

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-00767-RS
ADDRESS: 1425 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

M.K. Tucker ^{SS} _{COH}
M. TUCKER
DOE PROJECT ENGINEER

DATE

August 12, 1985

REA00767:REA-616

8508290364 850812
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	4
3.4 Radon/Radon Daughter Concentration	5
3.5 Extent of Contamination	5
4.0 RECOMMENDED REMEDIAL ACTION	6
4.1 Decontamination and Restoration	6
4.2 Evaluation of Recommended Remedial Action	6
5.0 REFERENCES	7
6.0 APPENDIX	8

1.0 EXECUTIVE SUMMARY

1.1 Introduction

The location, DOE ID No. GJ-00767-RS, is a single-family residence located at 1425 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, 9 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is \$1,638. Remedial action on this property will take approximately 7 days to complete.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 1425 Hall Avenue, Grand Junction, Colorado

Zoning: Residential (RSF-8)

Lot Size: Approximately 6,000 sf (0.14 acres)

Legal Description: Lot 2, Block 2, Eastholme-in-Grandview 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:	Hall Avenue
South:	Single-family residence
East:	Single-family residence
West:	Single-family residence

2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-story residence
Size:	Approximately 950 sf
Construction Date:	1950
Construction:	Wood-frame
Foundation:	Concrete wall on spread footing
Footing Depth:	Approximately 80" to bottom of footing from grade
Basement:	Yes - full
Crawl Space:	None
Condition:	Good

Other Structures:

Type:	Garage
Size:	Approximately 300 sf
Construction:	Wood-frame
Foundation:	Concrete stemwall on spread footing
Condition:	Good

Type:	Shed
Size:	Approximately 80 sf
Construction:	Prefabricated metal
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-00767-RS on July 8, 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 under the patio south of the primary structure, under the sidewalk north of the primary structure, and an additional small deposit by the east property line.

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: 13 to 15 uR/h
Highest Outside Gamma Reading (HOG): 58 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): 16 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 Table 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: Grass
Direction From Primary Structure: North
Other Directions: East of front steps
Total Depth of Contamination: 6 inches
Approximate Square Footage: 16
- (Area B) Surface Material: Concrete
Direction From Primary Structure: North
Other Directions: South of Area A
Total Depth of Contamination: Estimated at 6 inches
Other (height or thickness): 4-inch-thick concrete
Comments: Depth of contamination is based on data collected in Area A.
Approximate Square Footage: 16
- (Area C) Surface Material: Concrete
Direction From Primary Structure: South
Total Depth of Contamination: 12 inches
Other (height or thickness): 4-inch-thick concrete
Approximate Square Footage: 208
- (Area D) Surface Material: Grass
Direction From Primary Structure: Southeast
Other Directions: South yard
Total Depth of Contamination: 6 inches
Approximate Square Footage: 45

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-00767-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 \$1,638.

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-GMD4-84AL28460) 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 Grid-Point Exposure Rates
Figure 3.2	Exterior Sample Locations
Figure 3.3	Exterior 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-00767-RS

1425 Hall 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	155264	03	TC	2.7		*	Water line
		06	TC	3.0		*	North of primary structure
		09	TC	3.2		*	
		12	TC	3.3		*	
		15	TC	3.4		*	
		18	TC	3.5		*	DC = 0 inches
		21	TC	3.6		*	
		24	TC	3.6		*	
		27	TC	3.6		*	
		30	TC	3.6		*	
		33	TC	3.5		*	
		36	TC	3.5		*	
2	156255	00	DS	20.4		*	By north porch
		06	DS	<1.0		*	DC = 6 inches
3	158248	00	DS	1.8		*	West of north porch
4	159270	00	DS	2.1		*	By gas line
		27	DS	1.5		*	
5	163236	00	DS	<1.0		*	West of primary structure
6	178271	00	DS	1.8		*	East of primary structure
		03	TC	3.4		*	
		06	TC	3.7		*	
		09	TC	3.5		*	
		12	TC	3.5		*	
		15	TC	3.5		*	
		18	TC	3.5		*	DC = 0 inches
		21	TC	3.6		*	
		24	TC	3.7		*	
		27	TC	3.6		*	
		30	TC	3.6		*	
		33	TC	3.6		*	
		36	TC	3.6		*	
		39	TC	3.6		*	
		42	TC	3.5		*	
		45	TC	3.6		*	
		48	TC	3.6		*	
		51	TC	3.5		*	
		54	TC	3.6		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-00767-RS

1425 Hall 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.		
6	178271	57	TC	3.5		*	
		60	TC	3.4		*	
		63	TC	3.4		*	
		66	TC	3.2		*	
		69	TC	3.3		*	
		72	TC	3.4		*	
		75	TC	3.4		*	
		78	TC	3.4		*	
		81	TC	3.3		*	
		84	TC	3.2		*	
		87	TC	3.2		*	
		90	TC	3.3		*	
		93	TC	3.4		*	
		96	TC	3.4		*	
		99	TC	3.4		*	
7	194255	00	DS	11.2		*	Patio south of primary structure
8	197273	00	DS	<1.0		*	Rose garden
		06	DS	1.0		*	
9	198250	03	TC	30.4		*	On patio
		06	TC	32.6		*	
		09	TC	20.7		*	
		12	TC	13.4		*	DC = 12 inches
		15	TC	9.3		*	Based on the
		18	TC	7.2		*	deconvolution graph
		21	TC	6.1		*	
		24	TC	5.4		*	
		27	TC	5.1		*	
		30	TC	4.8		*	
		33	TC	4.6		*	
		36	TC	4.6		*	
		39	TC	4.5		*	
		42	TC	4.3		*	
		45	TC	4.2		*	
		48	TC	4.1		*	
10	237275	00	DS	4.8		*	Southeast corner
		06	DS	1.8		*	of the property

Radium Concentrations at Exterior Locations

DOE ID #GJ-00767-RS

1425 Hall 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.		
11	240260	00	DS	<1.0		*	Background
		03	TC	2.6		*	South of primary
		06	TC	3.0		*	structure
		09	TC	3.2		*	
		12	TC	3.3		*	
		15	TC	3.4		*	DC = 0 inches
		18	TC	3.5		*	
		21	TC	3.5		*	
		24	TC	3.4		*	
		27	TC	3.4		*	
		30	TC	3.4		*	
		33	TC	3.4		*	
		36	TC	3.4		*	

Measurement Types:

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

Notes: DC = Depth of Contamination
 * = No Soil Sample Taken
 [n] = Reading Taken n-Inches
 Above Floor or Ground
 Date of Survey = 07-08-85
 Team Leader = MR

Table 3.2

Summary of Interior Gamma Exposure Rates

DOE ID #GJ-00767-RS

1425 Hall 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)
Basement	*	*	*	*	15-16	*
Garage	*	*	*	*	14-16	*
Shed	*	*	*	*	14-15	*

* 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-00767-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				
B	4 x 4 =	16	x 0.3 =	5	
C	13 x 16 =	208	x 0.3 =	62	
				67	
	Volume of Concrete			=	67/27 = 2
	Contaminated Fill				
A	4 x 4 =	16	x 0.5 =	8	
B	4 x 4 =	16	x 0.2 =	3	
C	13 x 16 =	208	x 0.7 =	146	
D	3 x 15 =	45	x 0.5 =	23	
				180	
	Volume of Fill			=	180/27 = 7
	TOTAL VOLUME - EXTERIOR				= 9

See Appendix Figure 3.3 For Areas

=====

Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-00767-RS Page 1 of 1

EXTERIOR

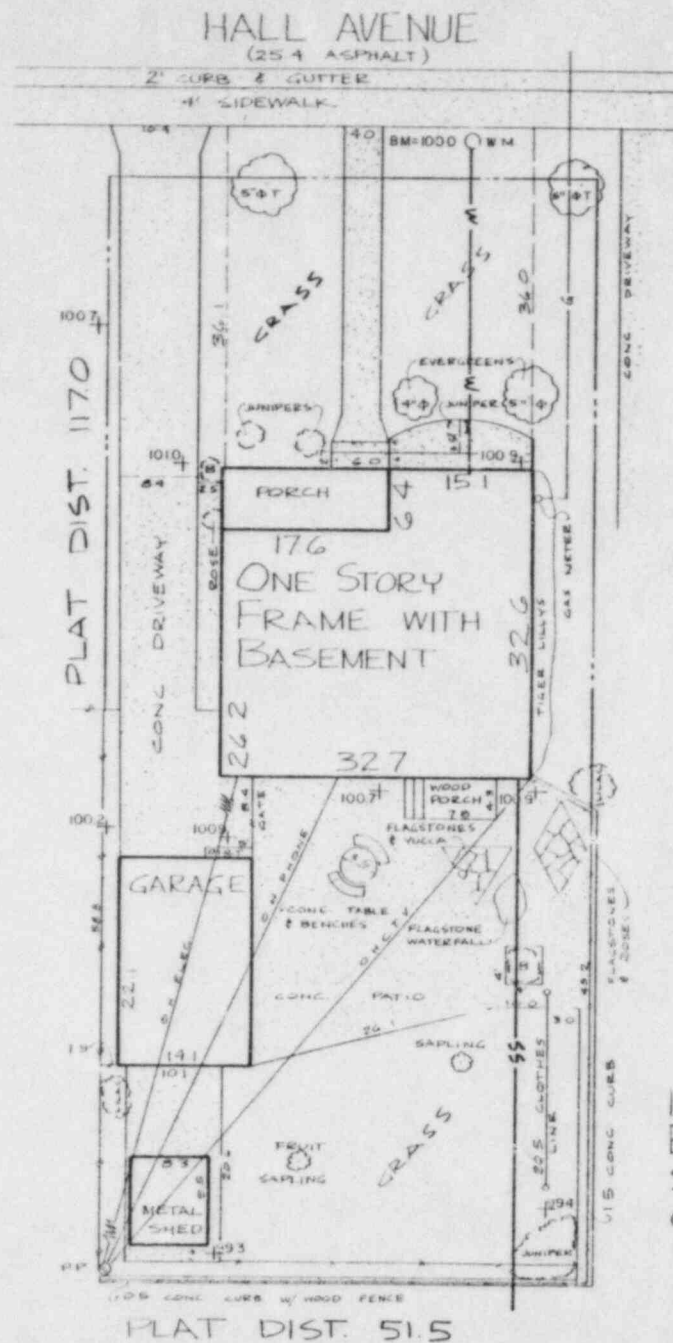
Remove/replace concrete 224 sf @ \$3/sf	\$ 672
Remove identified residual radioactive material 4 cy @ \$14.50/cy (machine-open)	58
3 cy @ \$44/cy (manual-open)	132
Replace areas with roadbase 6 cy @ \$11.50/cy	69
Replace area with topsoil 1 cy @ \$9.50/cy	10
Replace area with sod 45 sf @ \$.50/sf	23
	<hr/>
TOTAL EXTERIOR	\$ 964
TOTAL INTERIOR	0
ACCESS CONTROL	100
	<hr/>
SUBTOTAL	\$ 1,064
CONTINGENCY @ 10%	106
	<hr/>
SUBTOTAL	\$ 1,170
CONTRACTOR OVERHEAD & PROFIT @ 40%	468
	<hr/>
GRAND TOTAL	\$ 1,638

RR080885
REA00767/REA-616/LMR

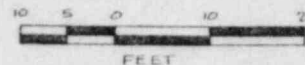


FIGURE 2.1
VICINITY MAP






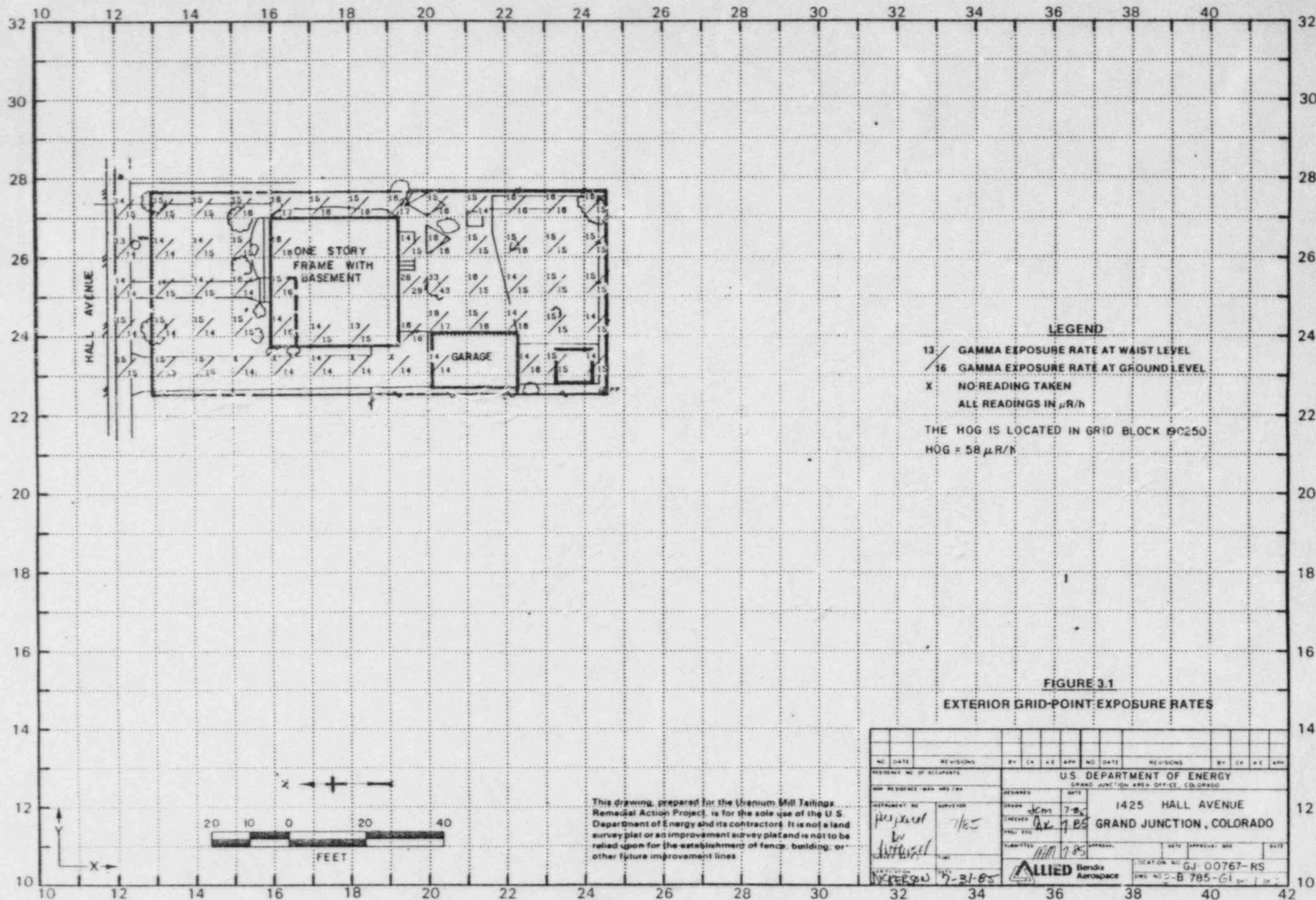
LOT 2 BLOCK 2
EASTHOLME-IN-GRANDVIEW
SUB. GRAND JCT. MESA
COUNTY COLO.

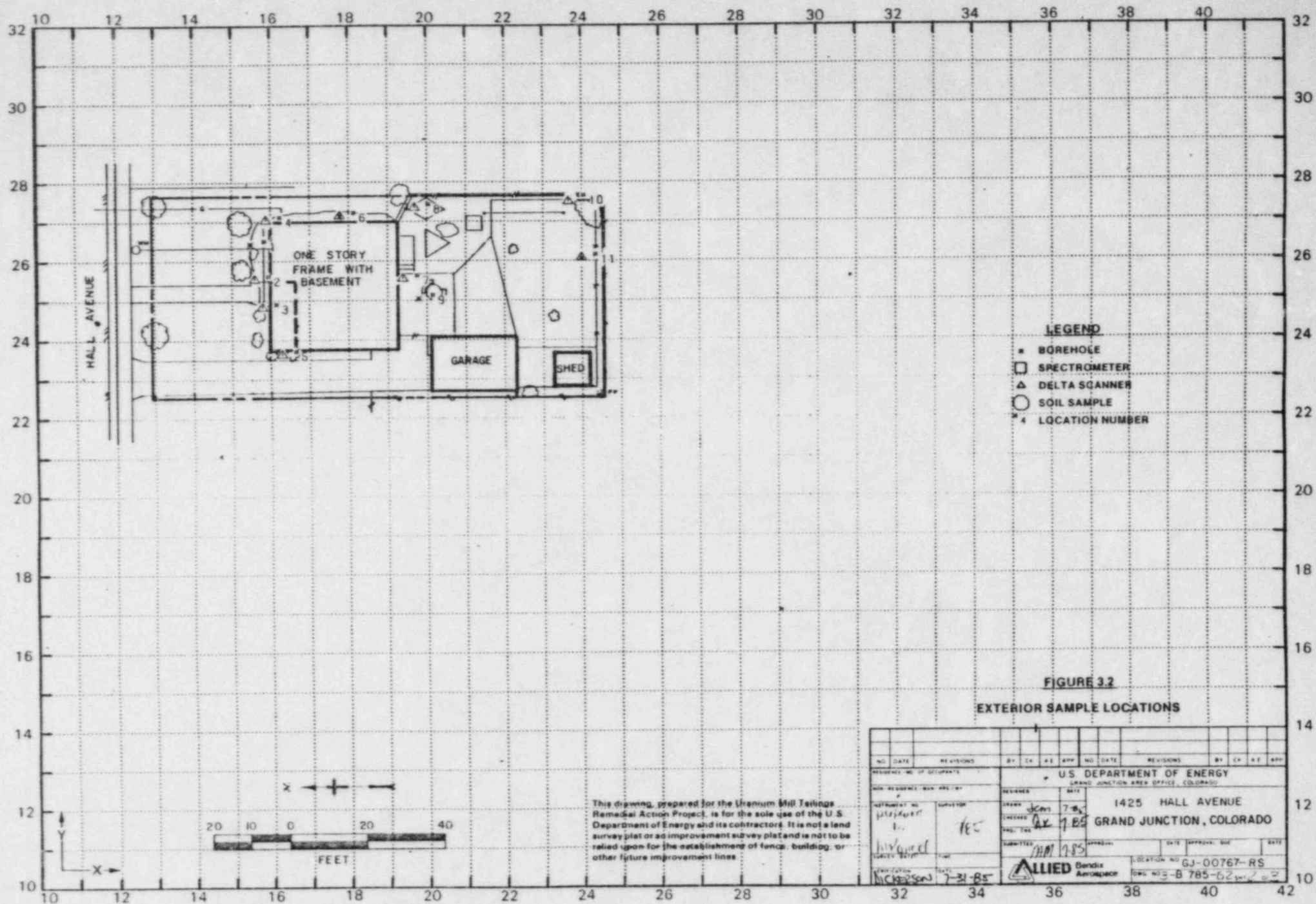


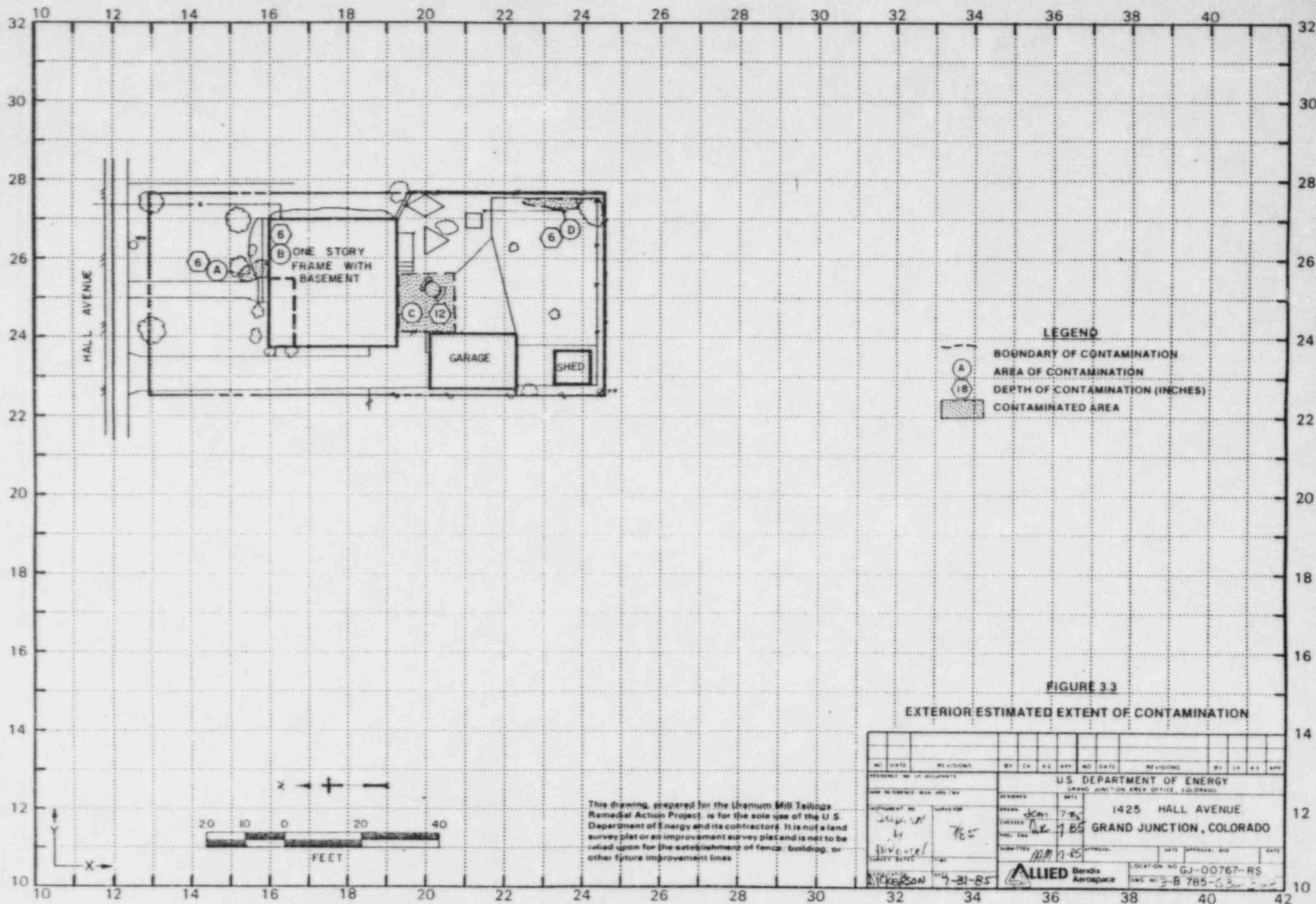
This drawing, prepared for the Uranium Mill Tailings Remedial Action Project, is for the sole use of the U.S. Department of Energy and its contractors. It is not a land survey plat or an improvement survey plat and is not to be relied upon for the establishment of fence, building, or other future improvement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

FIGURE 2.2 SITE PLAN

U.S. DEPARTMENT OF ENERGY			DOE ID NO.
GRAND JUNCTION PROJECT OFFICE, COLORADO			GJ00767RS
ADDRESS 1425 HALL AVENUE			 Allied Building Corporation Residential Engineering Corporation Grand Junction, Colorado
GRAND JUNCTION, COLO			
SURV WHL/7185	DRAFT TJ/7285	CR 7-2-85	
DRAWING NO. 30785 F-1			SHEET 1 OF 1







3/85

DOE ID NO. GJ-00767-RJ

Date 7/22/85

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

Official Survey Report

Property Address 1425 Hall Avenue
Property Owner B.D. and M.T. Wallace
Address of Owner (if different from above) _____
Report Prepared By Mark Rangel

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 XX 1 Under or around exterior improvements.

1 1 Under or around a typically nonoccupied structure.

1 XX 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/CDR

J. Themelis, Mgr. UMTRA Proj. Off.

HIG = 16 uR/h
HOG = 58 uR/h

MEMORANDUM

ALLIED Bendix
Aerospace

Bendix Field Engineering Corporation
Grand Junction Operations
Grand Junction, Colorado

Date: July 8, 1985
To: Files
From: Mark Rangel
Subject: Team Leader Notes - GJ-00767-RS

Address: 1425 Hall Avenue
Owner: B.D. and M.T. Wallace
Occupancy: Two

Team Members

M. Rangel (Team Leader)	L. Kula
D. Bell	M. Duran
R. Herman	H. Mattison

Instruments

See Equipment Summary sheet.

There are three concrete pours that make-up the patio.

The sewer line was not located. No elevated readings were found in the basement to show possible contamination of the sewer line.

Concrete surrounded the house on three sides.

No problems, all team members were frisked before leaving the property.

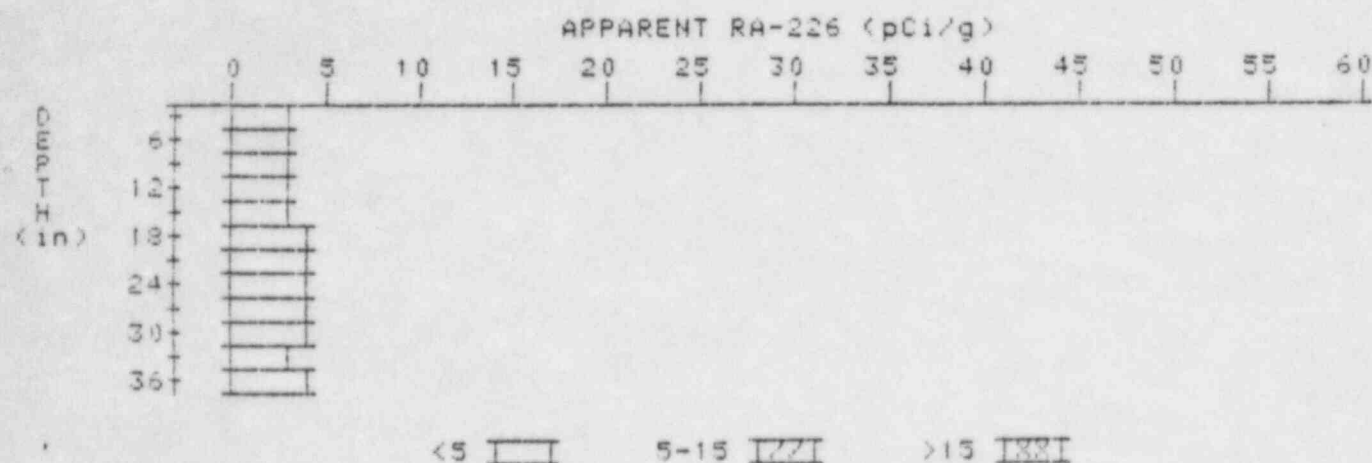
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

1

PROPERTY NUMBER: GJ-00767-R3

HOLE NUMBER: 1

LOCATION: 155264



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.7	2.7
6	3.0	3.2
9	3.2	3.4
12	3.3	3.3
15	3.4	3.4
18	3.5	3.5
21	3.6	3.6
24	3.6	3.6
27	3.6	3.6
30	3.6	3.6
33	3.5	3.3
36	3.5	3.5

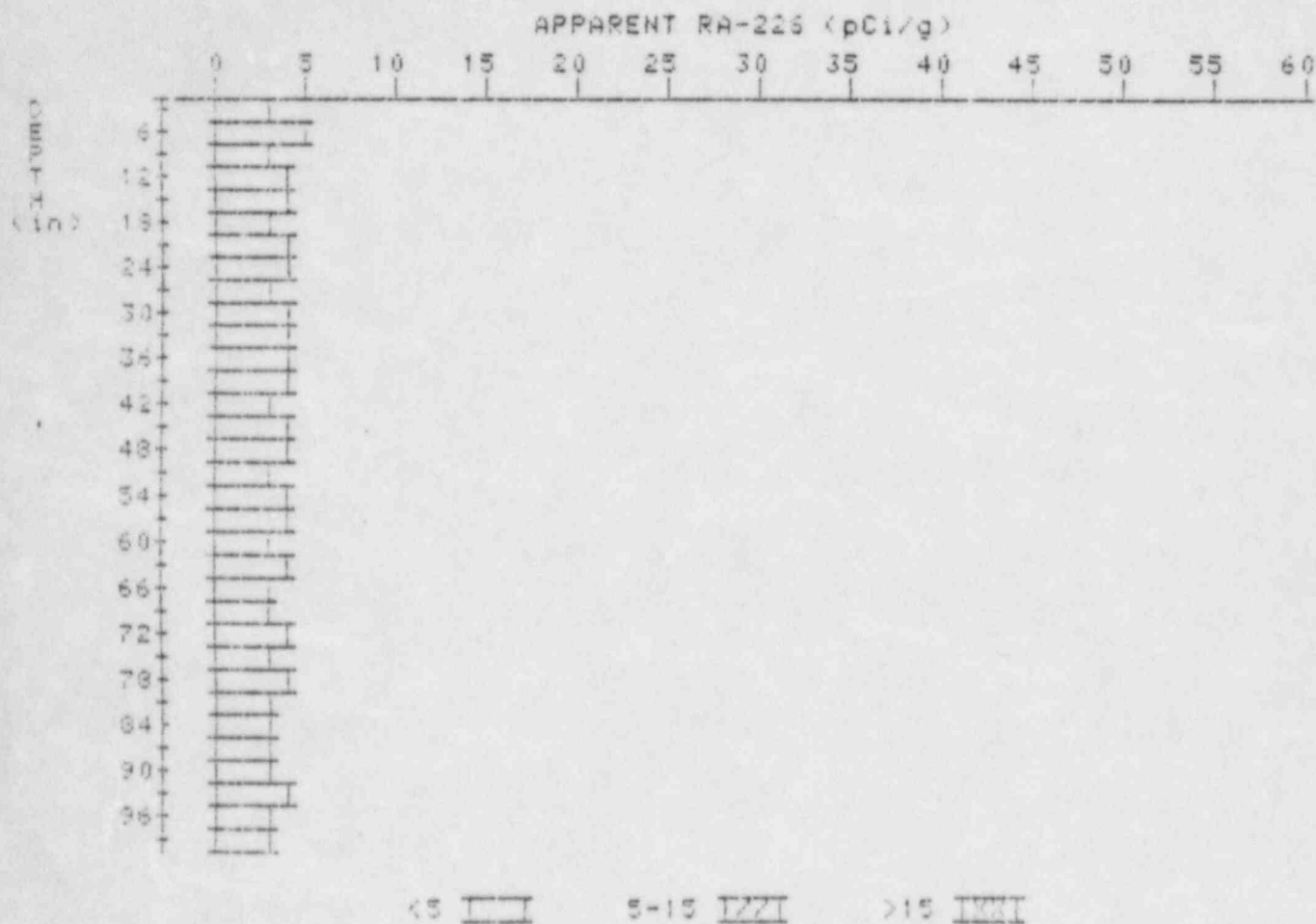
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

6

PROPERTY NUMBER: GJ-00767-RS

HOLE NUMBER: 6

LOCATION: 178271

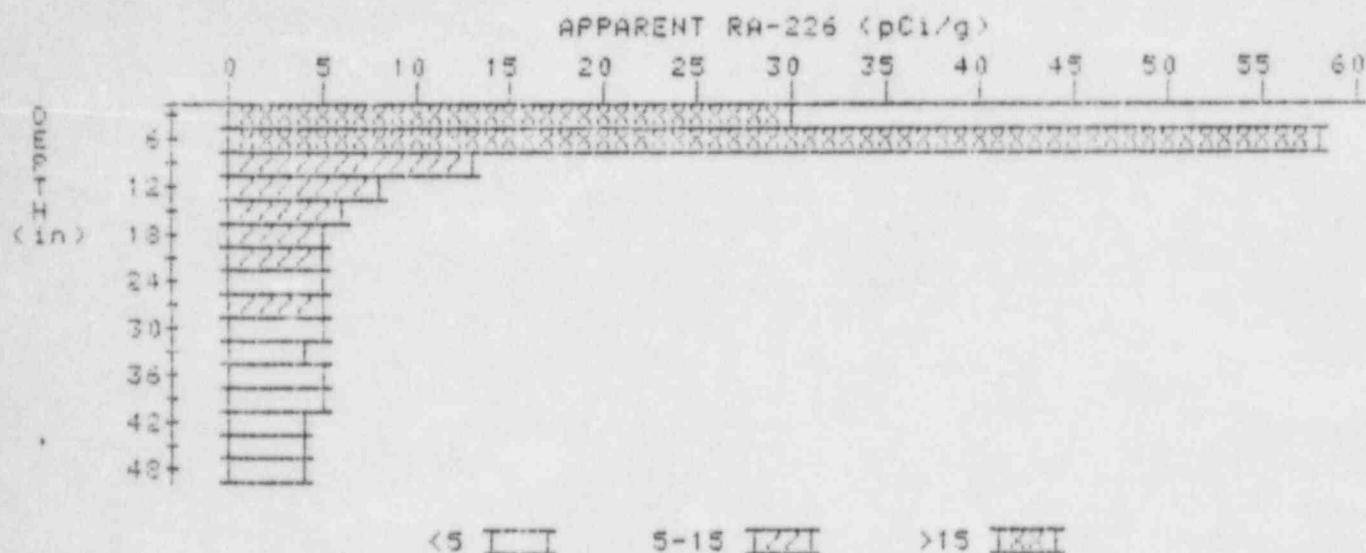


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.4	3.4
6	3.7	4.6
9	3.5	3.1
12	3.5	3.5
15	3.8	3.5
18	3.8	3.3
21	3.6	3.6
24	3.7	4.1

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

9

PROPERTY NUMBER: GJ-00767-RS
HOLE NUMBER: 9
LOCATION: 198250



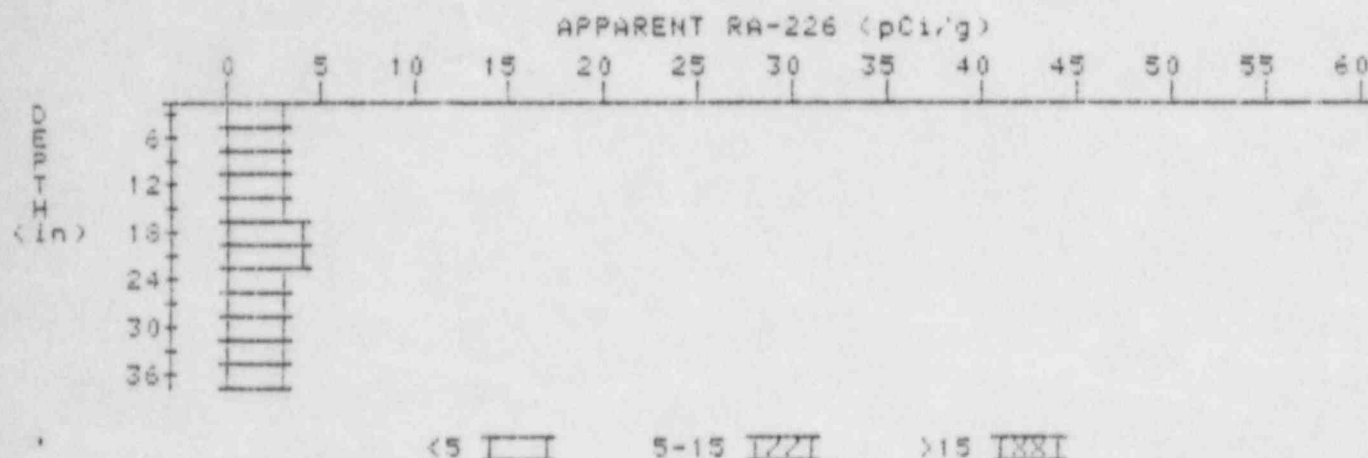
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	30.4	30.4
6	32.6	57.7
9	20.7	12.5
12	13.4	7.7
15	9.3	5.7
18	7.2	5.4
21	6.1	5.4
24	5.4	4.7
27	5.1	5.1
30	4.8	4.6
33	4.6	4.2
36	4.6	4.8
39	4.5	4.7
42	4.3	4.1
45	4.2	4.2
48	4.1	4.1

APPARENT RADIUM-226 CONCENTRATION 11 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00767-RS

HOLE NUMBER: 11

LOCATION: 240260



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.6	2.6
6	3.0	3.4
9	3.2	3.4
12	3.3	3.3
15	3.4	3.4
18	3.5	3.7
21	3.8	3.7
24	3.4	3.2
27	3.4	3.4
30	3.4	3.4
33	3.4	3.4
36	3.4	3.4

