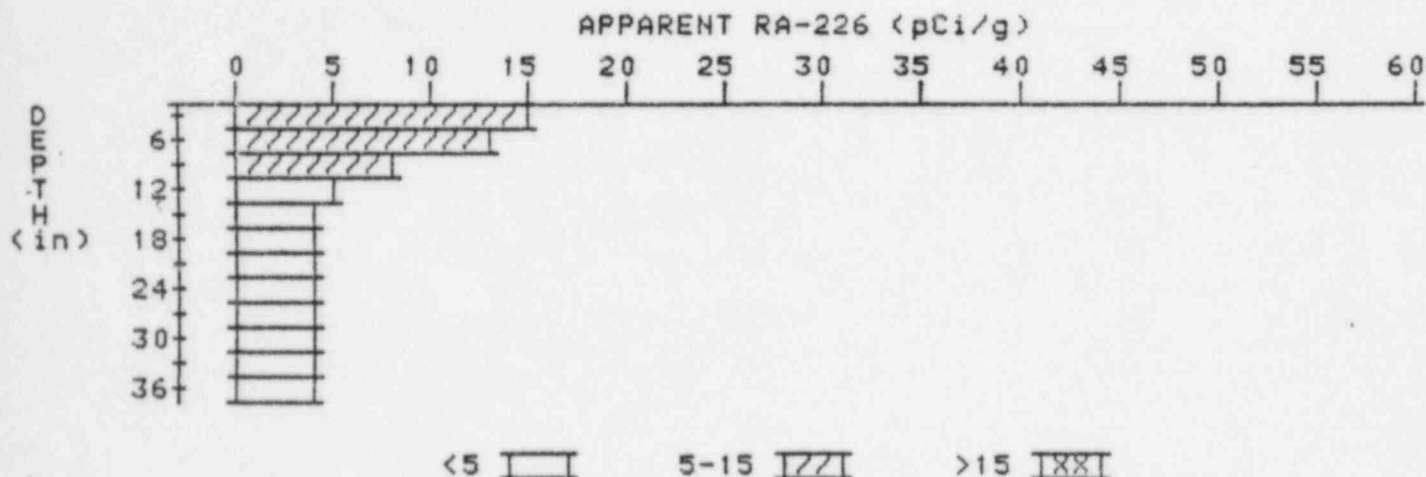
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

6

PROPERTY NUMBER: GJ-00316-RS

HOLE NUMBER: 6

LOCATION: 180230



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	14.8	14.8
6	12.2	12.9
9	9.2	8.3
12	6.7	4.9
15	5.2	3.6
18	4.6	4.1
21	4.3	4.3
24	4.0	3.6
27	3.9	3.9
30	3.8	3.8
33	3.7	3.5
36	3.7	3.7

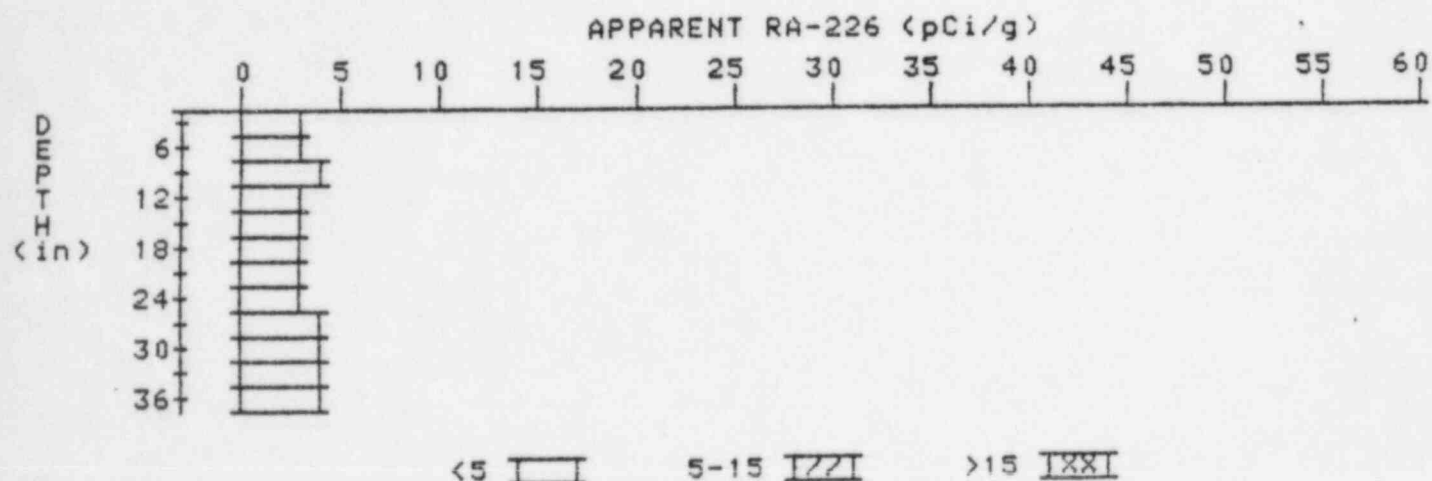
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

7

PROPERTY NUMBER: GJ-00316-RS

HOLE NUMBER: 7

LOCATION: 185265



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.1	3.1
6	3.3	3.5
9	3.4	3.6
12	3.4	3.4
15	3.4	3.4
18	3.4	3.4
21	3.4	3.4
24	3.4	3.2
27	3.5	3.7
30	3.5	3.5
33	3.5	3.5
36	3.5	3.5

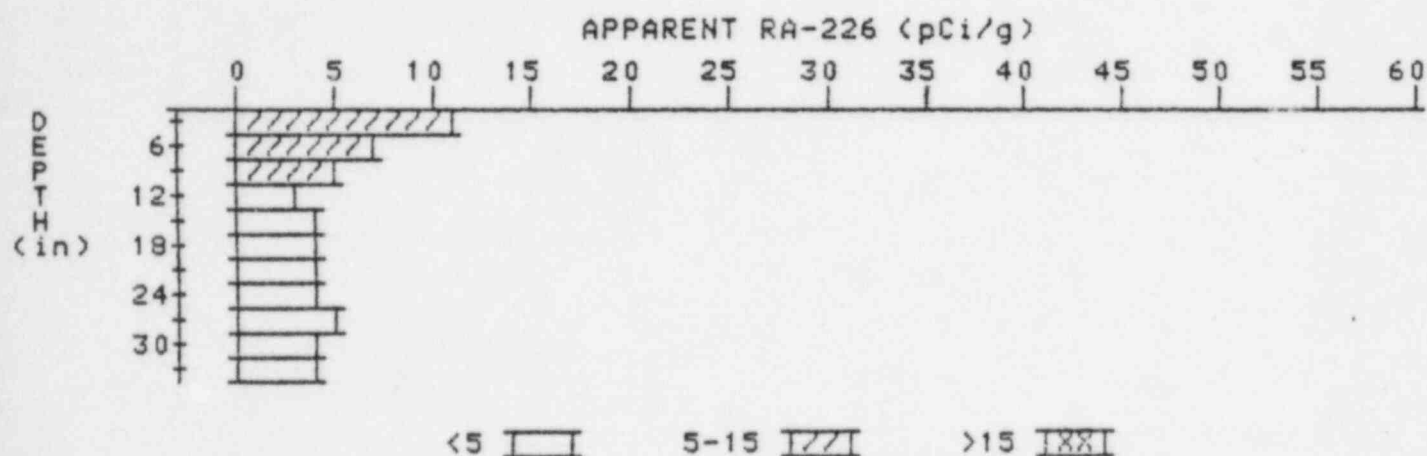
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

8

PROPERTY NUMBER: GJ-00316-RS

HOLE NUMBER: 8

LOCATION: 190290



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	10.9	10.9
6	8.1	6.5
9	6.2	5.1
12	4.9	3.3
15	4.5	4.3
18	4.2	3.7
21	4.2	4.2
24	4.2	4.0
27	4.3	4.7
30	4.2	3.8
33	4.3	4.3

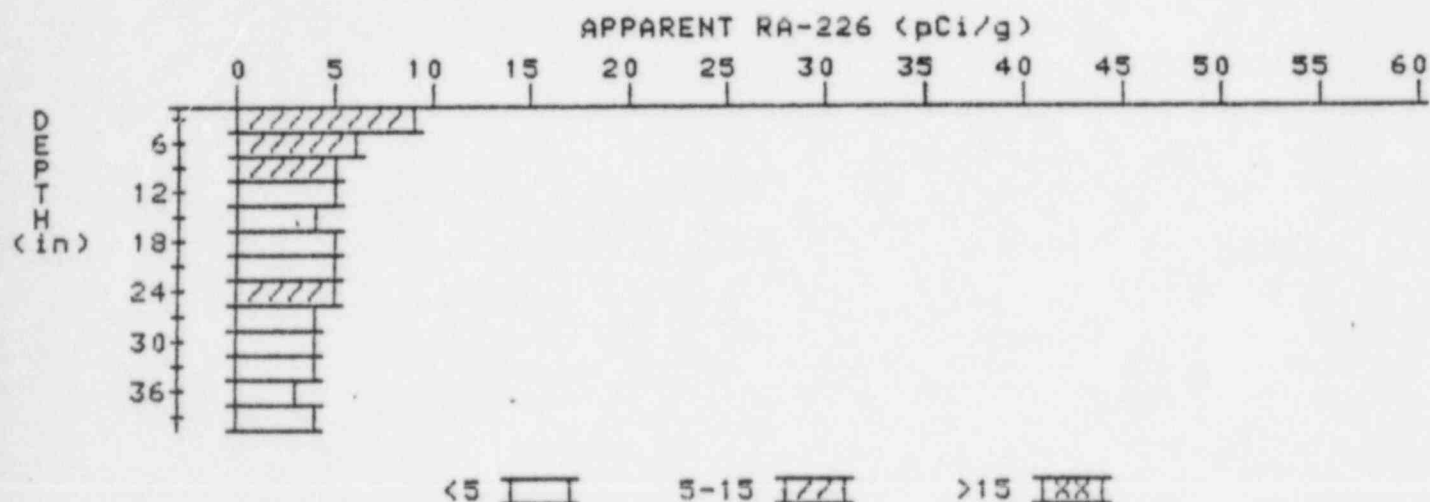
APPARENT RADIUM-226 CONCENTRATION 12

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00316-RS

HOLE NUMBER: 12

LOCATION: 209256



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	8.7	8.7
6	7.0	5.9
9	5.9	5.2
12	5.2	4.7
15	4.8	4.1
18	4.8	5.0
21	4.7	4.7
24	4.6	5.1
27	4.2	3.3
30	4.0	3.6
33	4.0	4.4
36	3.3	3.3
39	3.9	3.9

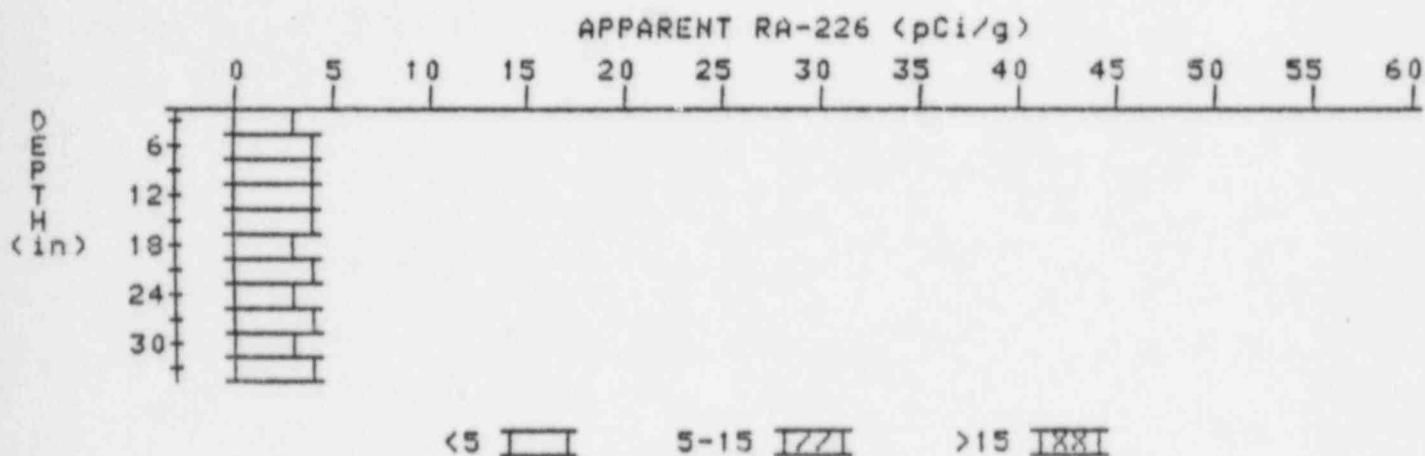
APPARENT RADIUM-226 CONCENTRATION 15

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00316-RS

HOLE NUMBER: 15

LOCATION: 225288



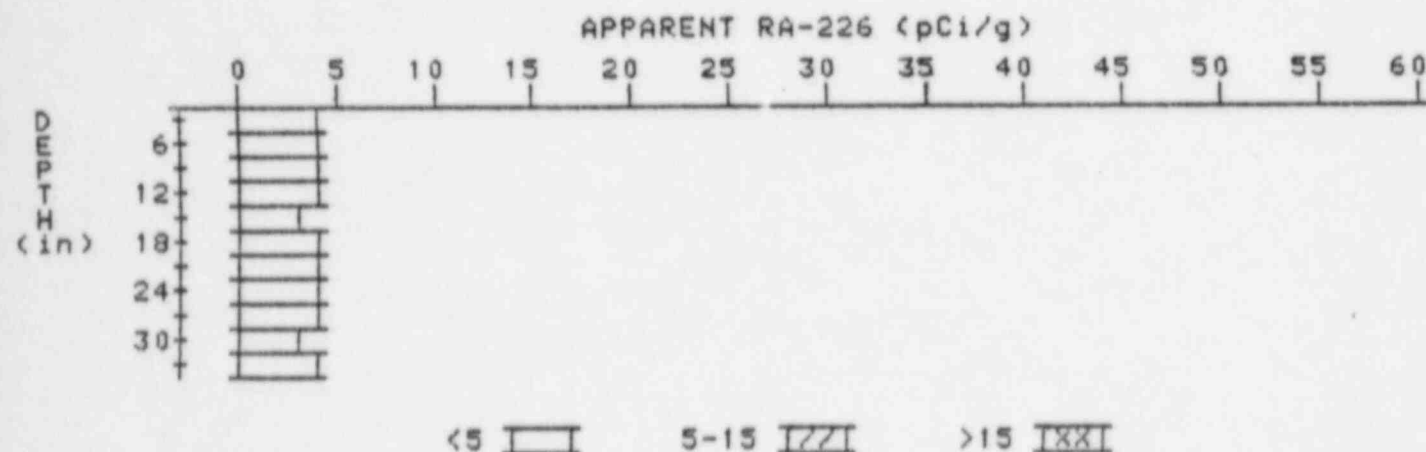
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.2	3.2
6	3.4	3.6
9	3.5	3.7
12	3.5	3.5
15	3.5	3.5
18	3.5	3.3
21	3.6	4.0
24	3.5	3.3
27	3.5	3.5
30	3.5	3.1
33	3.7	3.7

APPARENT RADIUM-226 CONCENTRATION 16 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00316-RS

HOLE NUMBER: 16

LOCATION: 230230



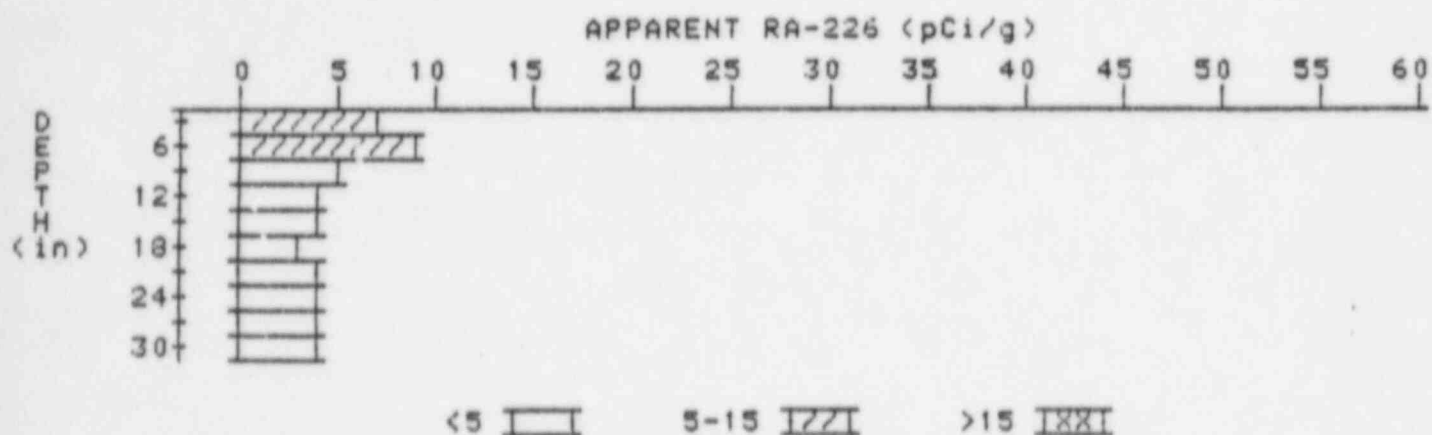
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.1	4.1
6	4.1	4.3
9	4.0	4.0
12	3.9	4.1
15	3.7	3.3
18	3.7	3.5
21	3.8	4.0
24	3.8	3.6
27	3.9	4.3
30	3.8	3.4
33	3.9	3.9

APPARENT RADIUM-226 CONCENTRATION 19 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00316-RS

HOLE NUMBER: 19

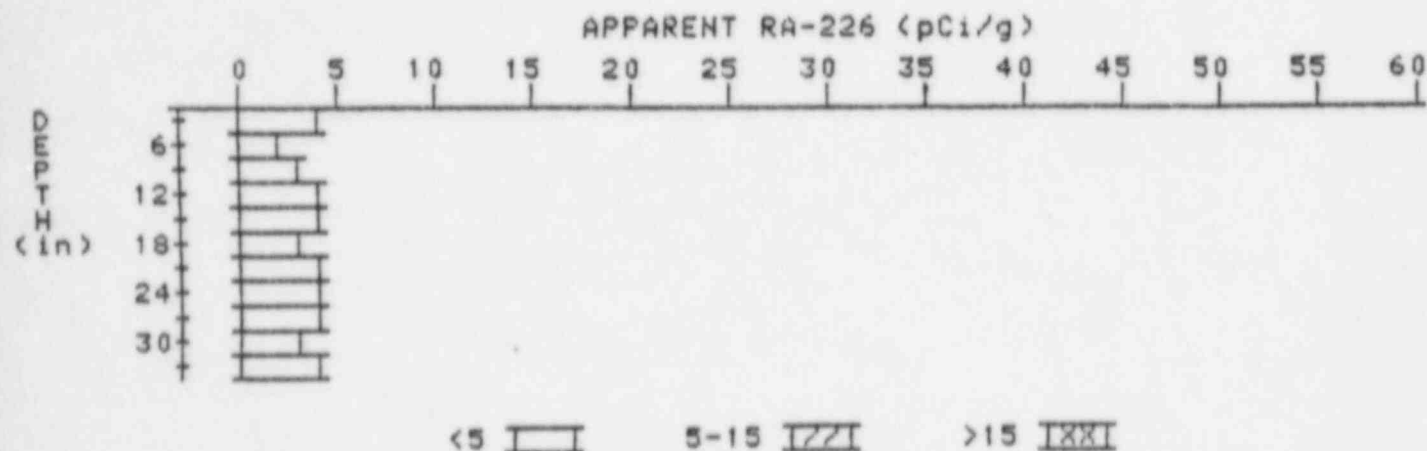
LOCATION: 239259



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	7.0	7.0
6	6.9	8.9
9	5.7	5.0
12	4.9	4.4
15	4.4	4.2
18	4.0	3.3
21	4.0	4.2
24	3.9	3.7
27	3.9	3.7
30	4.0	4.0

APPARENT RADIUM-226 CONCENTRATION 21 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00316-RS
HOLE NUMBER: 21
LOCATION: 240287



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.8	3.8
6	3.3	2.2
9	3.4	3.4
12	3.5	3.5
15	3.6	3.8
18	3.6	3.4
21	3.7	3.9
24	3.7	3.7
27	3.7	3.9
30	3.6	3.1
33	3.8	3.8

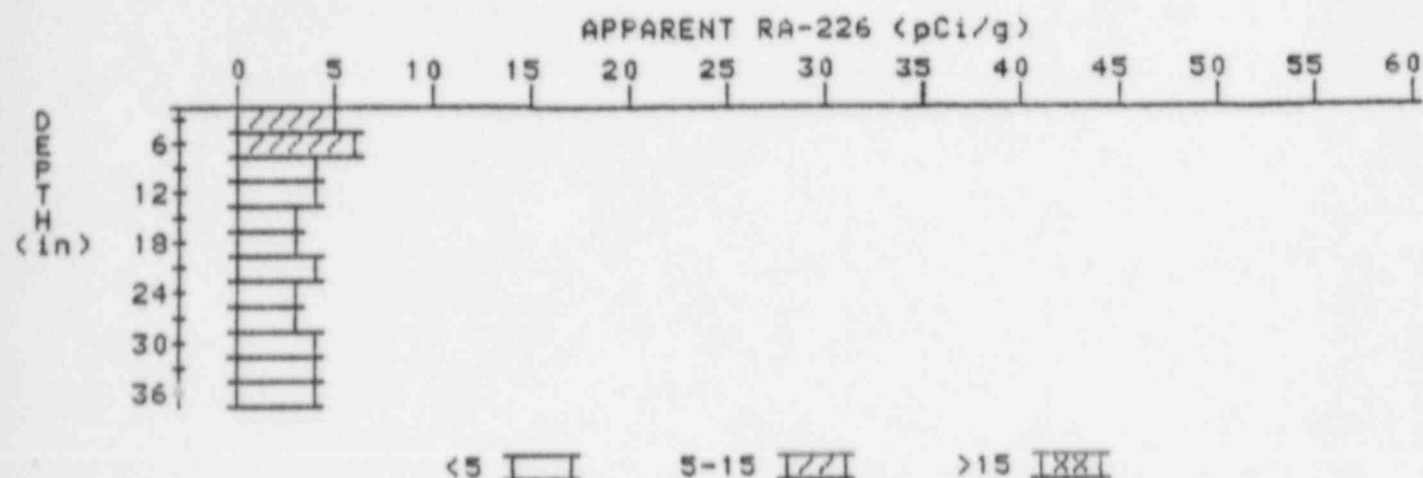
APPARENT RADIUM-226 CONCENTRATION 23

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00316-RS

HOLE NUMBER: 23

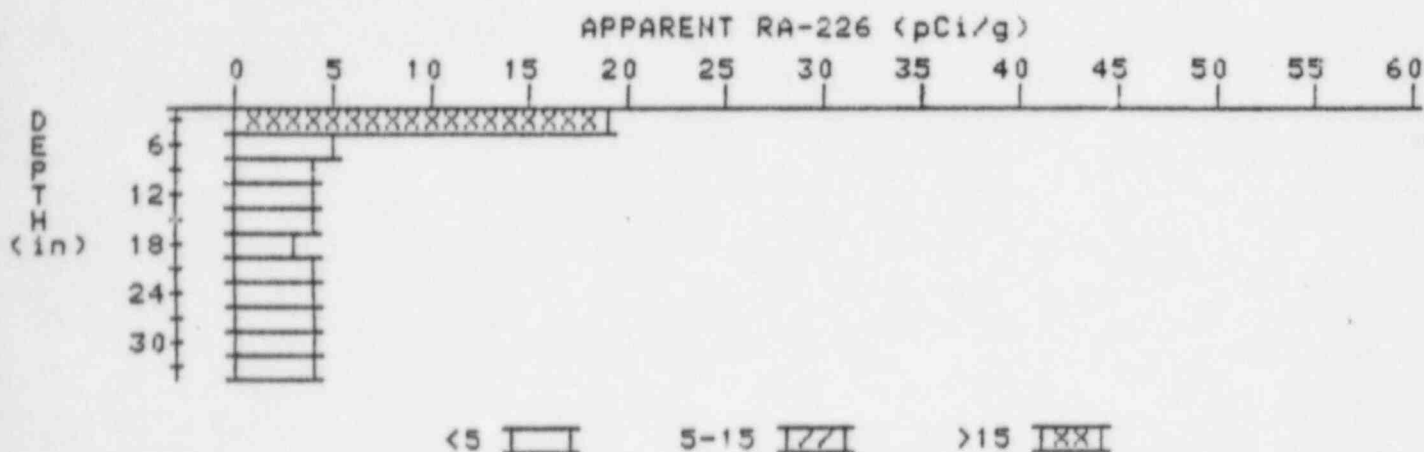
LOCATION: 260234



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.4	5.4
6	5.3	6.4
9	4.6	4.2
12	4.1	3.9
15	3.7	3.3
18	3.5	2.8
21	3.7	4.2
24	3.6	3.4
27	3.6	3.4
30	3.7	3.9
33	3.7	3.9
36	3.6	3.6

APPARENT RADIUM-226 CONCENTRATION 27 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00316-RS
HOLE NUMBER: 27
LOCATION: 275290



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	18.7	18.7
6	11.2	4.6
9	7.4	4.0
12	5.5	3.7
15	4.6	3.9
18	4.1	3.4
21	4.0	3.8
24	4.0	3.8
27	4.1	4.5
30	4.0	3.6
33	4.1	4.1

