RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-01390-RS
ADDRESS: 2025 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 by WA
M. TUCKER
DOE PROJECT ENGINEER

DATE August 2, 1985

REA01390:REA-705

TABLE OF CONTENTS

Section		Page
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-01390-RS, is a single-family residence located at 2025 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, 12 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is $1,061. Remedial action on this property will take approximately 4 days to complete.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 2025 North 21st Street, Grand Junction, Colorado

Zoning: Residential (RSF-8)

Lot Size: Approximately 7,800 sf (0.18 acre)

Legal Description: Lot 8, Sungold Park Annex, 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 2,084 sf
Construction Date:	1955
Construction:	Wood-frame
Foundation:	Concrete wall on spread footing
Footing Depth:	Approximately 98" to bottom of footing from grade
Basement:	Yes - full
Crawl Space:	None
Condition:	Good

Other Structures:

Type:	Shed #1
Size:	Approximately 41 sf
Construction:	Wood-frame
Foundation:	Concrete slab-on-grade
Condition:	Good

Type:	Shed #2 (play-house)
Size:	Approximately 41 sf
Construction:	Wood-frame
Foundation:	Railroad ties
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-01390-RS on July 2, 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 in the west 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, 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): 35 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 Reading: 16 to 18 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 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: Soil
Direction From Primary Structure: Northwest
Other Directions: Northwest corner of property
Total Depth of Contamination: 6 inches
Approximate Square Footage: 316

(Area B) Surface Material: Soil
Direction From Primary Structure: Southwest
Other Directions: South property line
Total Depth of Contamination: 6 inches
Approximate Square Footage: 300

(Area C) Surface Material: Soil
Direction From Primary Structure: Northeast
Total Depth of Contamination: 6 inches
Approximate Square Footage: 25

(Area D) Surface Material: Soil
Direction From Primary Structure: East
Other Directions: Adjacent to east foundation of primary structure
Total Depth of Contamination: 6 inches
Approximate Square Footage: 15

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-01390-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 $1,061.

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 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

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	In Situ Ra-226 (pCi/g) Spectr.	Chem Ra-226 (pCi/g)	Comments
1	133289	00	DS	9.8		*	North yard
		06	DS	2.7		*	
		10	DS	<1.0		*	
2	144281	00	DS	3.6		*	Northwest of
		06	DS	1.6		*	primary structure
3	145285	00	DS	5.0		*	Northwest of
		06	DS	2.5		*	primary structure
		12	DS	1.6		*	
4	146236	00	DS	1.9		*	By southwest gate
		06	DS	1.2		*	
5	153236	00	DS	2.5		*	By southwest gate
		06	DS	1.5		*	
6	153291	00	DS	5.2		*	Northwest of
		06	DS	1.7		*	primary structure
7	170237	00	DS	5.2		*	Southwest of
		06	DS	<1.0		*	primary structure
8	185237	03	TC	7.5		*	Southwest of primary
		06	TC	6.7		*	structure
		09	TC	5.7		*	DC = 6 inches
		12	TC	4.8		*	Based on all
		15	TC	4.1		*	available data
		18	TC	3.9		*	
		21	TC	3.8		*	
		24	TC	3.8		*	
		27	TC	4.0		*	
9	196237	00	DS	1.8		*	Southwest of
		06	DS	1.8		*	primary structure
10	204244	00	DS	2.0		*	West of primary
		06	DS	2.2		*	structure
		12	DS	1.7		*	
11	205262	03	TC	3.6		*	Sewer line
		06	TC	3.8		*	West of primary
		09	TC	4.0		*	structure
		12	TC	4.1		*	DC = 0 inches

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
11	205262	15	TC	4.1		*	
		18	TC	4.2		*	
		21	TC	4.1		*	
		24	TC	4.1		*	
		27	TC	4.1		*	
		30	TC	4.1		*	
		33	TC	4.1		*	
		36	TC	4.0		*	
		39	TC	4.0		*	
		42	TC	4.0		*	
		45	TC	4.0		*	
		48	TC	4.1		*	
		51	TC	4.1		*	
		54	TC	4.0		*	
		57	TC	4.0		*	
12	216238	00	DS	1.5		*	Gas line
		18	DS	1.8		*	On gas line
13	232262	03	TC	3.9		*	Water line
		06	TC	4.0		*	East of primary
		09	TC	4.0		*	structure
		12	TC	4.0		*	DC = 0 inches
		15	TC	4.1		*	
		18	TC	4.0		*	
		21	TC	4.1		*	
		24	TC	4.0		*	
		27	TC	4.0		*	
		30	TC	4.0		*	
		33	TC	4.0		*	
		36	TC	4.0		*	
		39	TC	4.0		*	
		42	TC	4.1		*	
		45	TC	4.1		*	
		48	TC	4.2		*	
		51	TC	4.1		*	
		54	TC	4.1		*	
		57	TC	4.0		*	
		60	TC	4.1		*	
14	232268	00	DS	3.0		*	East of primary
		06	DS	2.7		*	structure
		12	DS	1.6		*	

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	In Situ Ra-226 (pCi/g) Spectr.	Chem Ra-226 (pCi/g)	Comments
15	243298	00	DS	2.7		*	Northeast of
		06	DS	1.3		*	primary structure
16	255275	00	DS	1.1		*	Background
		03	TC	3.3		*	DC = 0 inches
		06	TC	3.7		*	East yard
		09	TC	3.9		*	
		12	TC	4.1		*	
		15	TC	4.1		*	
		18	TC	4.1		*	
		21	TC	4.1		*	
		24	TC	4.0		*	
		27	TC	4.1		*	
		30	TC	4.1		*	
		33	TC	4.1		*	
		36	TC	4.1		*	

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 = 07-02-85
Team Leader = TF

Table 3.2
Summary of Interior Gamma Exposure Rates
DOE ID No. GJ-01390-RS 2025 North 21st Street

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	*	*	*	*	16-18	*
Shed 1	*	*	*	*	15-16	*
Shed 2	*	*	*	*	16-18	*

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

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-01390-RS

AREA	CALCULATIONS(ft)		SF		DEPTH(ft)		CF				CUBIC YARDS
EXTERIOR											
A	26 x 11	=	286								
	10 x 3	=	30								
			316	x	0.5	=	158				
B	60 x 5	=	300	x	0.5	=	150				
C	5 x 5	=	25	x	0.5	=	13				
D	5 x 3	=	15	x	0.5	=	8				
	TOTAL VOLUME - EXTERIOR					=	329	=	329/27	=	12

See Appendix Figure 3.3 For Areas

Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-01390-RS Page 1 of 1

EXTERIOR

Remove identified residual radioactive material		
9 cy @ $14.50/cy (machine-open)		$ 131
3 cy @ $44/cy (manual-open)		132
Replace areas with topsoil		
12 cy @ $9.50/cy		114
Replace areas with sod		
188 sf @ $.35/sf		66
	TOTAL EXTERIOR	$ 443
	TOTAL INTERIOR	0
	ACCESS CONTROL	200
	SUBTOTAL	$ 643
	CONTINGENCY @ 10%	64
	SUBTOTAL	$ 707
	CONTRACTOR OVERHEAD & PROFIT @ 50%	354
	GRAND TOTAL	$ 1,061

FAV072985
REA01390/REA-705/AP

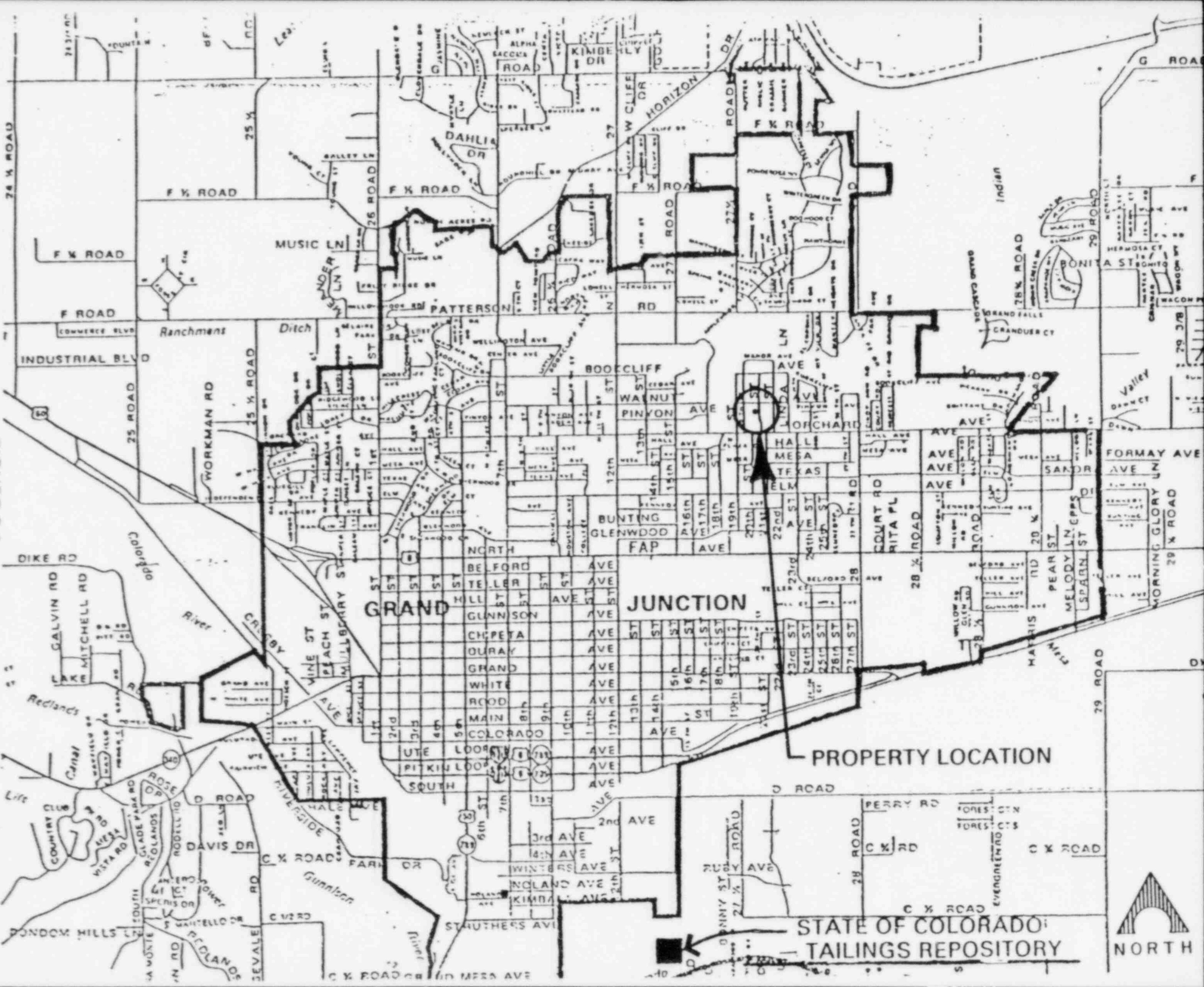
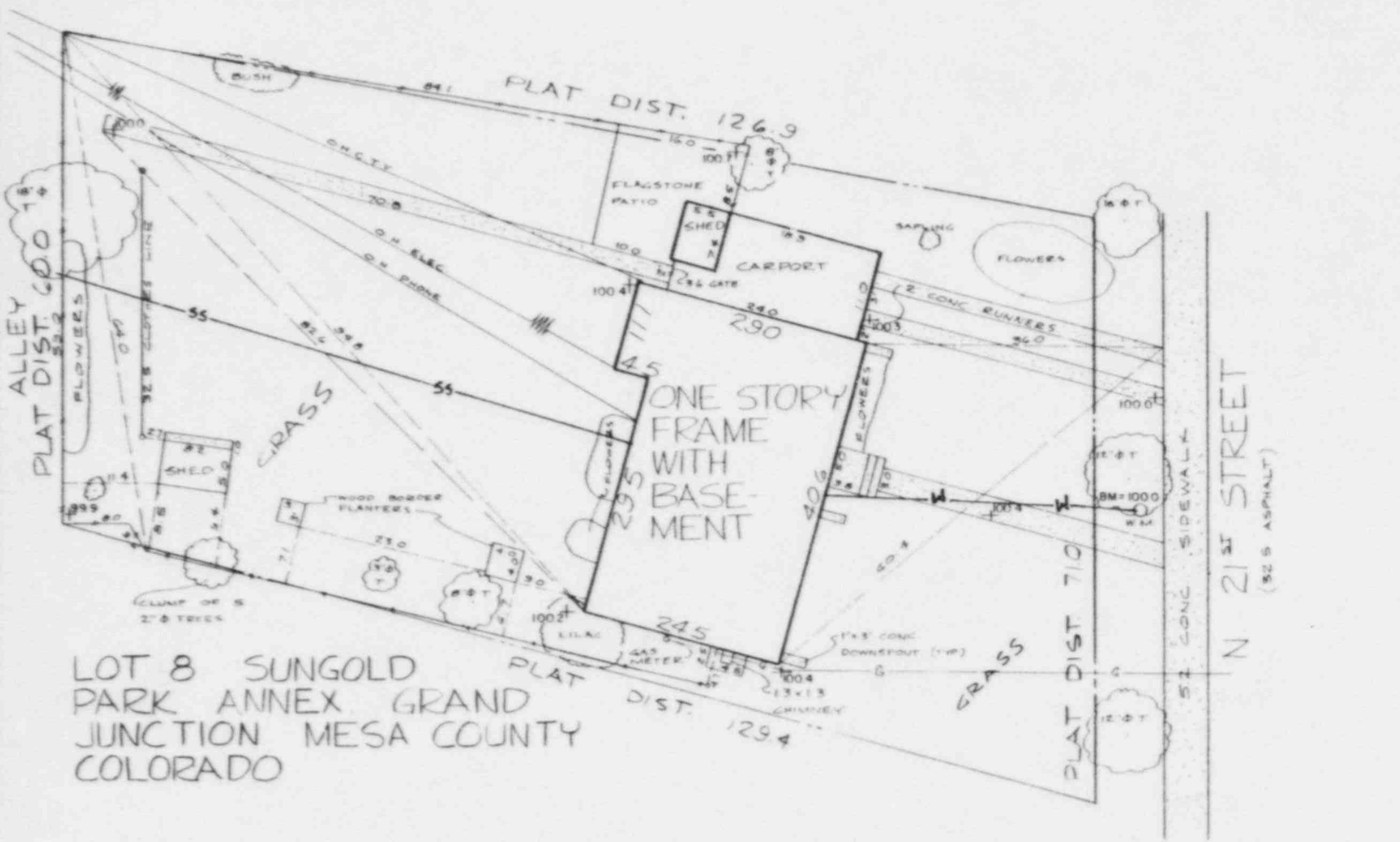


FIGURE 2.1
VICINITY MAP



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 GRAND JUNCTION PROJECT OFFICE, COLORADO		DOE ID NO. GJ01390 RS
ADDRESS 2025 N 21st ST GRAND JCT COLO		ALLIED Bendix Aerospace Bendix Field Engineering Corporation Grand Junction Operations
SURV RSS / 6 24 85	DRAFT 1 J / 6 27 85	CK CAT 9-7 85
DRAWING NO. 3 C 716	F-1	SHEET 1 OF 1

FIGURE 2.2 SITE PLAN

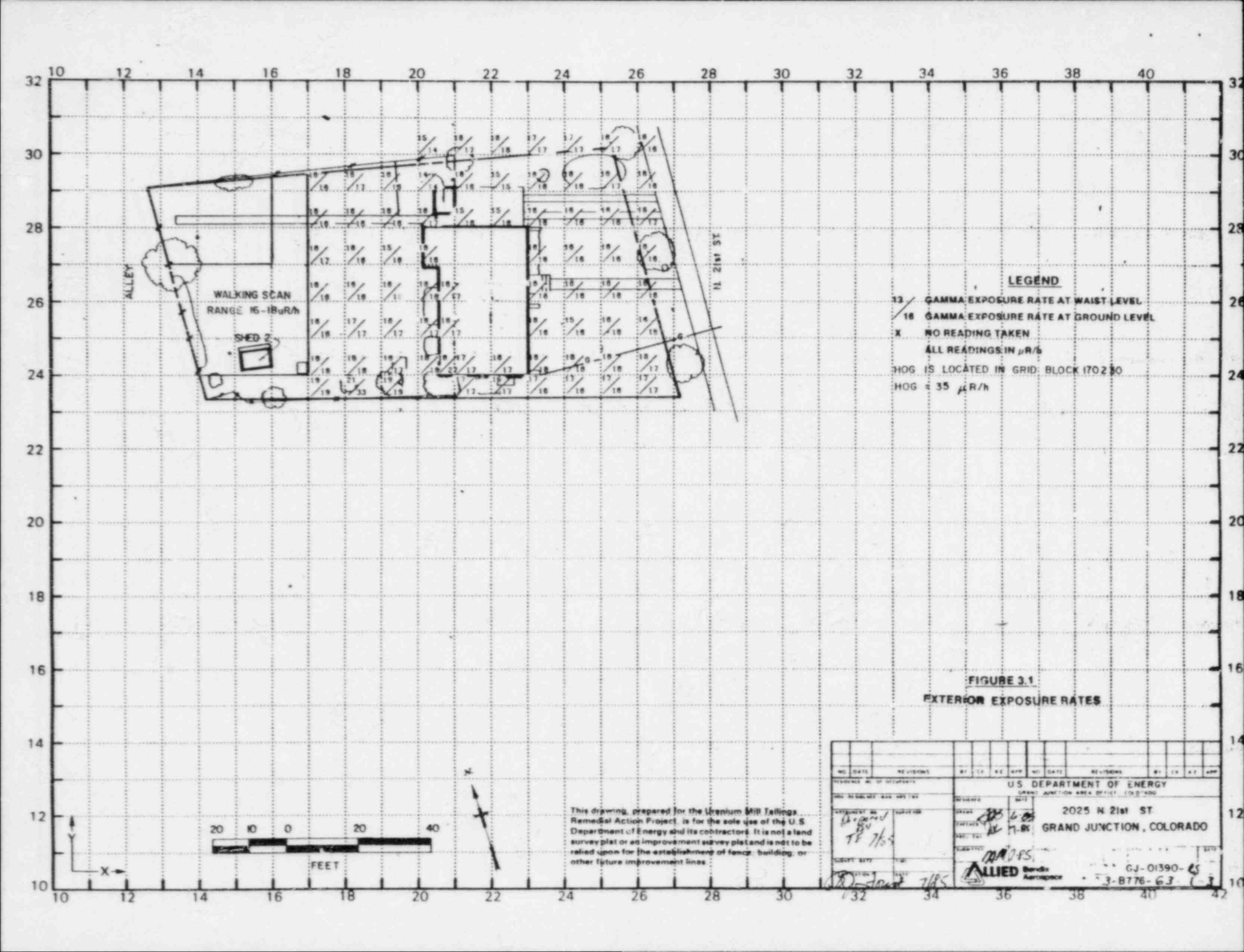


FIGURE 3.1

EXTERIOR EXPOSURE RATES

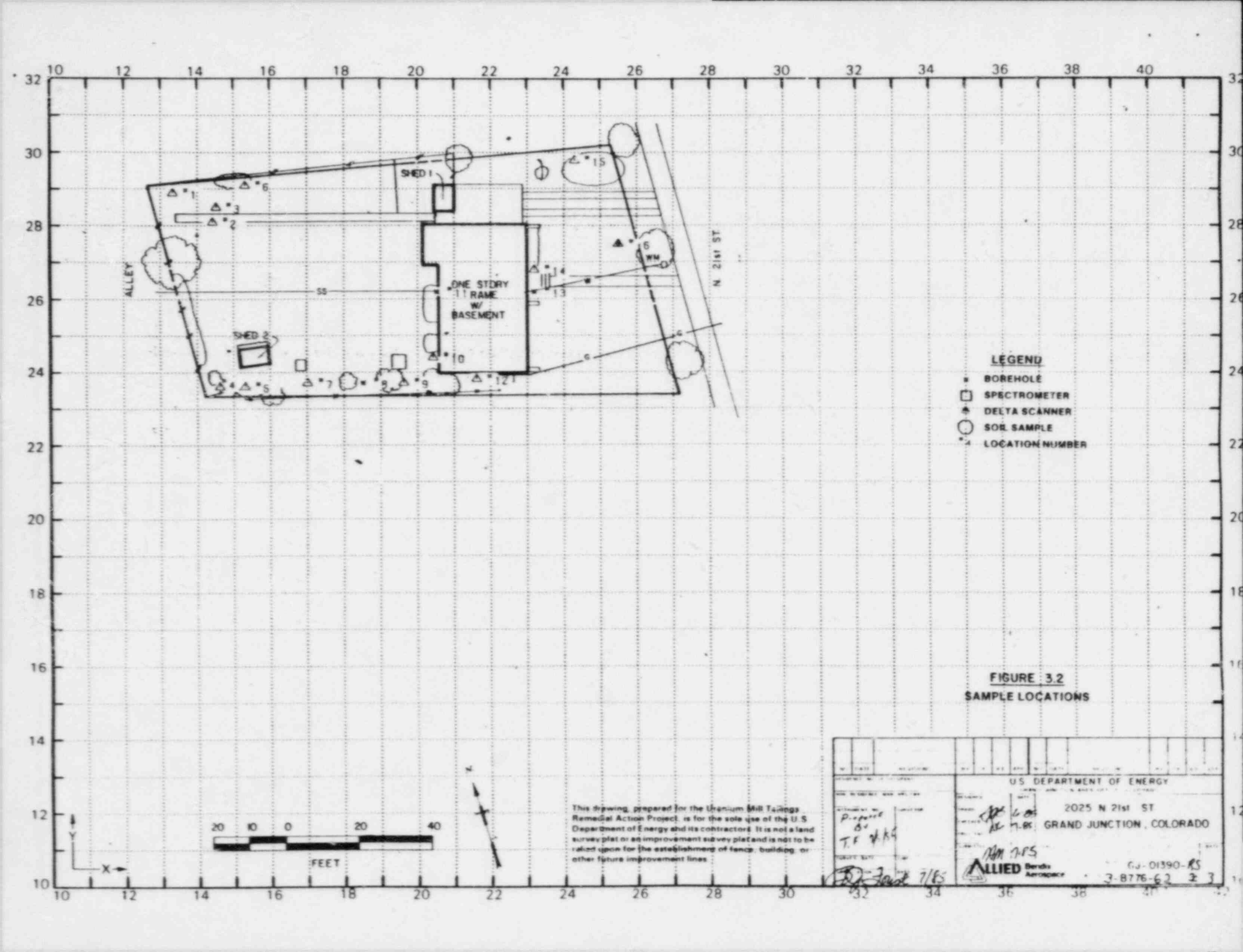


FIGURE 3.2
SAMPLE LOCATIONS

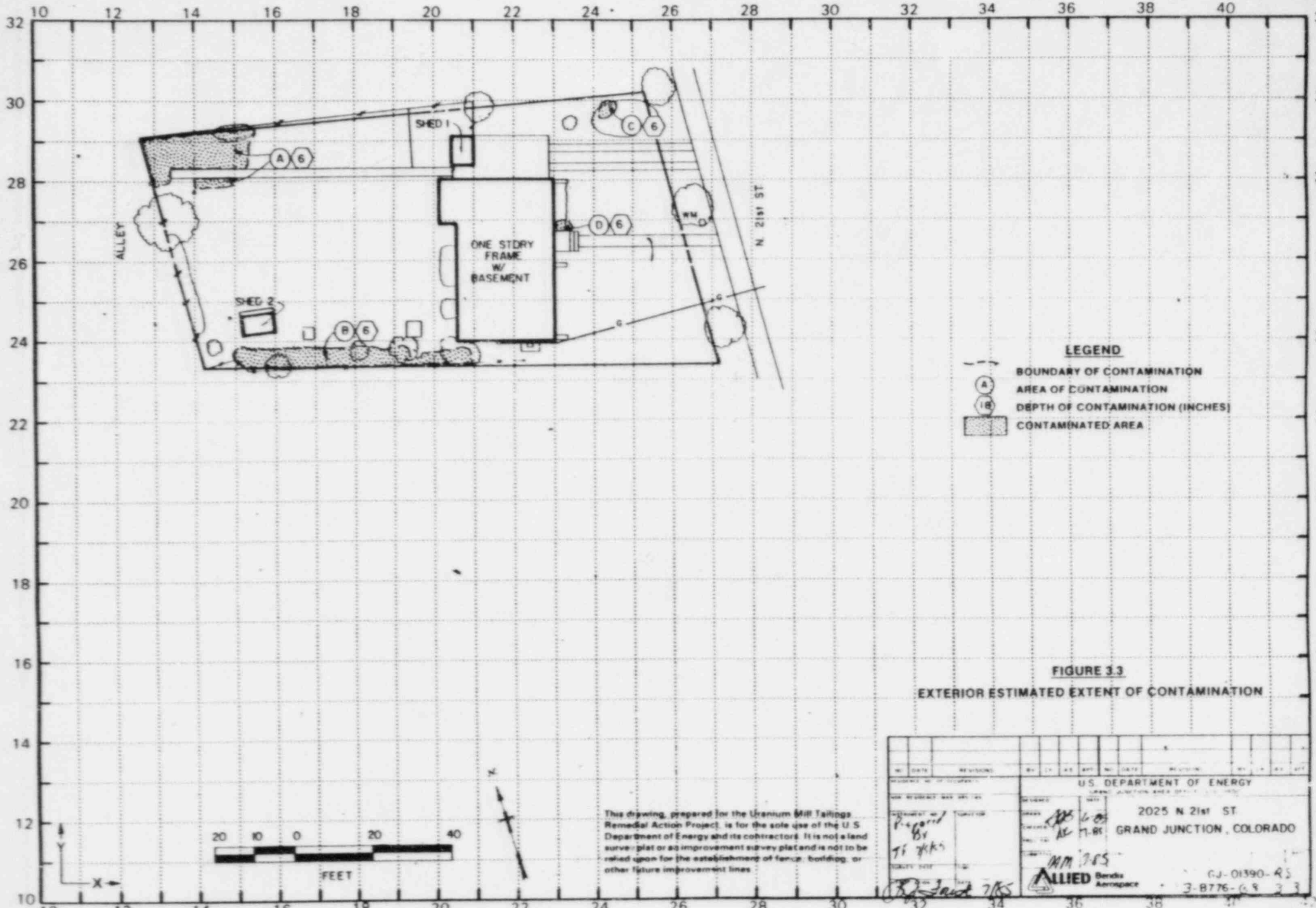


FIGURE 3.3

EXTERIOR ESTIMATED EXTENT OF CONTAMINATION

3/85

DOE ID NO. GJ-01390-RS Date 7/2/85

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

Official Survey Report

Property Address 2025 North 21st Street

Property Owner Jerry and Mary Ellen Martinez

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 ractioactive materials found at the following locations:

1 X 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 = 35 uR/h

MEMORANDUM

ALLIED Bendix
Aerospace

Bendix Field Engineering Corporation
Grand Junction Operations
Grand Junction, Colorado

Date: July 2, 1985

To: Files

From: Thomas Flores

Subject: Team Leader Notes - GJ-01390-RS

Address: 2025 North 21st Street

Owner: Jerry and Mary Ellen Martinez

Team Members

T. Flores (Team Leader)
D. Bell
S. Larsen
R. Herman
S. Southern
G. Meeker
D. Clay

The survey crew arrived on the property at 7:30 AM. After performing an exterior scan and grid point survey, we noted elevated readings along the north and south fence lines. Deltas and boreholes were performed in these areas.

No spillover was noted on the adjacent properties.

A wasp nest was found on the northwest corner of the property. Dave Diss of Health and Safety decided to spray the nest.

All utility lines were located and investigated, no elevated readings were noted.

The interior scan showed no interior contamination.

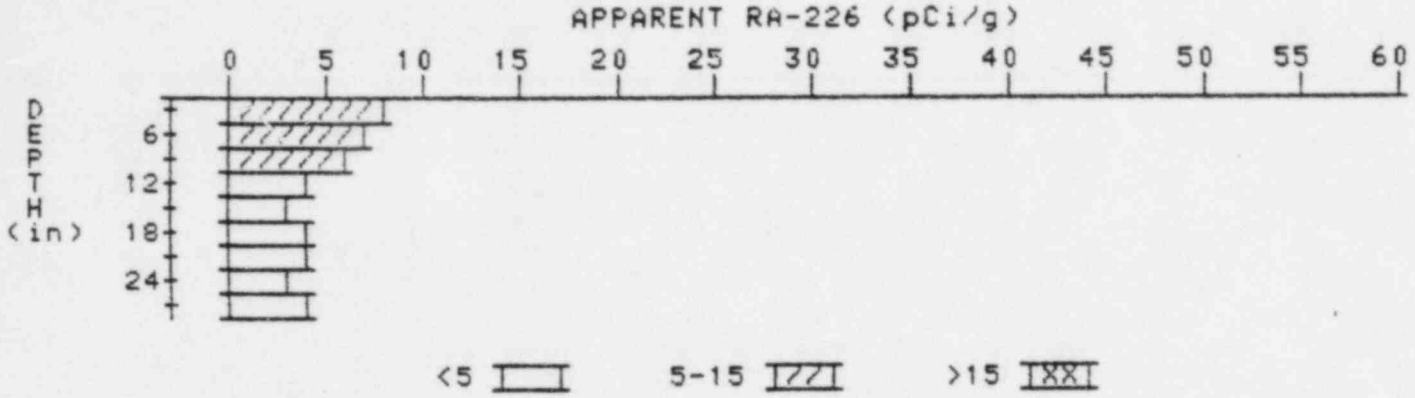
All team members were alpha scanned before leaving the property.

DECON V85.1<850524.0823>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

8

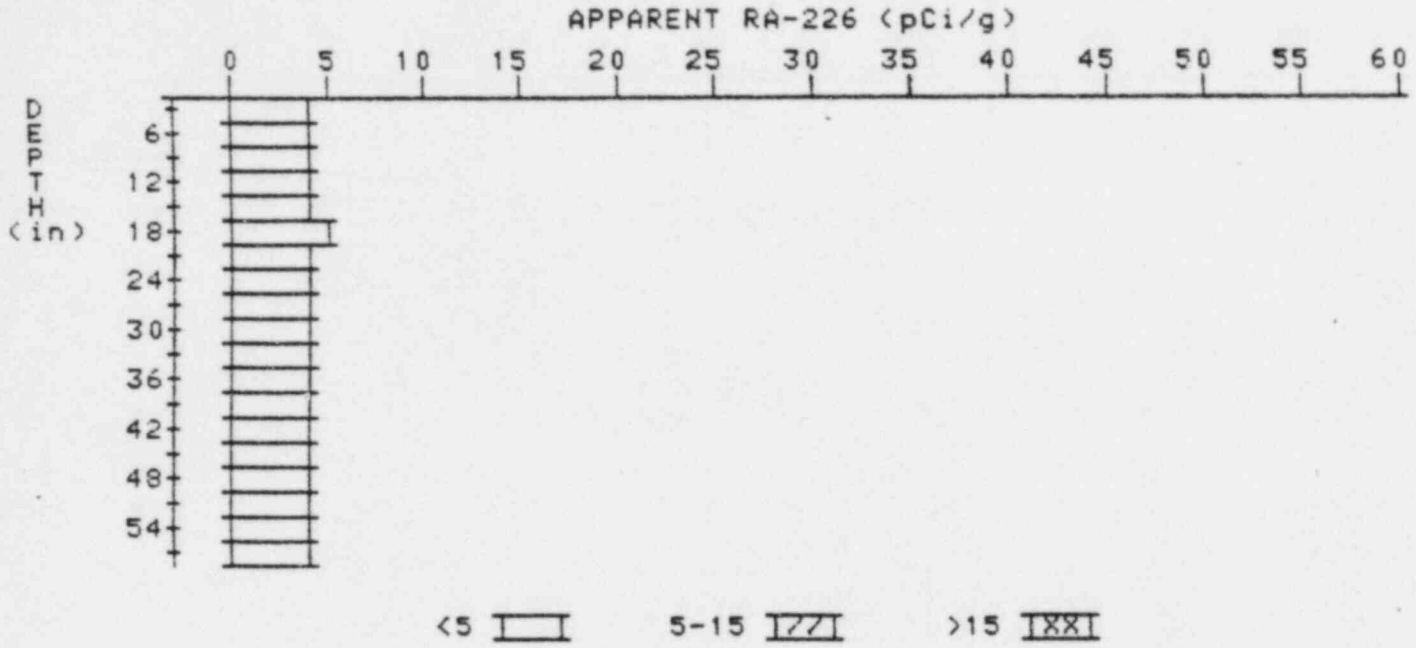
PROPERTY NUMBER: GJ-01390-RS
HOLE NUMBER: 8
LOCATION: 185237



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	7.5	7.5
6	6.7	7.1
9	5.7	5.5
12	4.8	4.4
15	4.1	3.2
18	3.9	3.7
21	3.8	3.6
24	3.8	3.4
27	4.0	4.0

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 11

PROPERTY NUMBER: GJ-01390-RS
HOLE NUMBER: 11
LOCATION: 205262



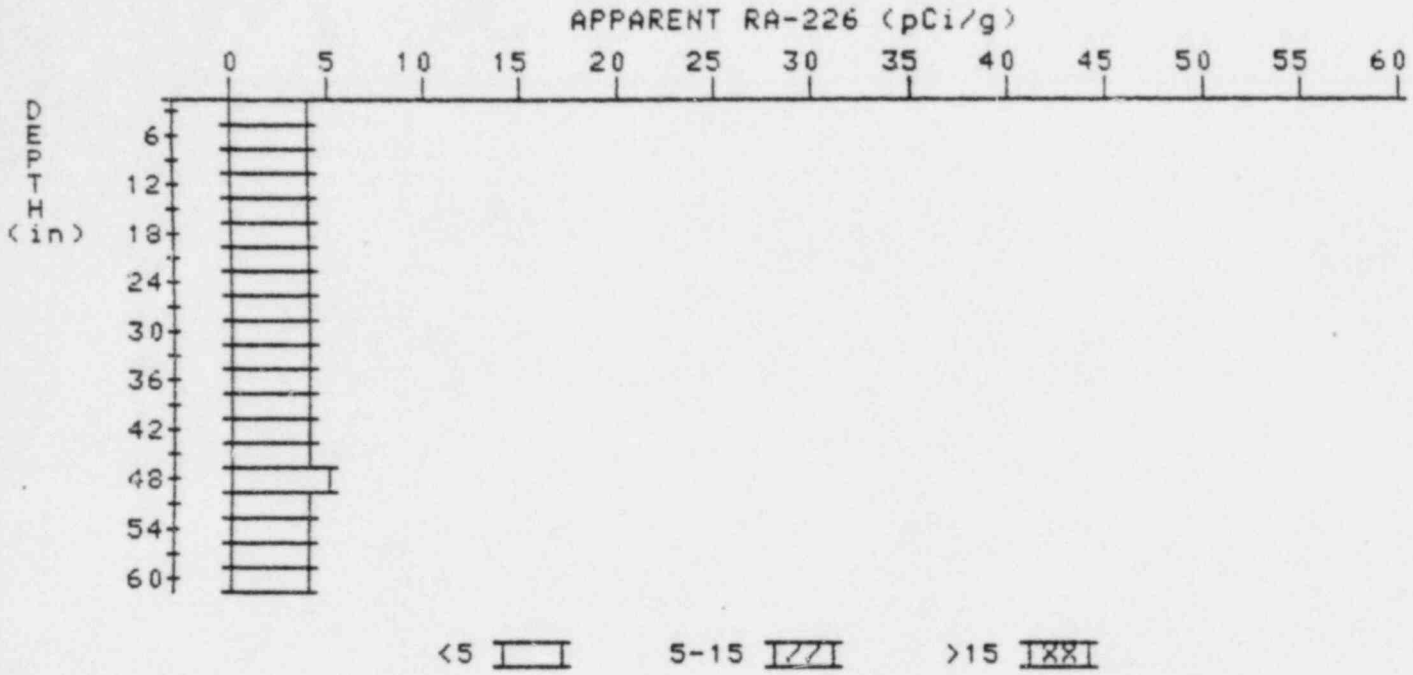
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.6	3.6
6	3.8	3.8
9	4.0	4.2
12	4.1	4.3
15	4.1	3.9
18	4.2	4.6
21	4.1	3.9
24	4.1	4.1
27	4.1	4.1
30	4.1	4.1
33	4.1	4.3
36	4.0	3.8
39	4.0	4.0
42	4.0	4.0
45	4.0	3.8
48	4.1	4.3
51	4.1	4.3
54	4.0	3.8

57	4.0	4.0

DECON V85.1<850524.0823>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 13

PROPERTY NUMBER: GJ-01390-RS
HOLE NUMBER: 13
LOCATION: 232262



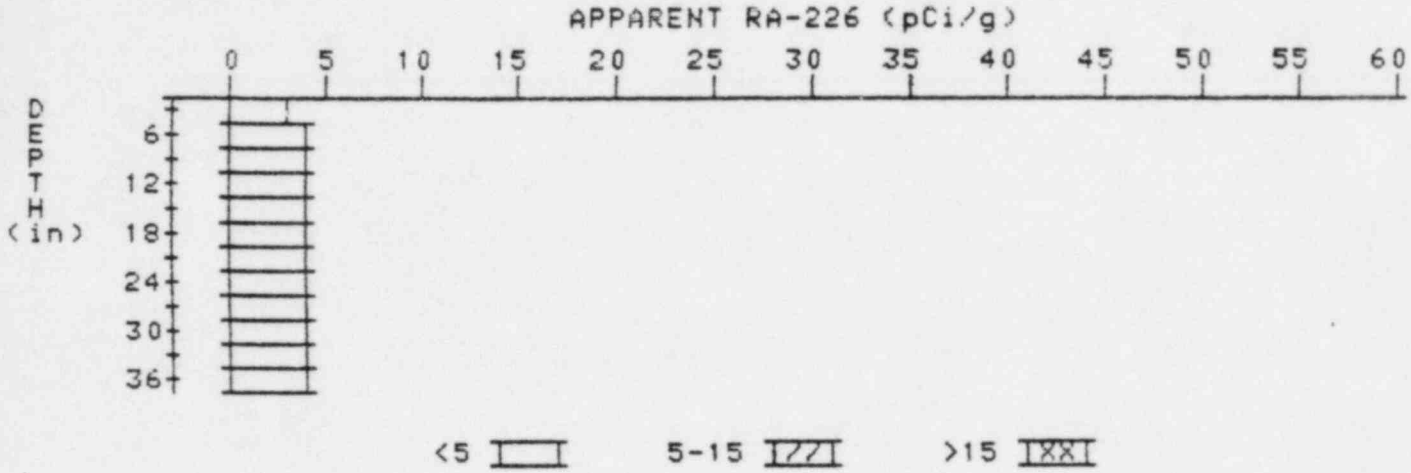
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.9	3.9
6	4.0	4.2
9	4.0	4.0
12	4.0	3.8
15	4.1	4.5
18	4.0	3.6
21	4.1	4.5
24	4.0	3.8
27	4.0	4.0
30	4.0	4.0
33	4.0	4.0
36	4.0	4.0
39	4.0	3.8
42	4.1	4.3
45	4.1	3.9
48	4.2	4.6
51	4.1	3.9
54	4.1	4.3

57	4.0	3.6
60	4.1	4.1

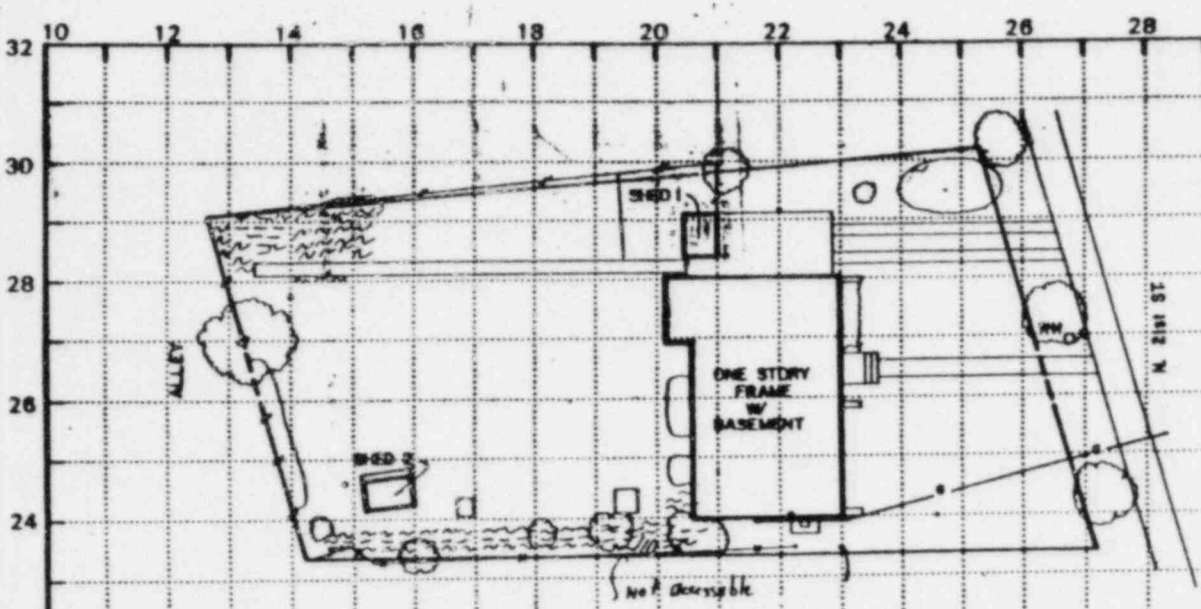
*DECON V85.1<850524.0823>

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 16

PROPERTY NUMBER: GJ-01390-RS
HOLE NUMBER: 16
LOCATION: 255275



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.3	3.3
6	3.7	4.1
9	3.9	3.9
12	4.1	4.5
15	4.1	4.1
18	4.1	4.1
21	4.1	4.3
24	4.0	3.6
27	4.1	4.3
30	4.1	4.1
33	4.1	4.1
36	4.1	4.1



EXTERIOR GAMMA SCAN

LEGEND

GAMMA READINGS OF 150 TO 199 cps

GAMMA READINGS OF 200 TO 500 cps

GAMMA READINGS OF >500 cps

Exterior Gamma Scan - Appendix Copy

20 10 0 20 40

FEET

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 as improvement survey plat and is not to be relied upon for the establishment of fence, building, or other future improvement lines.

Prepared by

U.S. 7/31/95

U.S. DEPARTMENT OF ENERGY

2025 N. 21st ST.

GRAND JUNCTION, COLORADO

GJ-0S390-RS

I-8776-F1

ALLIED Bendix Aerospace