

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-02275-RS
ADDRESS: 1535 North 21st Street

AUGUST 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

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

APPROVED BY

M. K. Tucker

M. TUCKER
DOE PROJECT ENGINEER

DATE

August 5, 1985

REA02275:REA-613

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PDR WASTE PDR
WM-54

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

The location, DOE ID No. GJ-02275-RS, is a single-family residence located at 1535 North 21st Street, Grand Junction, Colorado.

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

1.2 Evaluation and Recommendation

The action recommended is the removal of contaminated material and restoration of the property to its original condition. The identified residual radioactive material found on this property is tailings; the estimated volume is: exterior, 11 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is \$1,473. Remedial action on this property will take approximately 5 days to complete.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 1535 North 21st Street, Grand Junction, Colorado

Zoning: Residential (RSF-8)

Lot Size: Approximately 7,500 sf (0.17 acres)

Legal Description: Lot 11, Block 2, Del Mar Park Refile, 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:	Single-family residence
South:	Single-family residence
East:	North 21st Street
West:	Alley

2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-story residence
Size:	Approximately 737 sf
Construction Date:	1953
Construction:	Wood-frame
Foundation:	Concrete wall on spread footing
Footing Depth:	Approximately 26" to bottom of footing from grade
Basement:	None
Crawl Space:	Yes
Condition:	Good

Other Structures: None

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-02275-RS on June 26, 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: 14 to 16 uR/h
Highest Outside Gamma Reading (HOG): 33 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): 12 uR/h (ORNL)

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: Lawn
 Direction From Primary Structure: East
 Other Directions: Along city sidewalk
 Total Depth of Contamination: 12 inches
 Approximate Square Footage: 120

(Area B) Surface Material: Concrete
 Direction From Primary Structure: East
 Other Directions: Along North 21st street
 Total Depth of Contamination: 12 inches
 Other (height or thickness): 4 inch-thick-concrete
 Comments: City sidewalk
 Approximate Square Footage: 180

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-02275-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 \$1,473.

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	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-02275-RS

1535 North 21st Street

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.		
1	200270	00	DS	3.8		*	On bricks
		06	DS	1.7		*	Under bricks
2	208253	00	DS	1.1		*	Gas line
		15	DS	1.0		*	On gas line
3	240248	03	TC	2.9		*	Next to waterline
		06	TC	3.1		*	DC = 0 inches
		09	TC	3.4		*	
		12	TC	3.4		*	
		15	TC	3.5		*	
		18	TC	3.7		*	
		21	TC	3.7		*	
		24	TC	3.7		*	
		27	TC	3.7		*	
		30	TC	3.6		*	
		33	TC	3.6		*	
		36	TC	3.5		*	
		39	TC	3.6		*	
		42	TC	3.6		*	
		45	TC	3.6		*	
		48	TC	3.6		*	
		51	TC	3.5		*	
		54	TC	3.6		*	
		57	TC	3.6		*	
		60	TC	3.6		*	
		63	TC	3.6		*	
		66	TC	3.6		*	
		69	TC	3.5		*	
		72	TC	3.5		*	
4	250270	00	DS	<1.0		*	Background
		03	TC	2.7		*	DC = 0 inches
		06	TC	3.1		*	
		09	TC	3.3		*	
		12	TC	3.5		*	
		15	TC	3.5		*	
		18	TC	3.5		*	
		21	TC	3.5		*	
		24	TC	3.5		*	
		27	TC	3.5		*	
		30	TC	3.4		*	
		33	TC	3.3		*	
		36	TC	3.3		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-02275-RS

1535 North 21st Street

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.		
4	250270	39	TC	3.2		*	
5	260248	00	DS	8.2		*	Along city sidewalk
		06	DS	8.8		*	
		12	DS	3.4		*	
6	260260	00	DS	1.4		*	Along city sidewalk
		06	DS	1.1		*	
7	262242	03	TC	18.7		*	Through core in sidewalk DC = 12 inches Based on the deconvolution graph
		06	TC	23.2		*	
		09	TC	15.4		*	
		12	TC	10.2		*	
		15	TC	7.3		*	
		18	TC	6.0		*	
		21	TC	5.2		*	
		24	TC	4.7		*	
		27	TC	4.4		*	
		30	TC	4.2		*	
		33	TC	4.0		*	
8	262270	03	TC	17.0		*	Through core in sidewalk DC = 12 inches Based on the deconvolution graph
		06	TC	18.4		*	
		09	TC	12.6		*	
		12	TC	8.6		*	
		15	TC	6.7		*	
		18	TC	5.7		*	
		21	TC	5.0		*	
		24	TC	4.7		*	
		27	TC	4.4		*	
		30	TC	4.0		*	
		33	TC	3.8		*	
		36	TC	3.7		*	

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 = 06-26-85
 Team Leader = SM

Table 3.2

Summary of Interior Gamma Exposure Rates

DOE ID No. GJ-02275--RS 1535 North 21st Street 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)
Crawl Space	*	*	*	*	14-16	*

* A 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-02275-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	3 x 32	= 96			
	3 x 28	= 84			
	4 x 3	= 12			
		<hr/>			
		192	x 0.3	= 58	
				<hr/>	
	Volume of Concrete			= 58	= 58/27 = 2
	Contaminated Fill				
A	2 x 32	= 64			
	2 x 28	= 56			
		<hr/>			
		120	x 1.0	= 120	
B	3 x 32	= 96			
	3 x 28	= 84			
		<hr/>			
		180	x 0.7	= 126	
				<hr/>	
	Volume of Fill			= 246	= 246/27 = 9
					<hr/>
	TOTAL VOLUME - EXTERIOR				= 11

See Appendix Figure 3.3 For Areas

DOE ID No. GJ-02275-RS

Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-02275-RS

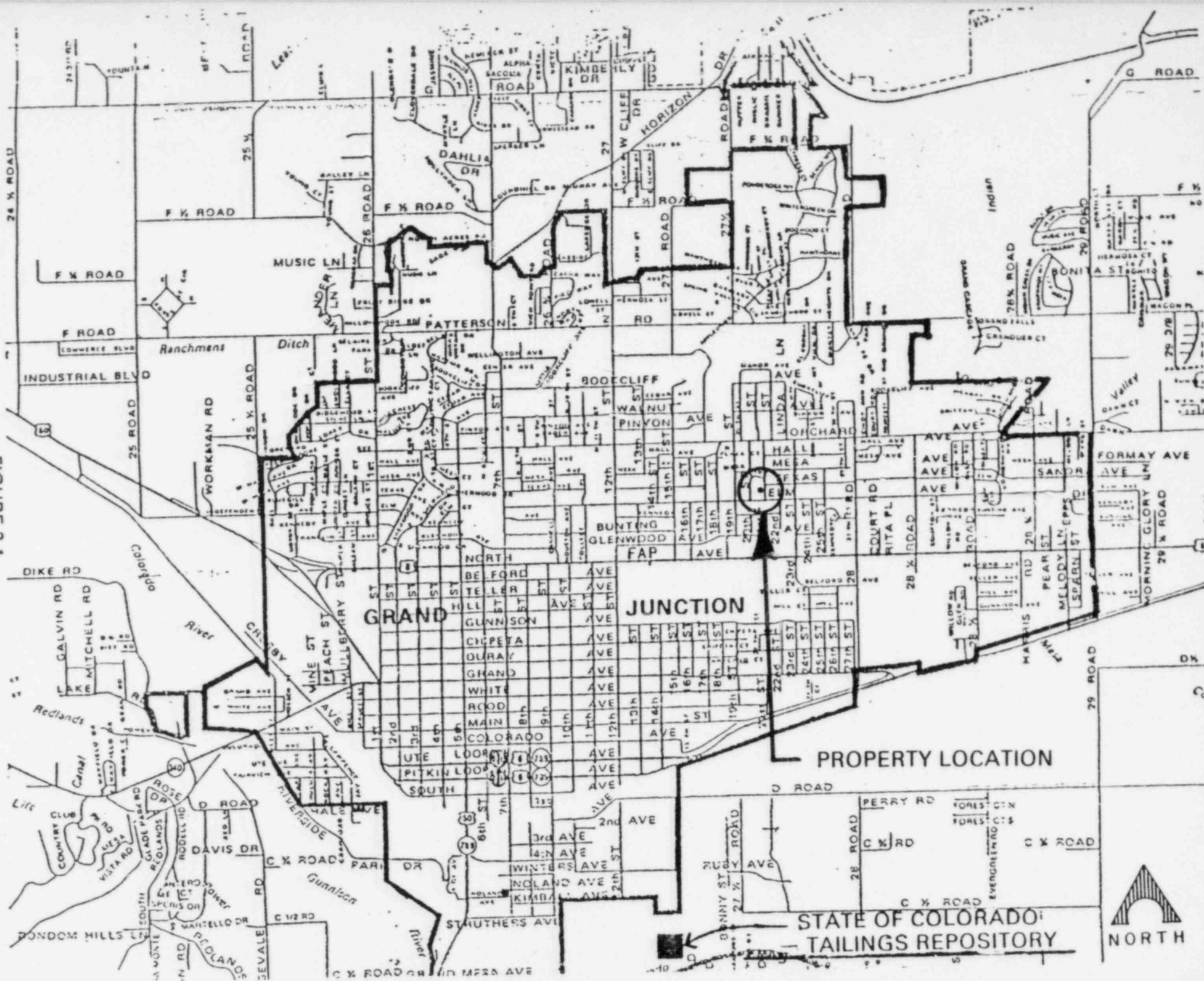
Page 1 of 1

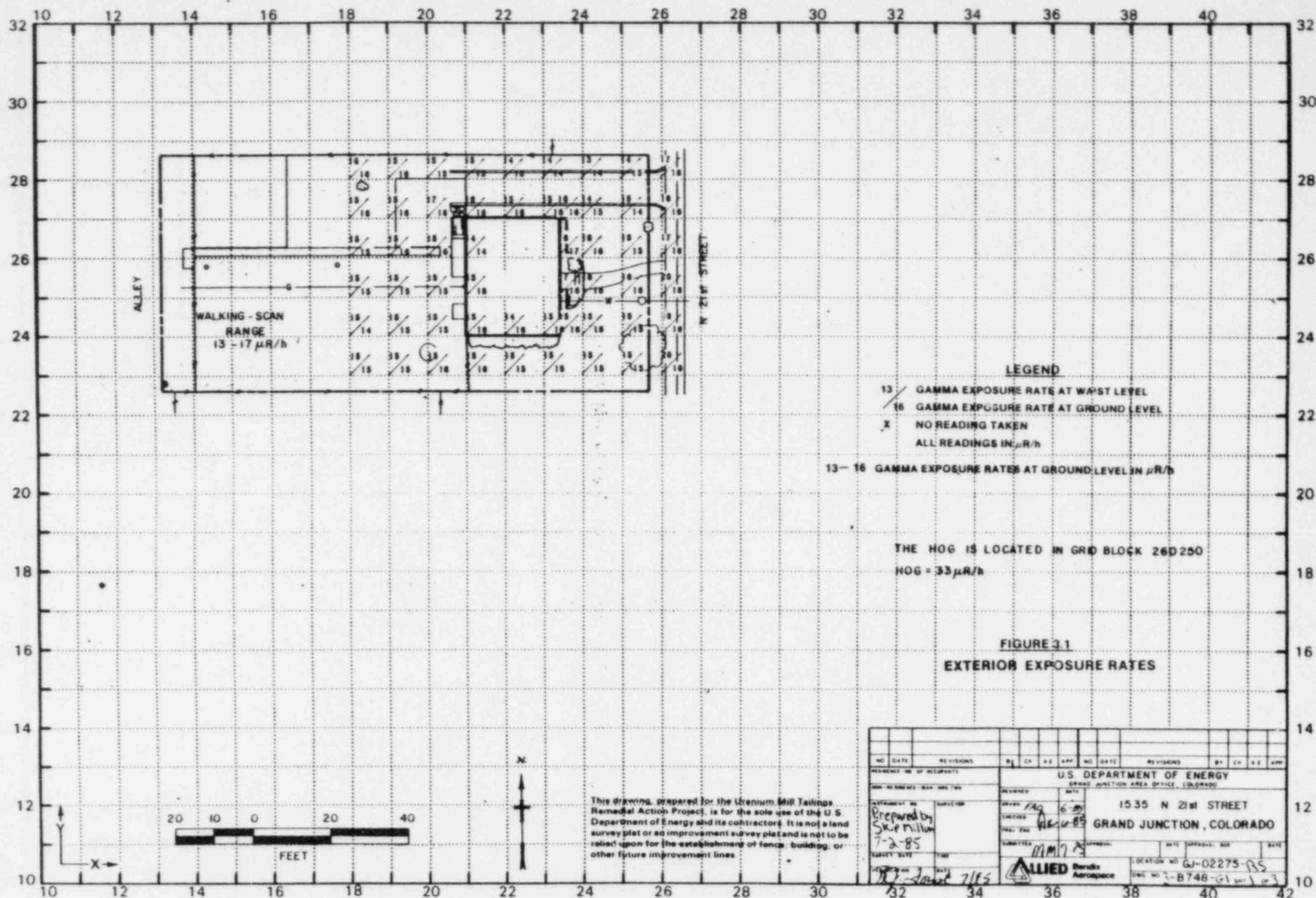
EXTERIOR

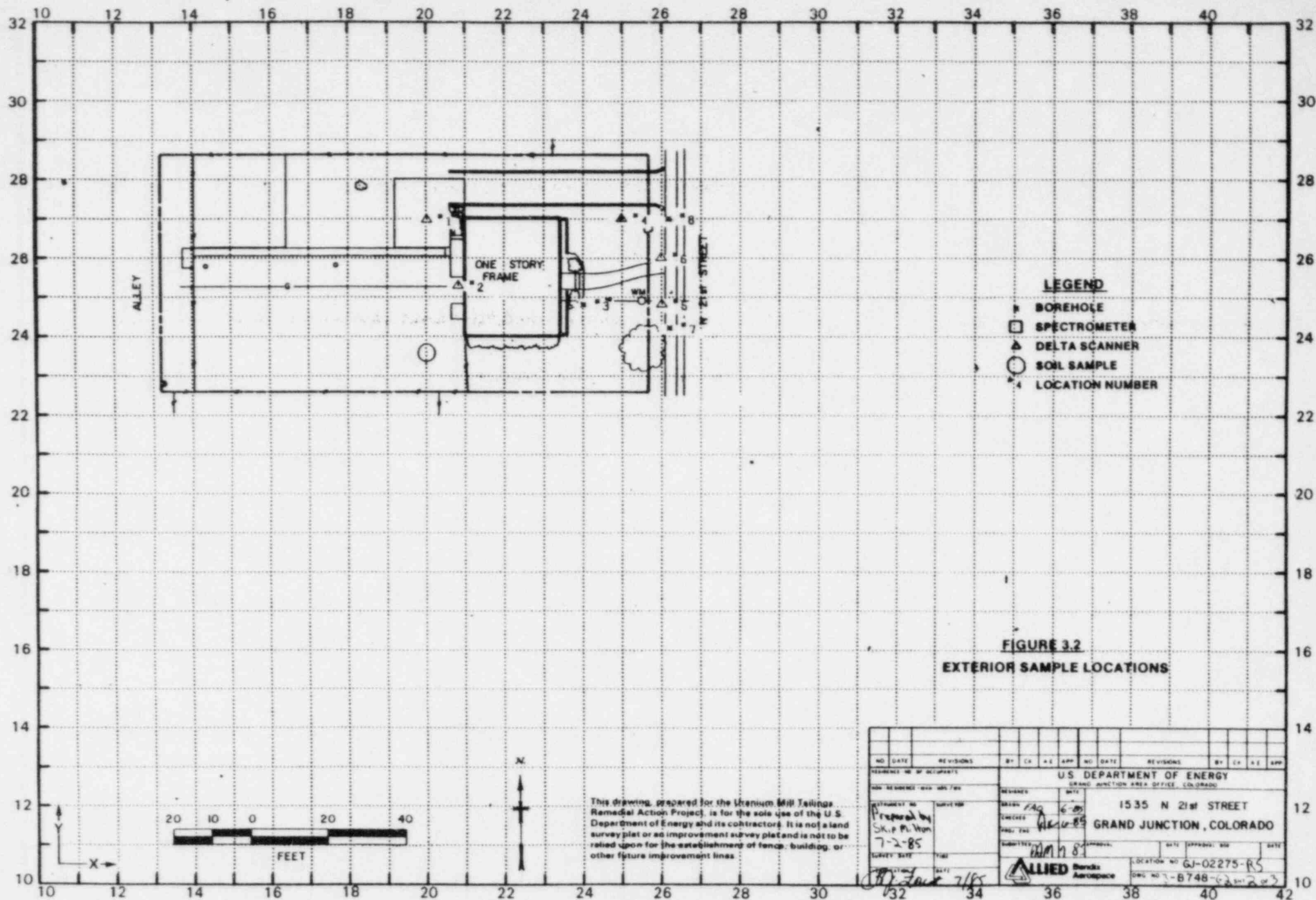
Remove/replace concrete 192 sf @ \$3/sf	\$	576
Remove identified residual radioactive material 9 cy @ \$14.50/cy (machine-open)		131
Replace areas with topsoil 4 cy @ \$9.50/cy		38
Replace areas with compacted roadbase 5 cy @ \$11.50/cy		58
Replace areas with sod 98 sf @ \$.50/sf		49
		<hr/>
TOTAL EXTERIOR	\$	852
TOTAL INTERIOR		0
ACCESS CONTROL		150
		<hr/>
SUBTOTAL	\$	1,002
CONTINGENCY @ 5%		50
		<hr/>
SUBTOTAL	\$	1,052
CONTRACTOR OVERHEAD & PROFIT @ 40%		421
		<hr/>
GRAND TOTAL	\$	1,473

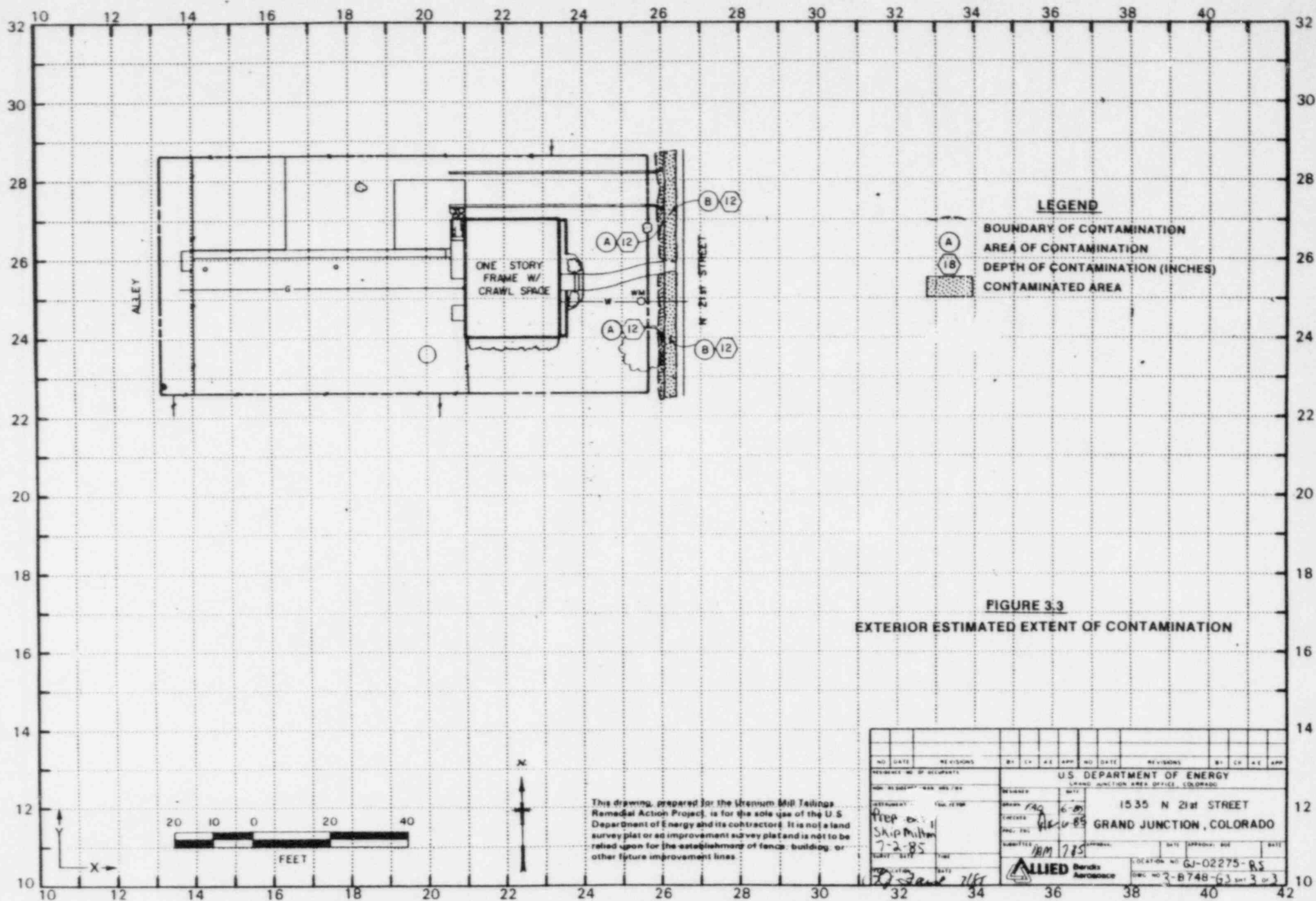
FAV072985
REA02275/ REA-613/ LMR

FIGURE 2.1
VICINITY MAP









3/85

DOE ID NO. GJ-02275-RS

Date 1-2 85

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

Official Survey Report

Property Address 1535 North 21st street

Property Owner E.L. Smith

Address of Owner (if different from above) 889 24 Road Grand Junction, Co. 81505

Report Prepared By Skip Milton

I. PRESENCE/ABSENCE OF RESIDUAL RADIOACTIVE MATERIALS

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

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

1 1 In open areas.

1XXX 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 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 = 12 uR/h
HOG = 33 uR/h

ALLIED Bendix
Aerospace

Bendix Field Engineering Corporation
Grand Junction Operations
Grand Junction, Colorado

Date: June 26, 1985
To: Files
From: Skip Milton
Subject: Team Leader Notes - GJ-02275-RS

Address: 1535 North 21st Street

Owner: E.I. Smith

Year Built: 1953

Weather: Clear and sunny.

Team Members

S. Milton (Team Leader)	M. Gilfillan
H. Mattison	M. Johnson
G. Larsen	V. Rothman
D. Bell	

An exterior gamma scan showed contamination associated with the carport (brick floor) and the city sidewalk. Two cores were performed and augers were bored.

A delta was performed on the bricks. No contamination was apparent underneath the bricks.

The homeowner was not present during the survey. I was unable to perform an interior survey; however, no elevated readings near the primary structure were noted.

All utility lines were investigated with deltas and/or boreholes.

A crawl space gamma survey showed no apparent contamination.

The crew was frisked before leaving the site.

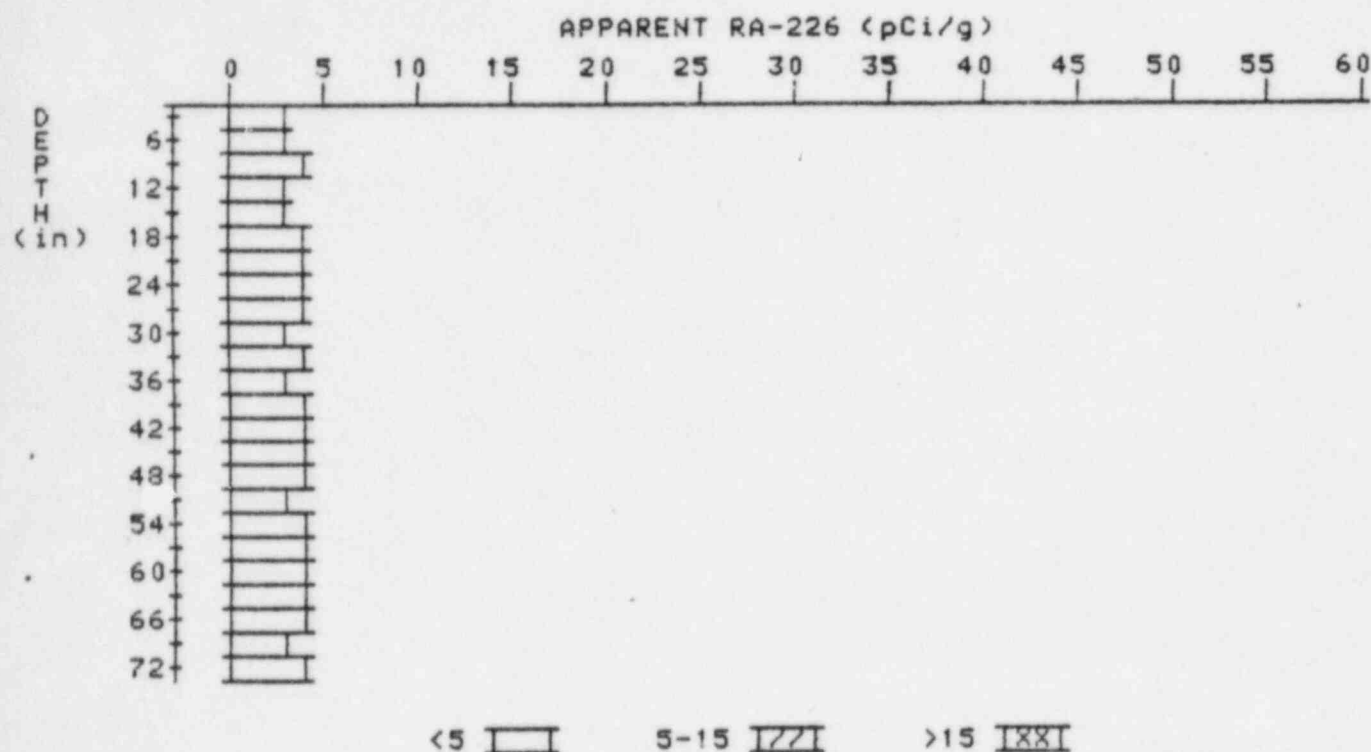
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

3

PROPERTY NUMBER: GJ-02275-RS

HOLE NUMBER: 3

LOCATION: 240248



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.9	2.9
6	3.1	2.9
9	3.4	3.9
12	3.4	3.2
15	3.5	3.3
18	3.7	4.1
21	3.7	3.7
24	3.7	3.7
27	3.7	3.9
30	3.6	3.4
33	3.6	3.8
36	3.5	3.1
39	3.6	3.8
42	3.6	3.6
45	3.6	3.6

48
51
54
57
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69
72

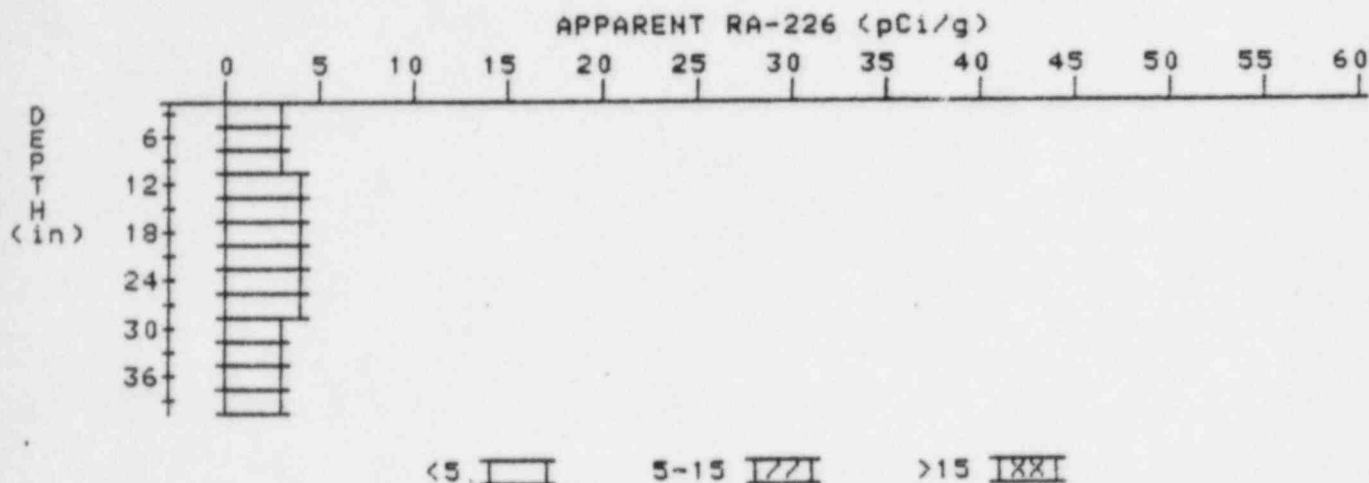
3.6
3.5
3.6
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3.6
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3.6
3.5
3.5

3.8
3.1
3.8
3.6
3.6
3.6
3.8
3.3
3.5

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

4

PROPERTY NUMBER: GJ-02275-RS
HOLE NUMBER: 4
LOCATION: 250270



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.7	2.7
6	3.1	3.5
9	3.3	3.3
12	3.5	3.9
15	3.5	3.5
18	3.5	3.5
21	3.5	3.5
24	3.5	3.5
27	3.5	3.7
30	3.4	3.4
33	3.3	3.1
36	3.3	3.5
39	3.2	3.2

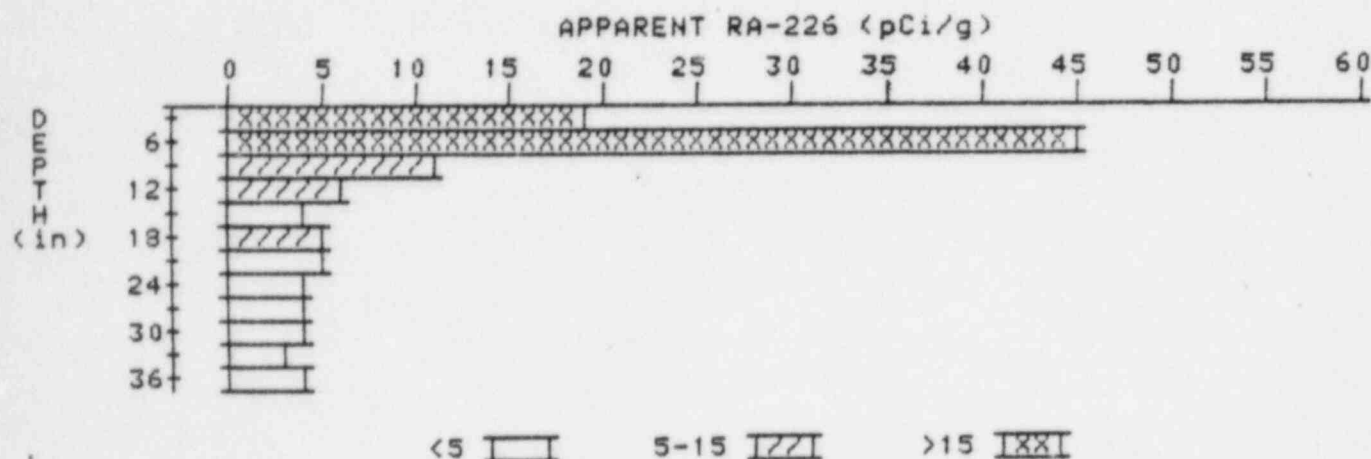
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

7

PROPERTY NUMBER: GJ-02275-RS

HOLE NUMBER: 7

LOCATION: 262242



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	18.7	18.7
6	23.2	45.1
9	15.4	10.8
12	10.2	6.1
15	7.3	4.5
18	6.0	5.1
21	5.2	4.7
24	4.7	4.3
27	4.4	4.2
30	4.2	4.2
33	4.0	3.5
36	4.1	4.1

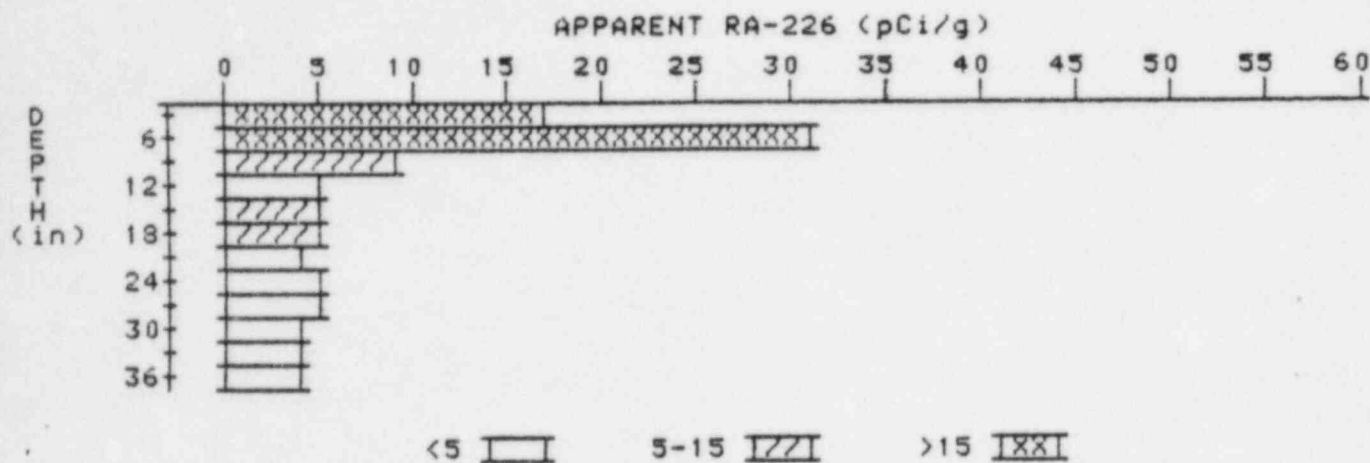
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

8

PROPERTY NUMBER: GJ-02275-RS

HOLE NUMBER: 8

LOCATION: 262270



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	17.0	17.0
6	18.4	31.2
9	12.6	9.4
12	8.6	4.9
15	6.7	5.1
18	5.7	5.2
21	5.0	4.3
24	4.7	4.7
27	4.4	4.6
30	4.0	3.6
33	3.8	3.6
36	3.7	3.7

