

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-04298-RS  
ADDRESS: 224 OURAY 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*  
M. TUCKER  
DOE PROJECT ENGINEER

DATE

*August 12, 1985*

REA04298:REA-708

8508300250 850819  
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-04298-RS, is a single-family residence located at 224 Ouray 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, 34 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is \$4,772. Remedial action on this property will take approximately 10 days to complete.

## 2.0 PROPERTY DESCRIPTION

### 2.1 General Description

Address: 224 Ouray Avenue, Grand Junction, Colorado

Zoning: Residential (RMF-64)

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

Legal Description: Lots 25 and 26, Block 57, 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:	Alley
South:	Ouray Avenue
East:	Single-family residence
West:	Single-family residence

### 2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-story residence
Size:	Approximately 1,280 sf
Construction Date:	1900
Construction:	Wood-frame
Foundation:	Concrete stemwall on spread footing
Footing Depth:	Approximately 12" to bottom of footing from grade
Basement:	None
Crawl Space:	Yes - under entire living area
Condition:	Good

Other Structures:

Type:	Garage
Size:	Approximately 300 sf
Construction:	Wood-frame
Foundation:	Concrete slab-on-grade
Condition:	Good

Type:	Shed
Size:	Approximately 180 sf
Construction:	Wood-frame
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 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: Utility room added and new foundation.

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-04298-RS on July 22, 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 to determine areas of potential contamination identified during previous radiologic assessments of this property.

The Bendix radiologic survey was designed to investigate the entire property, with emphasis on previously identified areas of contamination. Conclusions based upon data analyses are discussed in Section 3.5, Extent of Contamination. Photocopies of the Official Survey Report, 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 16 uR/h  
Highest Outside Gamma Reading (HOG): 33 uR/h

Exterior radium-concentration measurements are presented in Appendix Table 3.1. Exterior exposure-rate 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 radium-concentration measurements are presented in Appendix Table 3.2. Interior gamma exposure-rate measurements are summarized in Appendix Table 3.3.

#### 3.3 Boreholes, Soil Samples, and Other Measurements

Areas which displayed elevated gamma levels were further investigated; the locations and types of these investigations are shown in Appendix Figures 3.2 and 3.3. Data from these investigations is included in Appendix Tables 3.1 and 3.2.



### 3.4 Radon/Radon Daughter Concentration (RDC)

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

### 3.5 Extent of Contamination

Appendix Figure 3.4 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: Lawn  
Direction From Primary Structure: Northeast  
Other Directions: West of the driveway  
Total Depth of Contamination: 12 inches  
Approximate Square Footage: 8
- (Area B) Surface Material: Concrete  
Direction From Primary Structure: East  
Other Directions: Along the east property line  
Total Depth of Contamination: 12 inches  
Other (height or thickness): 4-inch-thick concrete  
Comments: The material underlying the concrete driveway is contaminated.  
Approximate Square Footage: 923

#### 4.0 RECOMMENDED REMEDIAL ACTION

##### 4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-04298-RS, includes removal of all areas identified as containing radioactive material (as discussed in Section 3.5 and shown in Appendix Figure 3.4) 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 \$4,772.

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 Exposure Rates
Figure 3.2	Interior Sample Location
Figure 3.3	Exterior Sample Locations
Figure 3.4	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-04298-RS

224 Ouray Avenue

Page 1 of 2

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
2	195262	00	DS	2.9		*	West of the driveway
		06	DS	4.0		*	
		12	DS	1.2		*	
3	197239	00	DS	1.5		*	Gas line
		13	DS	1.4		*	North foundation
4	198260	00	DS	<1.0		*	North sidewalk
		13	DS	1.8		*	Horizontal under the sidewalk
5	200250	00	DS	<1.0		*	North steps
6	206264	00	DS	24.2		*	Driveway
		03	TC	27.8		*	DC = 12 inches
		06	TC	31.8		*	Based on the
		09	TC	20.2		*	deconvolution graph
		12	TC	12.1		*	
		15	TC	8.3		*	
		18	TC	6.4		*	
		21	TC	5.6		*	
		24	TC	5.1		*	
		27	TC	4.8		*	
		30	TC	4.7		*	
		33	TC	4.5		*	
		36	TC	4.5		*	
7	213230	00	DS	<1.0		*	Sewer line West foundation
8	240261	00	DS	1.1		*	East of the primary structure
9	251250	00	DS	1.6		*	South foundation
		03	TC	3.4		*	Background
		06	TC	3.3		*	DC = 0 inches
		09	TC	3.2		*	
		12	TC	3.1		*	
		15	TC	3.1		*	
		18	TC	3.1		*	

## Radium Concentrations at Exterior Locations

DOE ID #GJ-04298-RS

224 Ouray Avenue

Page 2 of 2

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
9	251250	21	TC	3.0		*	
		24	TC	3.0		*	
		27	TC	3.2		*	
10	270270	00	DS	8.2		*	Driveway

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 = 07-22-85  
 Team Leader = TC

## Radium Concentrations at Interior Locations

DOE ID #GJ-04298-RS

224 Ouray Avenue

Page 1 of 1

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=====
                                In Situ Ra-226
Loc  Grid      Depth  Meas.      (pCi/g)      Chem Ra-226
#   Location  (in.)  Type   Tot. Ct  Spectr.   (pCi/g)      Comments
---  -
1           00     DS       1.3              *      Inside garage, at
                                           edge of driveway
=====
```

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 = 07-22-85  
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)
Ground floor	*	*	*	*	14-16	*
Garage	09	14-20	16	09	14-21	17
Shed 1	*	*	*	*	13-14	*
Shed 2	*	*	*	*	14-16	*

=====

\* Walking gamma scans were performed to confirm the absence of interior contamination.



Table 4.1  
Area and Volume Calculations  
DOE ID No. GJ-04298-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	10 x 34 =	340			
	11 x 53 =	583			
		<hr/>			
		923	x 0.3 =	277	
				<hr/>	
	Volume of Concrete			= 277	= 277/27 = 10
	Contaminated Fill				
A	1 x 8 =	8	x 1.0 =	8	
B	10 x 34 =	340			
	11 x 53 =	583			
		<hr/>			
		923	x 0.7 =	646	
				<hr/>	
	Volume of Fill			= 654	= 654/27 = 24
					<hr/>
	TOTAL VOLUME - EXTERIOR				= 34

See Appendix Figure 3.4 For Areas

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Table 4.2  
Estimated Cost of Decontamination and Restoration  
DOE ID No. GJ-04298-RS

Page 1 of 1

EXTERIOR

Remove/replace concrete driveway 923 sf @ \$3/sf	\$ 2,769
Remove identified residual radioactive material 24 cy @ \$14.50/cy (machine-open)	348
Replace areas with roadbase 23 cy @ \$11.50/cy	265
Replace area with topsoil 1 cy @ \$9.50/cy	10
Replace area with sod 8 sf @ \$.50/sf	4
	<hr/>
TOTAL EXTERIOR	\$ 3,396
TOTAL INTERIOR	0
ACCESS CONTROL	100
	<hr/>
SUBTOTAL	\$ 3,496
CONTINGENCY @ 5%	175
	<hr/>
SUBTOTAL	\$ 3,671
CONTRACTOR OVERHEAD & PROFIT @ 30%	1,101
	<hr/>
GRAND TOTAL	\$ 4,772

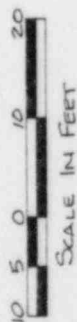
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RR081585  
REA04298/REA-708/AP



FIGURE 2.1  
VICINITY MAP



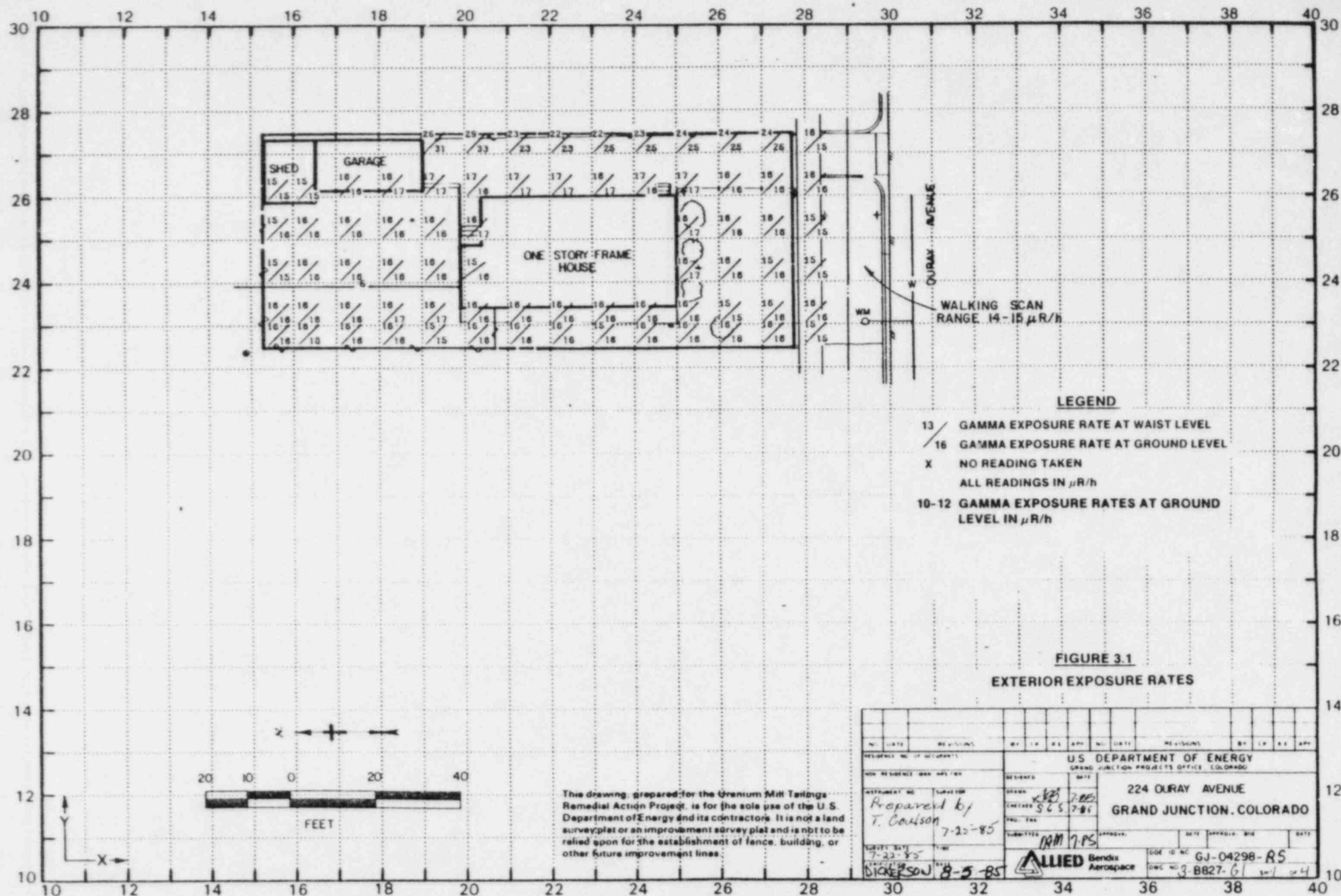
$$A_{AT} = 125.0'$$


**FIGURE 2.2 SITE PLAN**

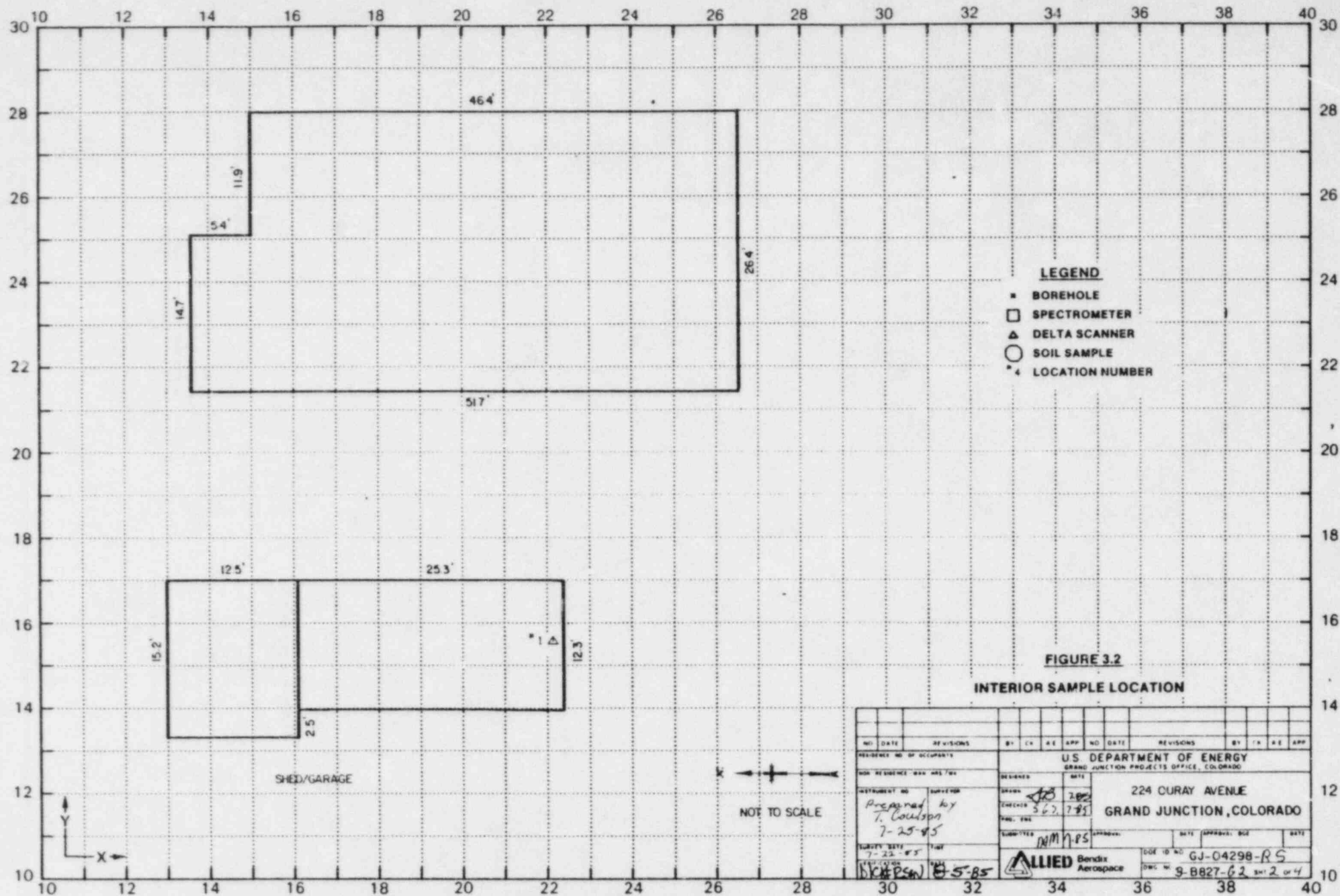
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U.S. DEPARTMENT OF ENERGY GRAND JUNCTION PROJECT OFFICE COLORADO	DOE ID NO GJ04298RS
ADDRESS 2224 OURAY AVENUE GRAND JUNCTION, COLORADO	ALLIED ENGINEERING Specialty Field Engineering Corporation 10000 E. 1st Avenue Denver, Colorado 80231
SURV WHL 7 16 85 DRAWING NO 2-C897-E	DATE 7-16-85 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.

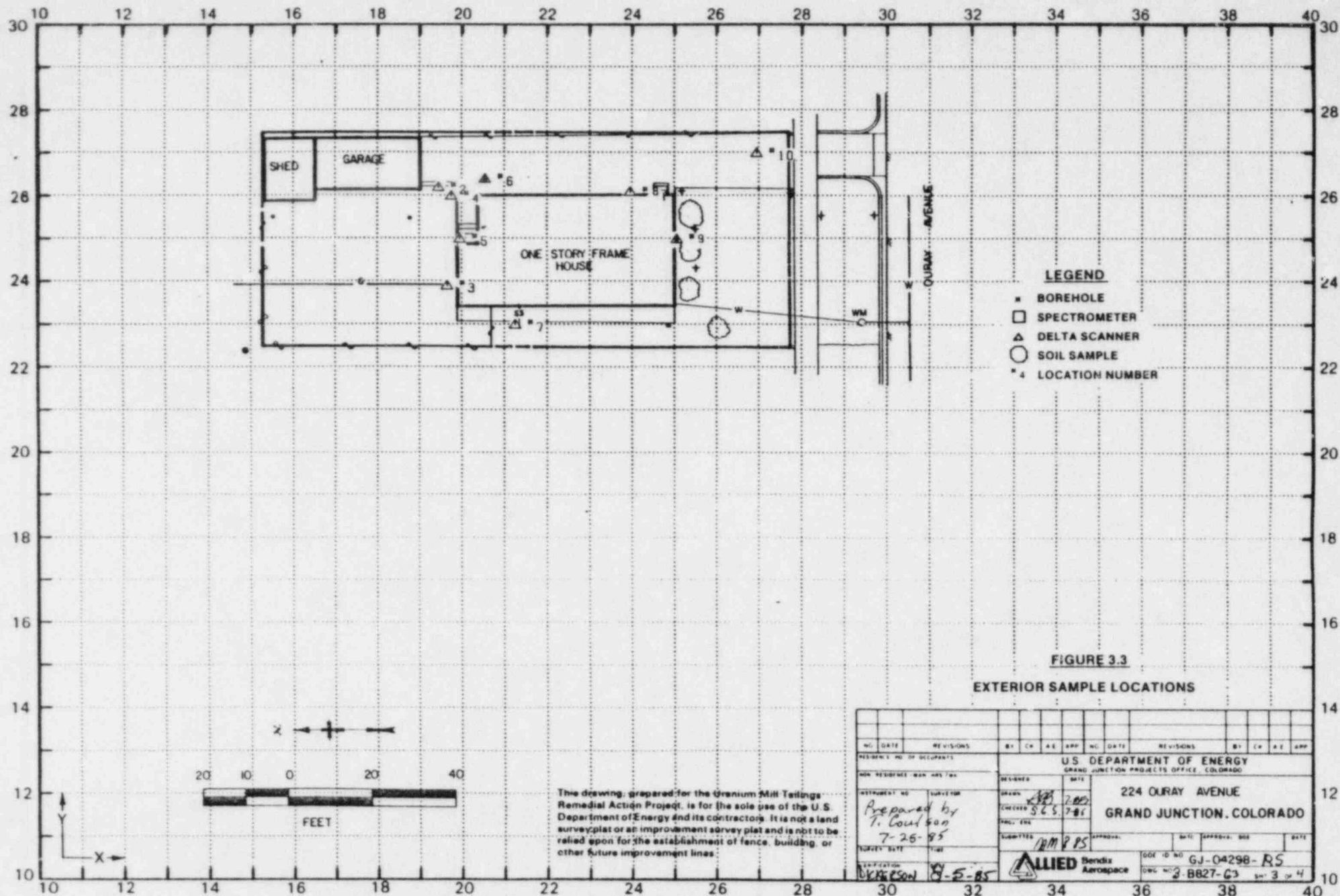


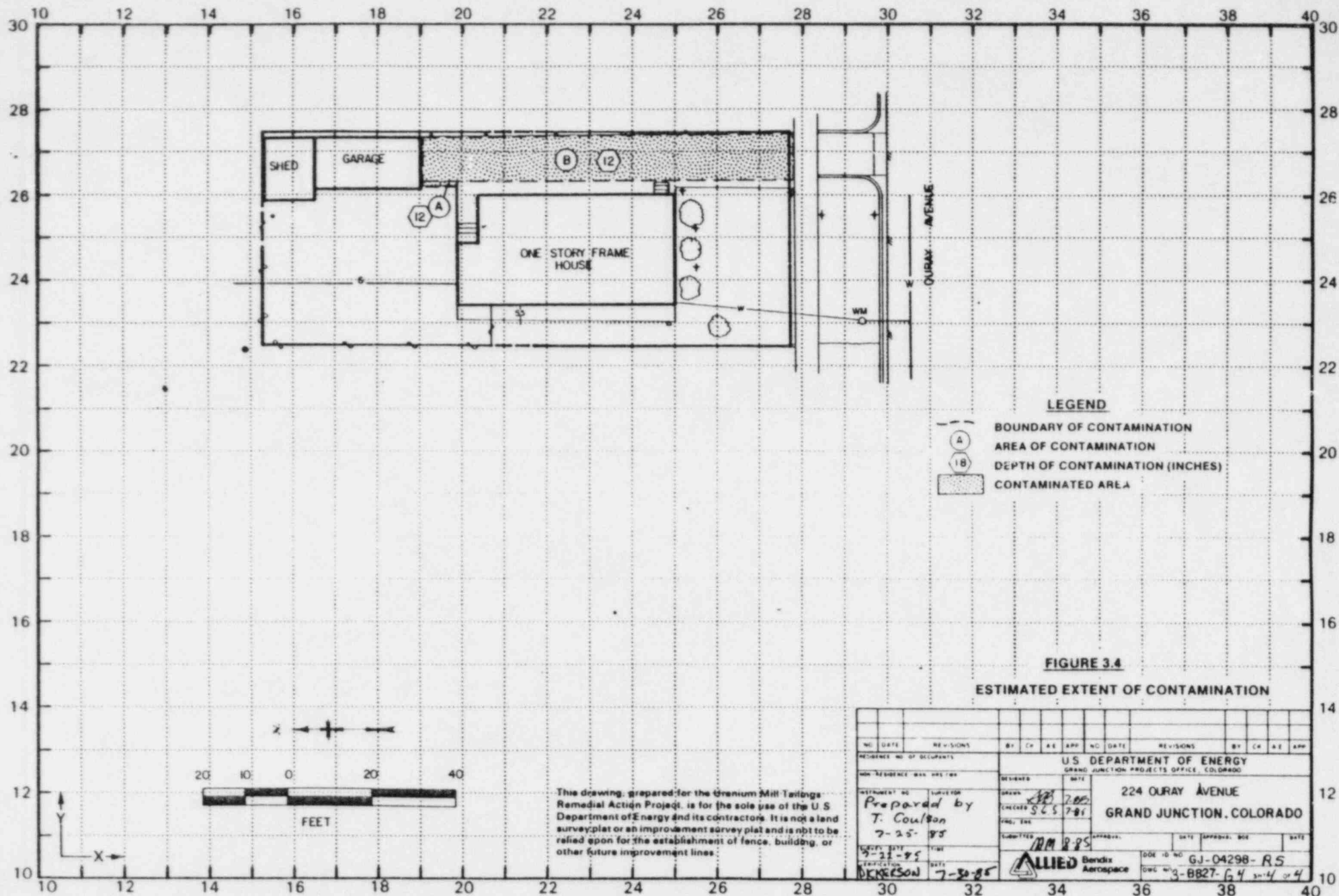




NO		DATE		REVISONS		BY		CHK		A/E		A	
RESIDENCE NO. OF OCCUPANTS						U.S. DEPARTMENT OF ENERGY GRAND JUNCTION PROJECTS OFFICE, COLORADO							
MAN RESIDENCE MAX. AHS. / Wk						DESIGNED		DATE		224 CURAY AVENUE GRAND JUNCTION, COLORADO			
INSTRUMENT NO.		SURVEYOR				DRAWN		DATE					
Prepared by T. Cousin 7-25-85						CHECKED		DATE					
						ENCL. ENG.		DATE					
SUNDTY DATE		TIME				SUBMITTER		DATE		APPROVED		DATE	
7-22-85						NIM NPS							
TIME / DATE		TIME				Bendis Aerospace		DOW NO		GJ-04298-RS			
Bendis Aerospace		5-85				ALLIED		DOW NO		9-8827-02		SH-2 or 4	
30		32		34		36		38					







DOE ID NO. GJ-04298- RS Date 7-25-85

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

Official Survey Report

Property Address 224 Ouray AvenueProperty Owner Frances Martin

Address of Owner (if different from above) \_\_\_\_\_

Report Prepared By Terry Coulson

I. PRESENCE/ABSENCE OF RESIDUAL RADIOACTIVE MATERIALS

☐ No evidence of residual radioactive material on surveyed property.

☒ Residual radioactive materials found at the following locations:

☒ In open areas.

☒ Under or around exterior improvements.

☒ Under or around a typically nonoccupied structure.

☐ Under or around a typically occupied structure.

II. RESULTS OF RADIOLOGIC ASSESSMENT

☐ 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.

☒ 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 = 33 uR/h

ALLIED Bendix  
Aerospace

Bendix Field Engineering Corporation  
Grand Junction Operations  
Grand Junction, Colorado

Date: July 22, 1985

To: Files

From: Terry Coulson

Subject: Team Leader Notes - GJ-04298-RS

Address: 224 Ouray Avenue

Owner: Frances Martin

Occupant: One

Weather: Warm and wonderful

Team Members

T. Coulson (Team Leader)  
V. Young  
C. Adams  
R. Wilkins

M. Heronema  
N. Wallace  
S. Southern

Instruments

See Equipment Summary sheet

The water and sewer lines were found in the crawl space. Corresponding exterior boreholes were drilled. The sewer line downhole scintillometer reading range was 140 to 175 counts per second (cps). A similar reading for the water line was noted (140 to 180 cps). The sewer line exits 15 feet from the back of the house on the west side. It is unknown whether it runs to the street or alley.

A core was taken in the contaminated driveway. A scintillometer reading of the core was 95 to 105 cps.

Team Leader Notes  
Terry Coulson  
GJ-04298-RS  
July 22, 1985  
Page 2

A walking scan was performed on the property to the east of the contaminated driveway. The average reading was 120 cps with a little "shine" at one spot of 140 cps.

The depth of the footing base is 12 inches below the exterior grade. The 13-inch delta on the backside of the house for the gas line should be adequate to cover this foundation. There is a concrete sidewalk between the driveway and house. This sidewalk is an older pour and not contaminated.

A Health and Safety representative arrived as we were leaving. Dave Diss assisted the crew in frisking.

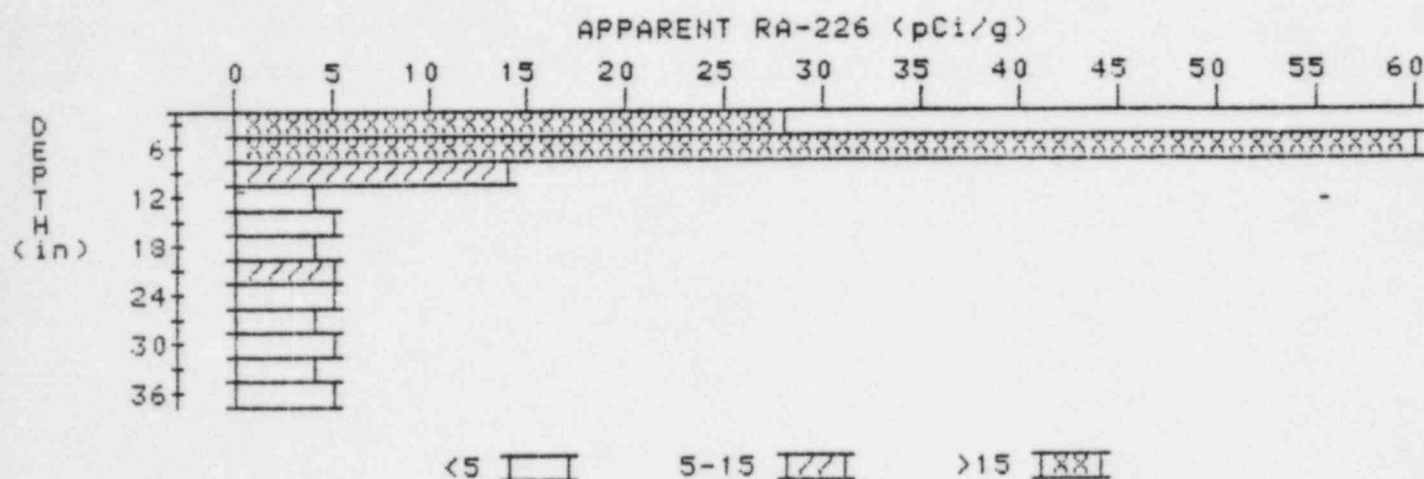
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

6

PROPERTY NUMBER: GJ-04298-RS

HOLE NUMBER: 6

LOCATION: 206264



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	27.8	27.8
6	31.8	59.5
9	20.2	14.0
12	12.1	4.5
15	8.3	4.9
18	6.4	4.4
21	5.6	5.1
24	5.1	4.7
27	4.8	4.4
30	4.7	4.9
33	4.5	4.1
36	4.5	4.5



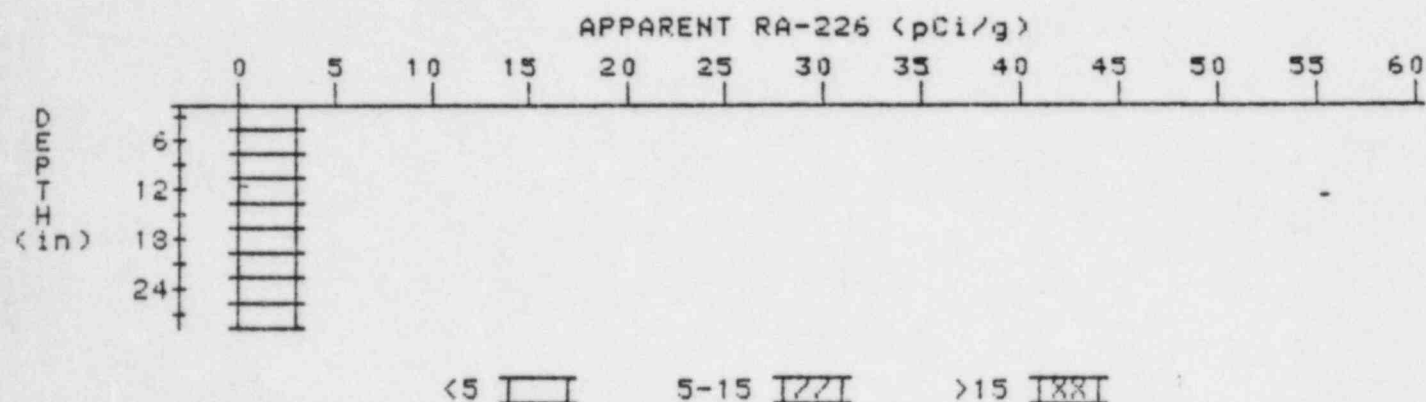
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

9

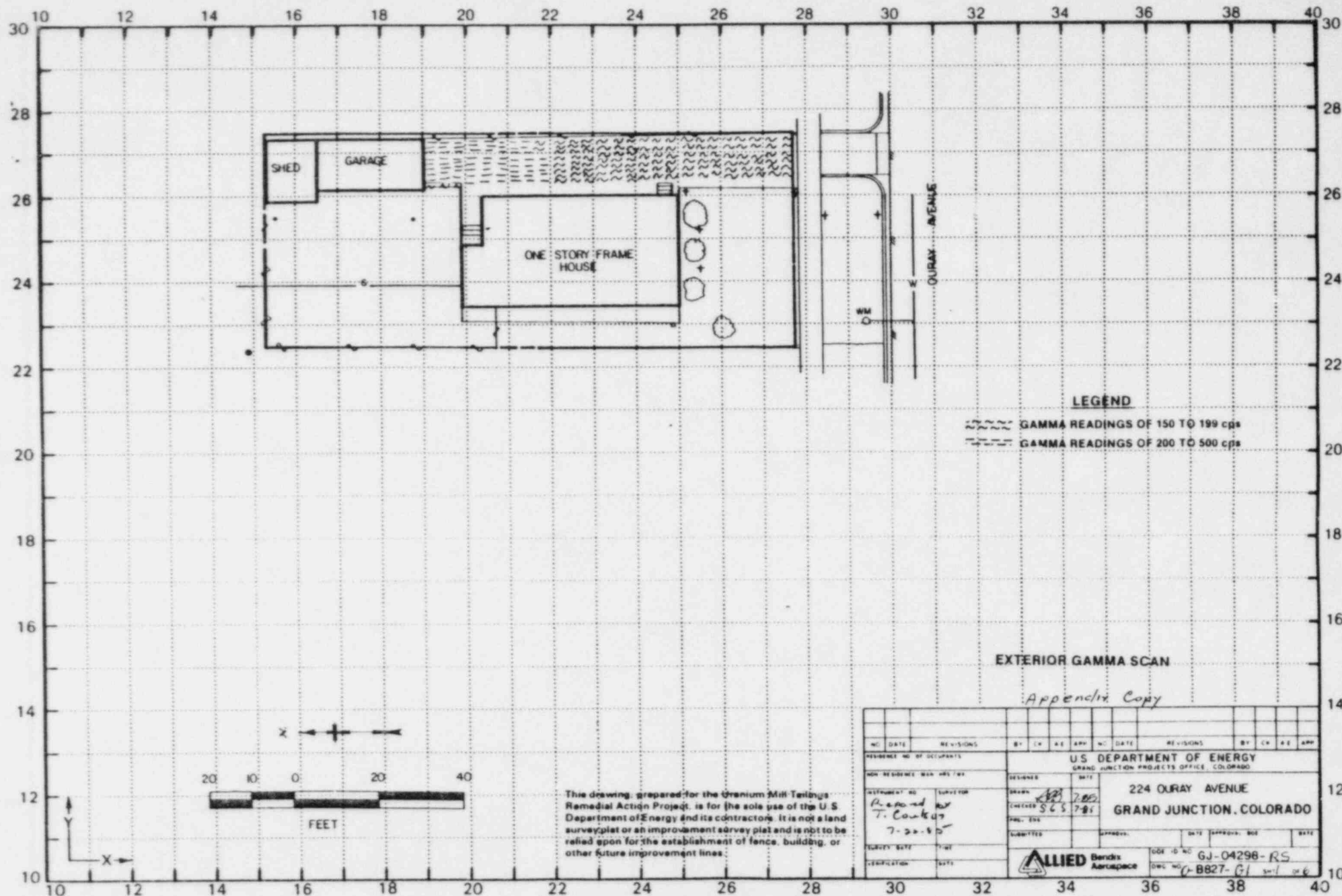
PROPERTY NUMBER: GJ-04298-RS

HOLE NUMBER: 9

LOCATION: 251250



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.4	3.4
6	3.3	3.3
9	3.2	3.2
12	3.1	2.9
15	3.1	3.1
18	3.1	3.3
21	3.0	2.8
24	3.0	2.6
27	3.2	3.2



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