

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-10337-RS
ADDRESS: 635 CHIPETA 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

M.K. Tucker *SM*

M. TUCKER
DOE PROJECT ENGINEER

DATE

August 2, 1985

REA10337:REA-614

8508140343 850806
PDR WASTE
WM-54 PDR

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

The location, DOE ID No. GJ-10337-RS, is a single-family residence located at 635 Chipeta 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, 18 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is \$2,012. Remedial action on this property will take approximately 8 days to complete.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 635 Chipeta Avenue, Grand Junction, Colorado

Zoning: Residential (RMF-64)

Lot Size: Approximately 6,250 sf (0.14 acres)

Legal Description: Lots 9 and 10, Block 61, City of Grand Junction, County of Mesa, State of Colorado.

Point of Reference: This property is located approximately 2 mile(s) northwest 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:	Chipeta Avenue
South:	Alley
East:	Alley
West:	Single-family residence

2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-story residence
Size:	Approximately 1,145 sf
Construction Date:	1900
Construction:	Wood-frame
Foundation:	Concrete and block wall on spread-footing
Footing Depth:	Not determined
Basement:	Yes - partial cellar
Crawl Space:	Yes
Condition:	Good

Other Structures:

Type:	Garage
Size:	Approximately 387 sf
Construction:	Wood-frame
Foundation:	None (mud-sill)
Condition:	Fair

General Remarks:

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

Historical Data:

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

Alterations to Structure: A porch at the southwest corner of the residence has been added.

Architectural Significance: None known

Historical Significance: None known

3.0 RADIOLOGIC SURVEY

3.1 Introduction

Radiologic data were collected by Bendix at DOE ID No. GJ-10337-RS on June 27, 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 associated with the city sidewalk.

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, 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): 40 uR/h

Exterior radium-concentration measurements are presented in Appendix Table 3.1. Grid-point survey and walking scan 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): 18 uR/h

Interior gamma exposure-rate measurements are summarized in Appendix Table 3.2.

3.3 Boreholes, Soil Samples, and Other Measurements

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

3.4 Radon/Radon Daughter Concentration (RDC)

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

3.5 Extent of Contamination

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

- (Area A) Surface Material: Concrete
Direction From Primary Structure: North
Other Directions: South of Chipeta Avenue
Total Depth of Contamination: 12 inches
Other (height or thickness): 4-inch-thick concrete
Comments: City sidewalk
Approximate Square Footage: 250
- (Area B) Surface Material: Lawn
Direction From Primary Structure: North
Other Directions: Adjacent to city sidewalk
Total Depth of Contamination: 12 inches
Comments: A small section (6 sf) of the 4-inch-thick
north-south sidewalk is included in this area.
Approximate Square Footage: 222
- (Area C) Surface Material: Soil
Direction From Primary Structure: South
Other Directions: South yard
Total Depth of Contamination: 6 inches
Approximate Square Footage: 12

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-10337-RS, includes removal of all areas identified as containing radioactive material (as discussed in Section 3.5 and shown in Appendix Figure 3.3) 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 \$2,012.

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	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 Exposure Rates
Figure 3.2	Exterior Sample Locations
Figure 3.3	Estimated Extent of Contamination

Official Survey Report

Team Leader Notes

Deconvolution Graphs (Apparent Radium-226 Concentration)

Exterior Gamma Scan Map

Radium Concentrations at Exterior Locations

DOE ID #GJ-10337-RS

635 Chipeta Avenue

Page 1 of 3

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
1	143250	00	DS	7.9		*	
		06	DS	2.6		*	
2	143271	00	DS	9.4		*	North of city sidewalk
		06	DS	7.5		*	
		12	DS	<1.0		*	
		12	DS	24.5		*	Horizontal
3	146276	00	DS	27.6		*	On city sidewalk DC = 12 inches based on all available data
		03	TC	30.2		*	
		06	TC	40.8		*	
		09	TC	31.5		*	
		12	TC	20.3		*	
		15	TC	13.7		*	
		18	TC	9.7		*	
		21	TC	7.7		*	
		24	TC	6.1		*	
		27	TC	5.5		*	
		30	TC	5.0		*	
		33	TC	4.7		*	
		36	TC	4.6		*	
		39	TC	4.6		*	
		42	TC	4.6		*	
		45	TC	4.5		*	
		48	TC	4.4		*	
		51	TC	4.4		*	
		54	TC	4.3		*	
		57	TC	4.4		*	
		60	TC	4.3		*	
		63	TC	4.4		*	
		66	TC	4.2		*	
		69	TC	4.1		*	
		72	TC	4.1		*	
4	150260	00	DS	3.4		*	
		06	DS	12.5		*	Horizontal
5	173257	03	TC	3.2		*	Water line DC = 0 inches
		06	TC	3.4		*	
		09	TC	3.5		*	
		12	TC	3.5		*	
		15	TC	3.5		*	
		18	TC	3.5		*	
		21	TC	3.6		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-10337-RS

635 Chipeta Avenue

Page 2 of 3

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
5	173257	24	TC	3.6		*	
		27	TC	3.7		*	
		30	TC	3.8		*	
		33	TC	3.9		*	
		36	TC	4.0		*	
		39	TC	4.1		*	
		42	TC	4.1		*	
		45	TC	4.3		*	
		48	TC	4.3		*	
		51	TC	4.4		*	
		54	TC	4.3		*	
		57	TC	4.4		*	
		60	TC	4.3		*	
		63	TC	4.3		*	
		66	TC	4.2		*	
6	212263	00	DS	1.4		*	Gas line
		24	DS	1.3		*	
7	215236	00	DS	1.4		*	Background
		03	TC	3.1		*	DC = 0 inches
		06	TC	3.4		*	
		09	TC	3.6		*	
		12	TC	3.8		*	
		15	TC	3.9		*	
		18	TC	3.9		*	
		21	TC	3.9		*	
		24	TC	4.0		*	
		27	TC	3.9		*	
		30	TC	4.0		*	
		33	TC	4.1		*	
		36	TC	4.1		*	
8	220277	03	TC	2.6		*	Sewer line
		06	TC	2.9		*	DC = 0 inches
		09	TC	3.2		*	
		12	TC	3.4		*	
		15	TC	3.5		*	
		18	TC	3.6		*	
		21	TC	3.7		*	
		24	TC	3.8		*	
		27	TC	4.0		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-10337-RS

635 Chipeta Avenue

Page 3 of 3

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
8	220277	30	TC	4.0		*	
		33	TC	4.0		*	
		36	TC	4.0		*	
		39	TC	4.0		*	
		42	TC	4.0		*	
		45	TC	4.0		*	
		48	TC	4.0		*	
		51	TC	4.1		*	
		54	TC	4.1		*	
		57	TC	4.1		*	
		60	TC	4.1		*	
		63	TC	4.0		*	
		66	TC	4.1		*	
9	238261	00	DS	3.8		*	South of primary
		06	DS	1.3		*	structure

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 = 06-27-85
Team Leader = TF

Table 3.2

Summary of Interior Gamma Exposure Rates

DOE ID No. GJ-10337-RS

635 Chipeta Avenue

Page 1 of 1

Location	Number of Readings Taken at Waist Level	Range at Waist Level (uR/h)	Mean at Waist Level (uR/h)	Number of Readings Taken at Surface	Range at Surface (uR/h)	Mean Surface (uR/h)
Ground Floor	*	*	*	*	14 to 18	*
Garage	*	*	*	*	14 to 16	*

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

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-10337-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					
Concrete					
A	5 x 50 =	250	x 0.3 =	75	
B	2 x 3 =	6	x 0.3 =	2	
Volume of Concrete				= 77	= 77/27 = 3
Contaminated Fill					
A	5 x 50 =	250	x 0.7 =	175	
B	2 x 39 =	78	x 1.0 =	78	
	4 x 11 =	44	x 1.0 =	44	
	2 x 47 =	94	x 1.0 =	94	
	2 x 3 =	6	x 0.7 =	4 (under concrete)	
				222	
C	4 x 3 =	12	x 0.5 =	6	
Volume of Fill				= 401	= 401/27 = 15
TOTAL VOLUME - EXTERIOR					= 18

See Appendix Figure 3.3 For Areas

=====

EXTERIOR

Remove/replace concrete 256 sf @ \$3/sf	\$ 768
Remove identified residual radioactive material 15 cy @ \$14.50/cy (machine-open)	218
Replace areas with topsoil 8 cy @ \$9.50/cy	76
Replace areas with compacted roadbase 7 cy @ 11.50/cy	81
Replace areas with sod 216 sf @ \$.35/sf	76

TOTAL EXTERIOR	\$ 1,219
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TOTAL INTERIOR	0
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ACCESS CONTROL	150
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SUBTOTAL	\$ 1,369
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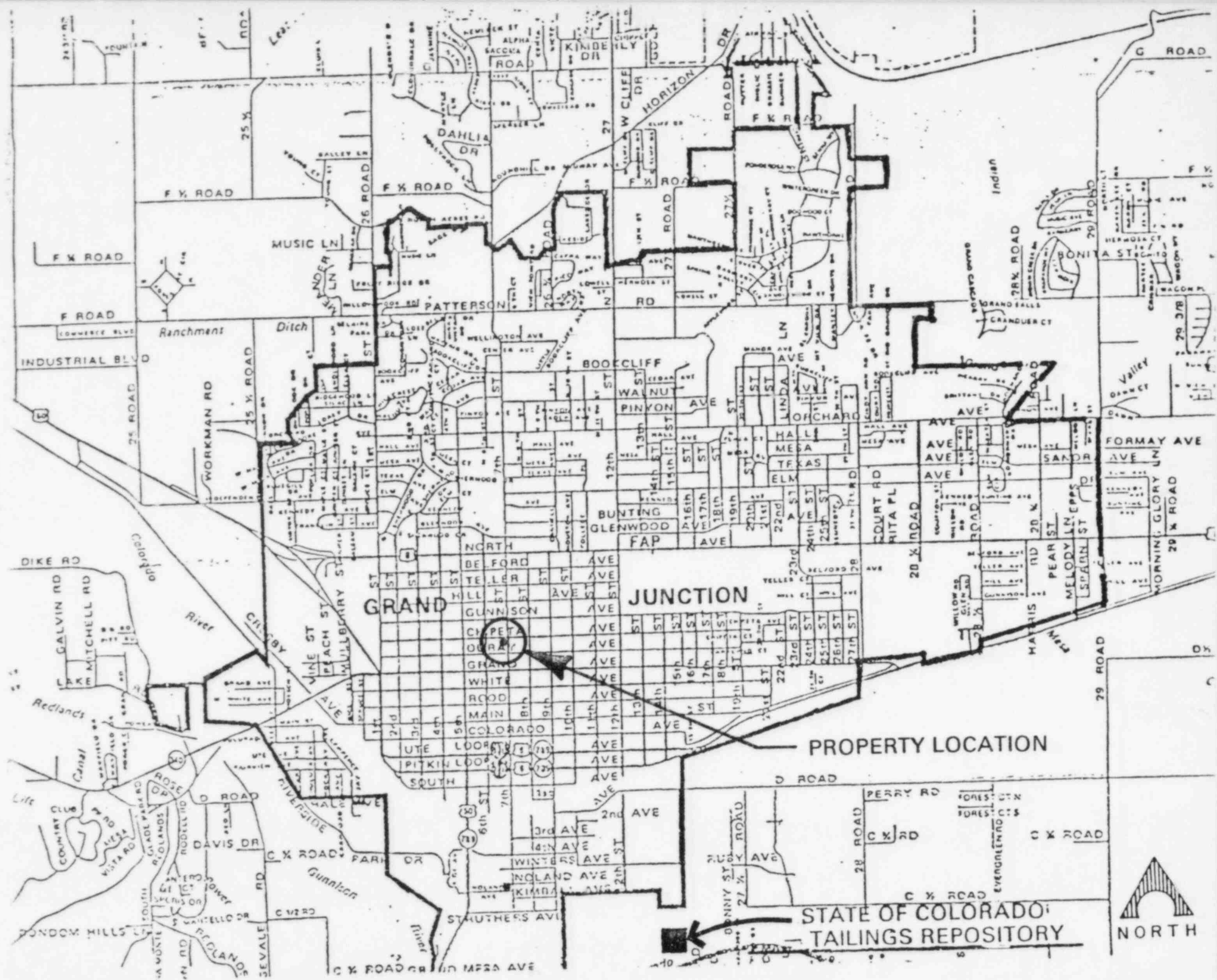
CONTINGENCY @ 5%	68
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SUBTOTAL	\$ 1,437
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CONTRACTOR OVERHEAD & PROFIT @ 40%	575
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GRAND TOTAL	\$ 2,012
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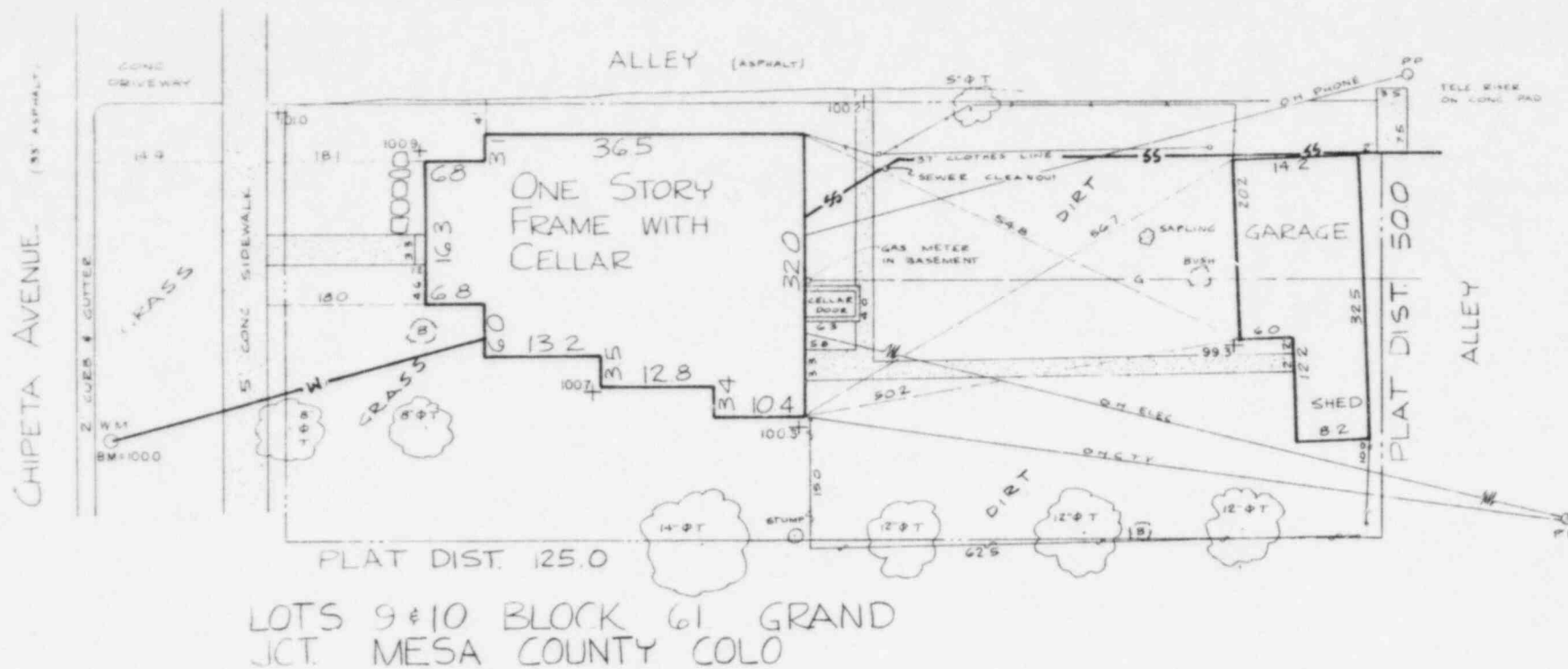
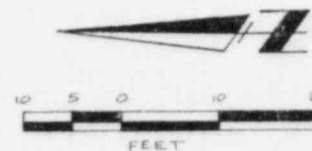

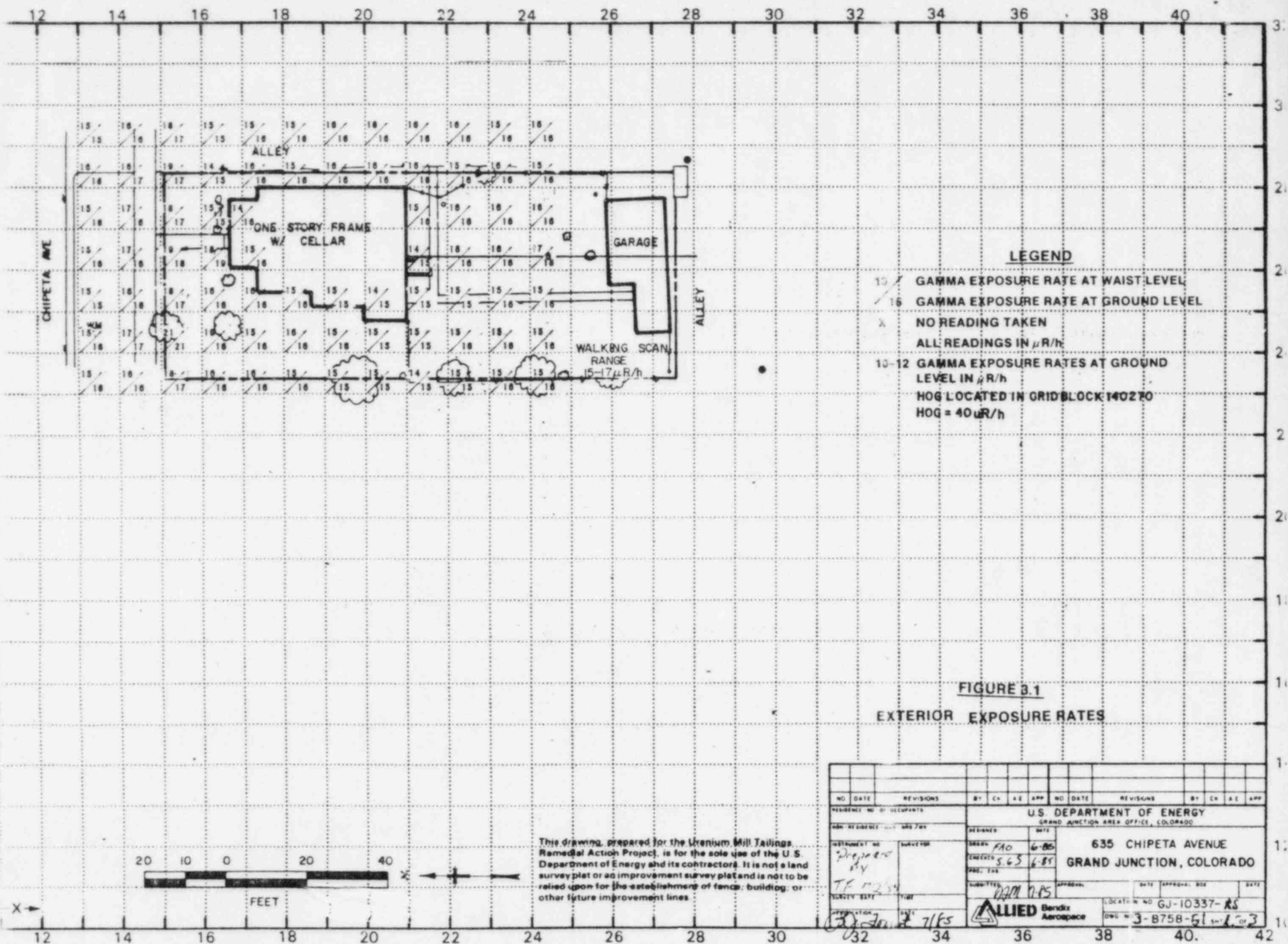


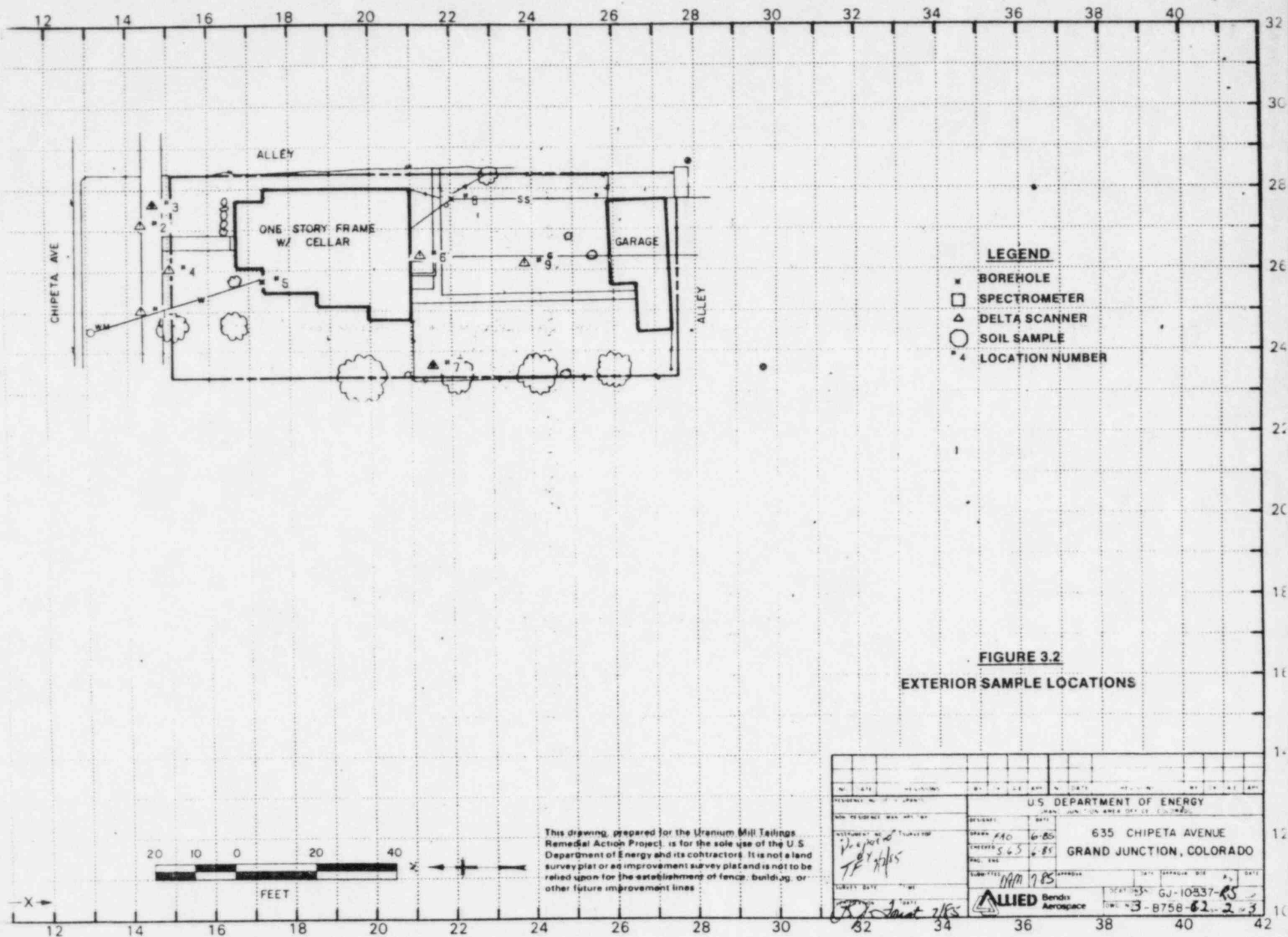
FIGURE 2.2 SITE PLAN

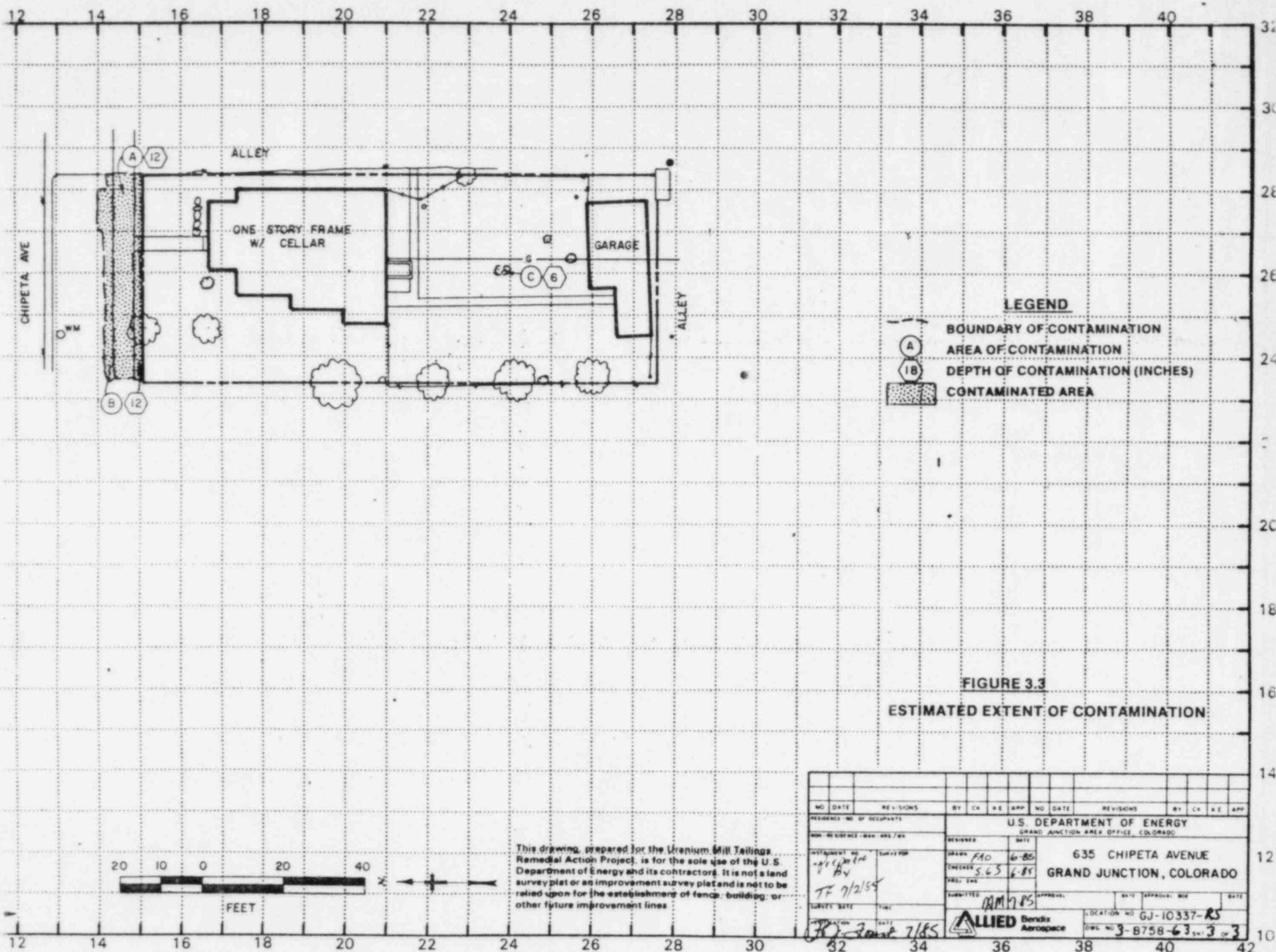


This drawing, prepared for the Uranium Mill Tailings Remedial Action Project, is for the sole use of the U.S. Department of Energy and its contractors. It is not a land survey plat or an improvement survey plat and is not to be relied upon for the establishment of fence, building, or other future improvement lines.

U.S. DEPARTMENT OF ENERGY		DOE ID NO.
GRAND JUNCTION PROJECT OFFICE COLORADO		GJ103372
ADDRESS 635 CHIPETA AVE		 Allied Pacific Engineering Corporation Grand Junction, Colorado
GRAND JUNCTION, COLO		
SURV WHL/G 20 85	DRAFT TJ/G 24 85	CK
DRAWING NO. 37/58	FT	SHEET 1 OF 1







3/85

DOE ID NO. GJ-10337-RS Date 6/27/85

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

Official Survey Report

Property Address 635 Chipeta
Property Owner Floyd Fortik
Address of Owner (if different from above) Same
Report Prepared By Tom Flores

I. PRESENCE/ABSENCE OF RESIDUAL RADIOACTIVE MATERIALS

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

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

1 1 In open areas.

1 X 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 = 18 uR/h
HOG = 40 uR/h

ALLIED Bendix
Aerospace

Bendix Field Engineering Corporation
Grand Junction Operations
Grand Junction, Colorado

Date: June 27, 1985

To: Files

From: Thomas Flores

Subject: Team Leader Notes - GJ-10337-RS

Address: 635 Chipeta Avenue

Owner: Floyd Fortik

Team Members

T. Flores (Team Leader)
V. Rothman
V. Hebel
C. Adams

S. Southern
P. Hardy
G. Larsen
M. Dexter

The survey crew arrived on the property at 12:45 PM.

A grid point survey and gamma scan were performed by the crew.

Elevated readings were found on the north sidewalk. A core was drilled through the sidewalk and a borehole was augered. Deltas were taken on the sidewalk and adjacent to the sidewalk.

All utility lines were located, no elevated readings were found.

I checked for spillovers onto the adjacent properties, none were found.

An interior scan was performed, no elevated readings were found inside the primary structure.

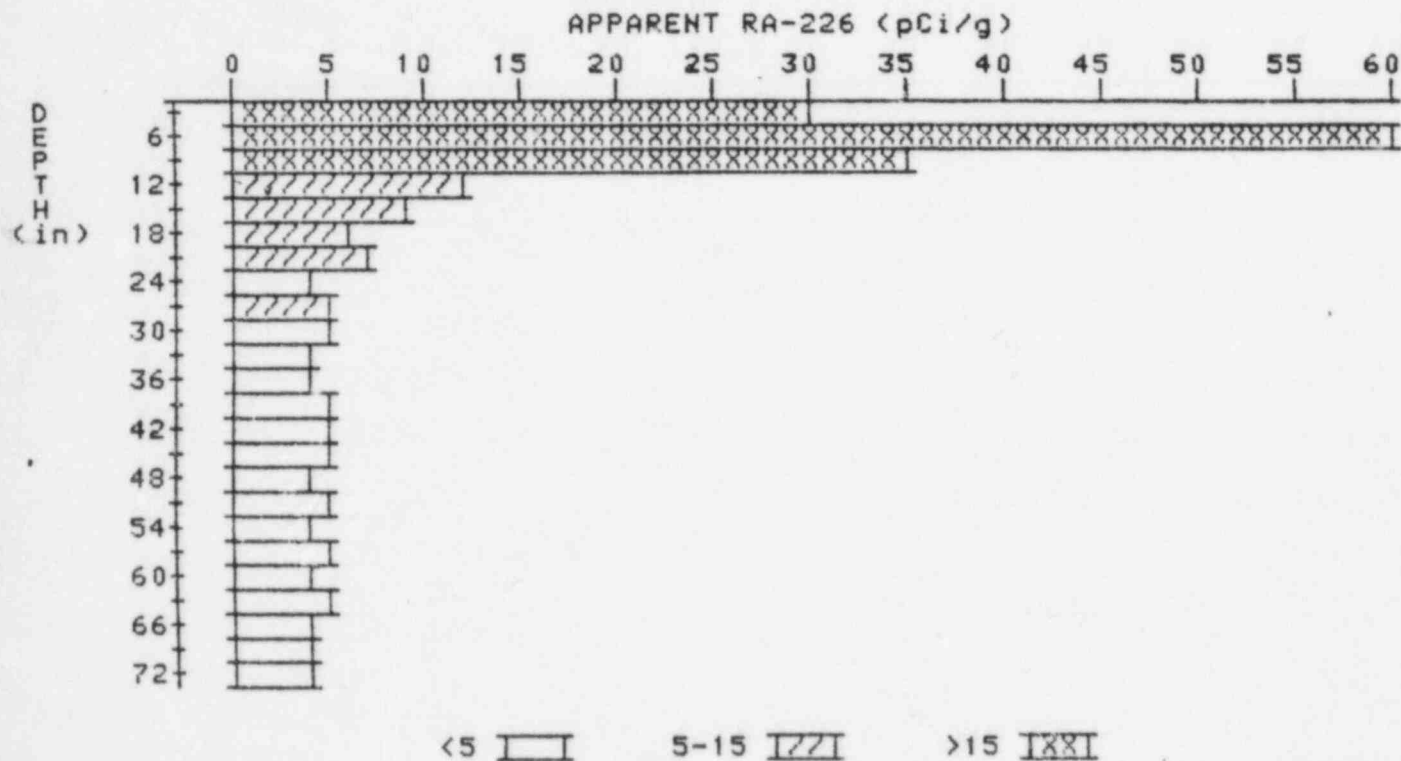
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

3

PROPERTY NUMBER: GJ-10337-RS

HOLE NUMBER: 3

LOCATION: 146276



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	30.2	30.2
6	40.8	76.2
9	31.5	34.9
12	20.3	12.1
15	13.7	9.1
18	9.7	6.1
21	7.7	7.0
24	6.1	4.3
27	5.5	5.3
30	5.0	4.6
33	4.7	4.3
36	4.6	4.4
39	4.6	4.6
42	4.6	4.8
45	4.5	4.5

48
51
54
57
60
63
66
69
72

4.4
4.4
4.3
4.4
4.3
4.4
4.2
4.1
4.1

4.2
4.6
3.9
4.8
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4.9
4.0
3.9
4.1

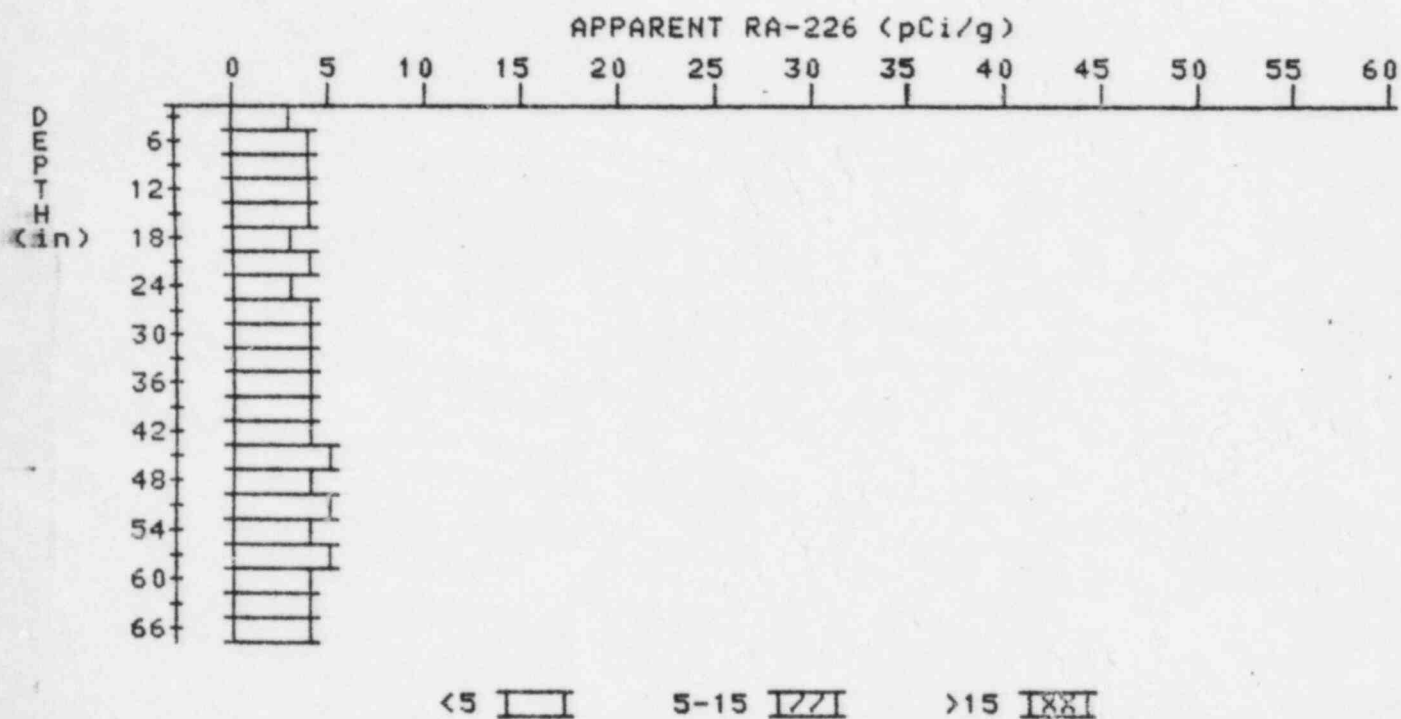
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

5

PROPERTY NUMBER: GJ-10337-RS

HOLE NUMBER: 5

LOCATION: 173257



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	3.8
24	3.6	3.4
27	3.7	3.7
30	3.8	3.8
33	3.9	3.9
36	4.0	4.0
39	4.1	4.3
42	4.1	3.7
45	4.3	4.7
48	4.3	4.1

51
54
57
60
63
66

4.4
4.3
4.4
4.3
4.3
4.2

4.8
3.9
4.8
4.1
4.5
4.2

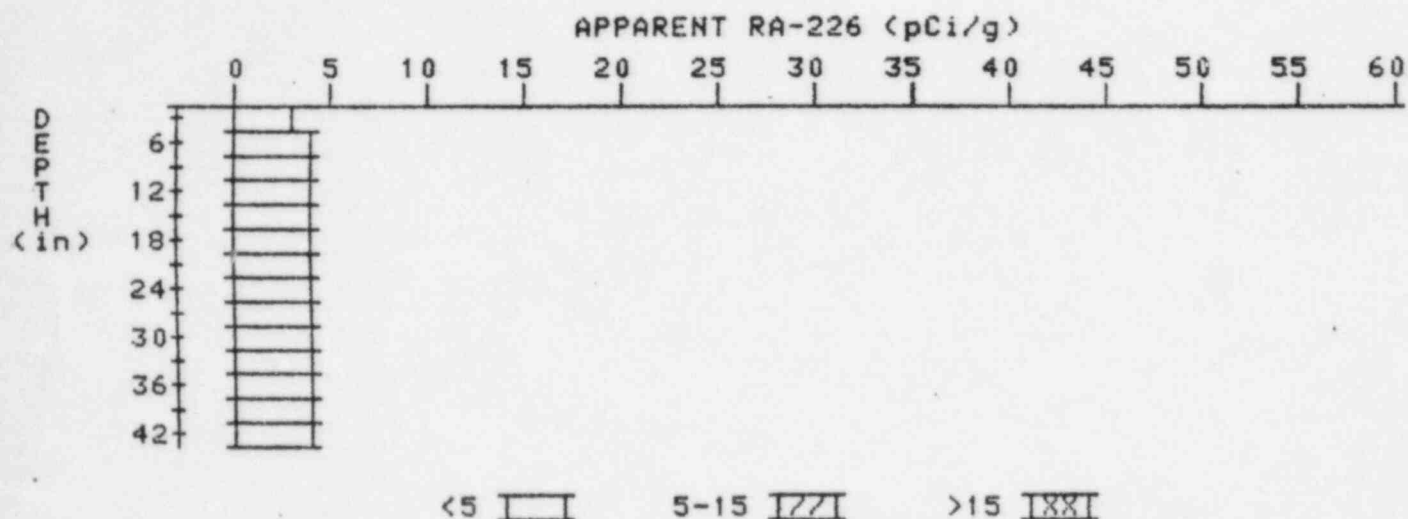
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

7

PROPERTY NUMBER: GJ-10337-RS

HOLE NUMBER: 7

LOCATION: 215236



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.1	3.1
6	3.4	3.6
9	3.6	3.6
12	3.8	4.0
15	3.9	4.1
18	3.9	3.9
21	3.9	3.7
24	4.0	4.4
27	3.9	3.5
30	4.0	4.0
33	4.1	4.3
36	4.1	4.1
39	4.1	3.9
42	4.2	4.2

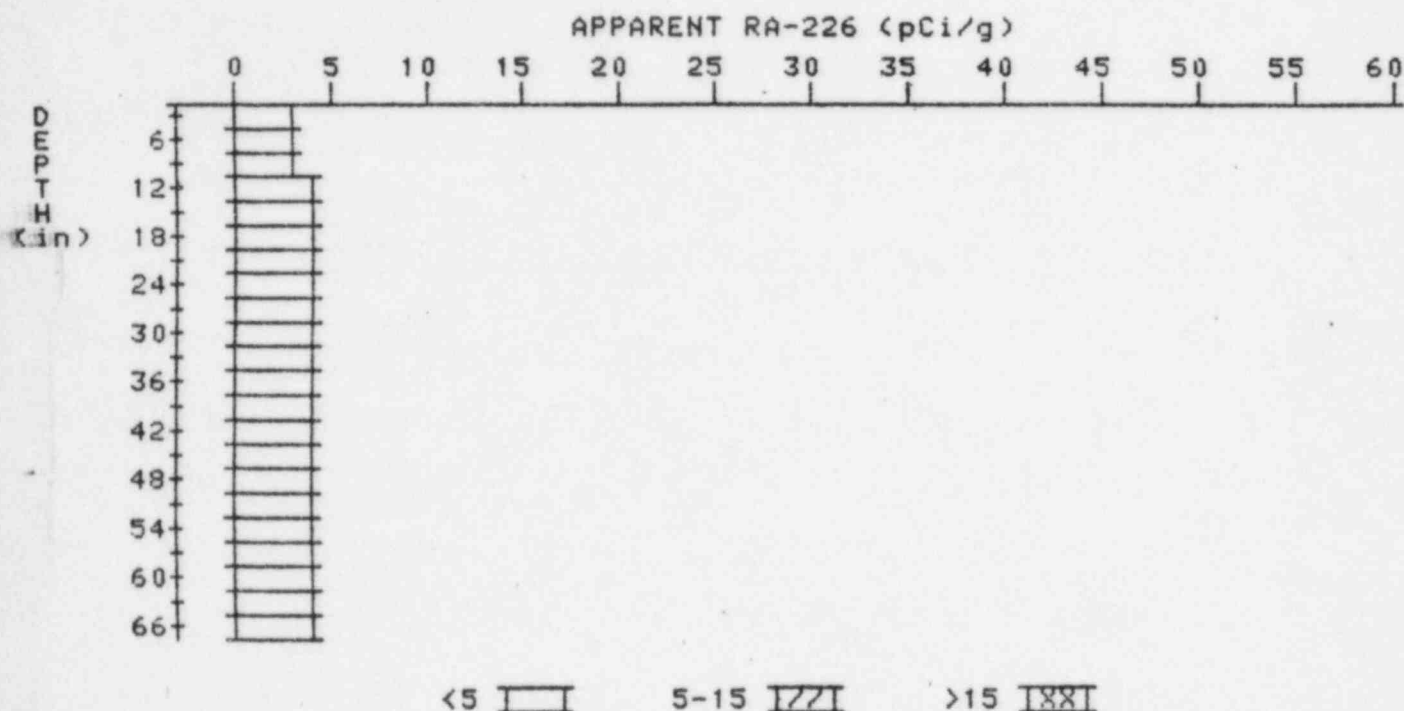
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

8

PROPERTY NUMBER: GJ-10337-R5

HOLE NUMBER: 8

LOCATION: 220277



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.6	2.6
6	2.9	2.9
9	3.2	3.4
12	3.4	3.6
15	3.5	3.5
18	3.6	3.6
21	3.7	3.7
24	3.8	3.6
27	4.0	4.4
30	4.0	4.0
33	4.0	4.0
36	4.0	4.0
39	4.0	4.0
42	4.0	4.0
45	4.0	4.0
48	4.0	3.8

51
54
57
60
63
66

4.1
4.1
4.1
4.1
4.0
4.1

4.3
4.1
4.1
4.3
3.6
4.1

