

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-13019-RS  
ADDRESS: 139 NORTH SPRUCE STREET

SEPTEMBER 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 H. Tucker  
M. TUCKER  
DOE PROJECT ENGINEER

DATE September 10, 1985

REA13019:REA-AB010

8509270206 850912  
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 . . . . .	4
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-13019-RS, is a single-family residence located at 139 North Spruce 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, 10 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is \$1,482. Remedial action on this property will take approximately 7 days to complete.

## 2.0 PROPERTY DESCRIPTION

### 2.1 General Description

Address: 139 North Spruce Street, Grand Junction, Colorado

Zoning: Industrial (I-1)

Lot Size: Approximately 3,750 sf (0.09 acres)

Legal Description: Part of Lot 9, Block 5, Mobley Subdivision. Beginning 666.1 feet South, and 410.0 feet West of NE corner of SE 1/4 Section 15, T1S, R1W, South 50.0 feet beginning West 125.0 feet, South 30.0 feet, East 125.0 feet, North to beginning. City of Grand Junction, County of Mesa, State of Colorado.

Point of Reference: This property is located approximately 2 miles northwest 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:	None

Bordering Properties:

North:	Residence
South:	Residence
East:	Spruce Street
West:	Alley

### 2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-story residence
Size:	Approximately 750 sf
Construction Date:	1918
Construction:	Wood-frame
Foundation:	Not investigated; remedial action will not involve the structure
Footing Depth:	Not investigated; remedial action will not involve the structure
Basement:	None
Crawl Space:	None

Condition: Poor

Other Structures:

Type: 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 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: None known

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-13019-RS on July 1, 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 east sidewalk and 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): 42 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 gamma exposure-rate measurements are summarized in 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: Northeast  
Other Directions: Along the north property line  
Total Depth of Contamination: 6 inches  
Comments: This is a small deposit of contamination  
beneath an elm tree.  
Approximate Square Footage: 20
- (Area B) Surface Material: Soil  
Direction From Primary Structure: East  
Other Direction: Along the sidewalk  
Total Depth of Contamination: 9 inches  
Approximate Square Footage: 132
- (Area C) Surface Material: Concrete  
Direction From Primary Structure: East  
Total Depth of Contamination: 9 inches  
Other (height or thickness): 4-inch-thick concrete  
Approximate Square Footage: 189

#### 4.0 RECOMMENDED REMEDIAL ACTION

##### 4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-13019-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 \$1,482.

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 Office, 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

## Radium Concentrations at Exterior Locations

DOE ID #GJ-13019-RS

139 North Spruce Street

Page 1 of 1

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
1	175265	00	DS	1.9		*	Background
		03	TC	3.2		*	
		06	TC	3.4		*	DC = 0 inches
		09	TC	3.4		*	
		12	TC	3.4		*	
		15	TC	3.5		*	
		18	TC	3.5		*	
		21	TC	3.6		*	
		24	TC	3.6		*	
		27	TC	3.6		*	
		30	TC	3.7		*	
		33	TC	3.8		*	
2	210255	00	DS	1.3		*	Gas line
		16	DS	2.3		*	
3	235283	00	DS	5.9		*	North property line
		06	DS	1.7		*	
4	255265	00	DS	4.5		*	East yard next to sidewalk
		06	DS	2.0		*	
5	268269	03	TC	25.0		*	Sidewalk
		06	TC	20.6		*	
		09	TC	12.6		*	DC = 9 inches
		12	TC	8.6		*	Based on the deconvolution graph
		15	TC	6.6		*	
		18	TC	5.5		*	
		21	TC	4.9		*	
		24	TC	4.6		*	
		27	TC	4.4		*	
		30	TC	4.3		*	
		33	TC	4.2		*	

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 = 07-01-85  
Team Leader = CH

Table 3.2

## Summary of Interior Gamma Exposure Rates

DOE ID No. GJ-13019-RS 139 North Spruce 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)
Primary Structure	*	*	*	*	14-16	*

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

Table 4.1  
Area and Volume Calculations  
DOE ID No. GJ-13019-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				
C	13 x 3	= 39			
	30 x 5	= 150			
		189	x 0.3	= 57	
	Volume of Concrete			= 57	= 57/27 = 2
	Contaminated Fill				
A	5 x 4	= 20	x 0.5	= 10	
B	31 x 2	= 62			
	2 x 10	= 20			
	2 x 10	= 20			
	2 x 15	= 30			
		132	x 0.8	= 106	
C	13 x 3	= 39			
	30 x 5	= 150			
		189	x 0.5	= 95	
	Volume of Fill			= 211	= 211/27 = 8
	TOTAL VOLUME - EXTERIOR				= 10

See Appendix Figure 3.3 For Areas

Table 4.2  
Estimated Cost of Decontamination and Restoration  
DOE ID No. GJ-13019-RS

Page 1 of 1

EXTERIOR

Saw-cut concrete sidewalk (4" deep) 3 lf @ \$0.63/inch depth	\$ 8
---	------

Remove/replace concrete flatwork 189 sf @ \$2.98/sf	563
--	-----

Remove identified residual radioactive material 2 cy @ \$44/cy (manual - open)	88
6 cy @ \$14.50/cy (machine - open)	87

Replace areas with topsoil 3 cy @ \$9.50	29
---	----

Replace areas with roadbase 4 cy @ \$11.50/cy	46
--	----

Replace areas with pea gravel 1 cy @ \$16/cy	16
---	----

Install 6 mil polyethylene 80 sf @ \$0.05/sf	4
---	---

	TOTAL EXTERIOR \$ 841
--	-----------------------

	TOTAL INTERIOR 0
--	------------------

	ACCESS CONTROL 100
--	--------------------

	SUBTOTAL \$ 941
--	-----------------

CONTINGENCY @ 5%	47
------------------	----

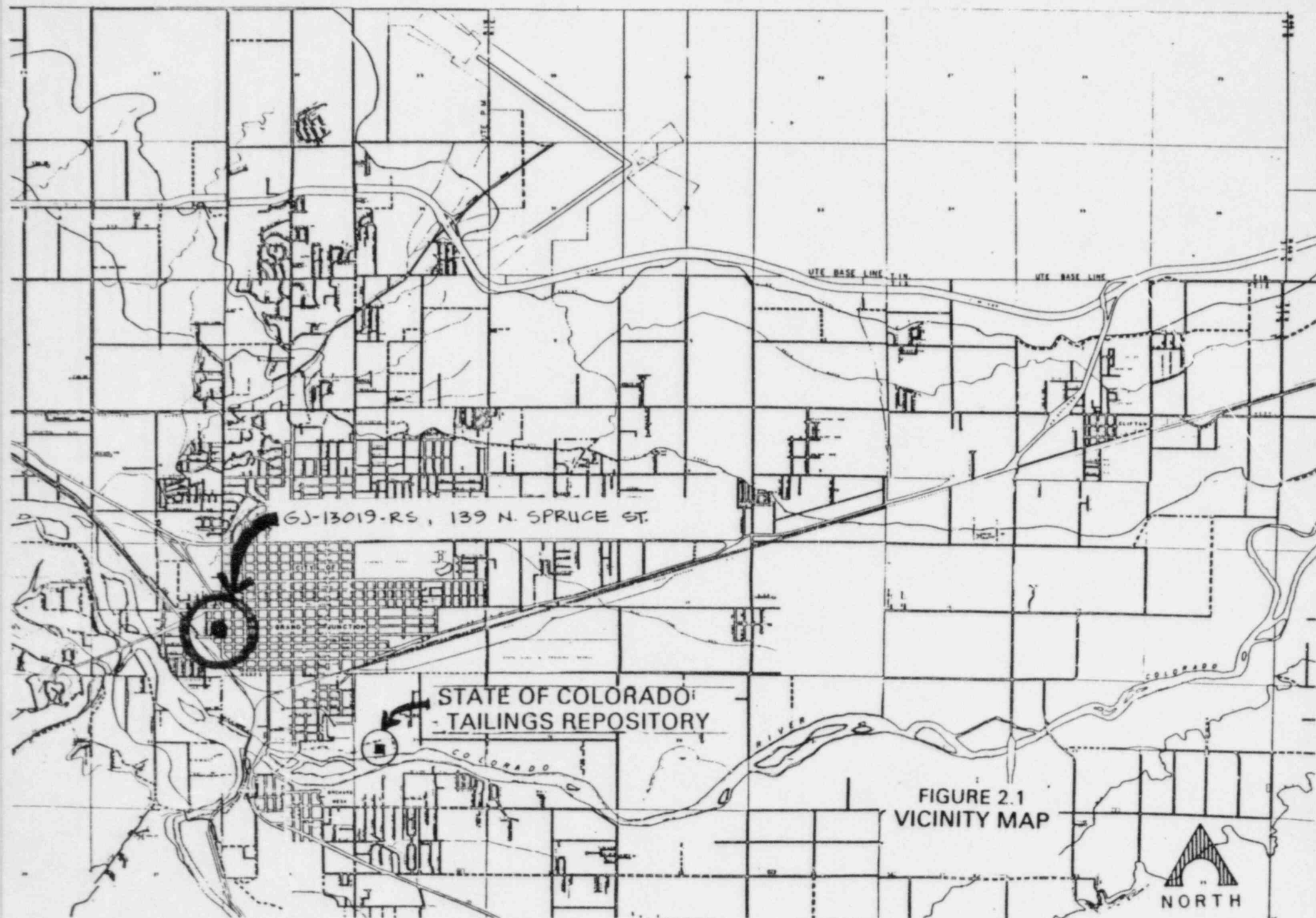
	SUBTOTAL \$ 988
--	-----------------

CONTRACTOR OVERHEAD & PROFIT @ 50%	494
------------------------------------	-----

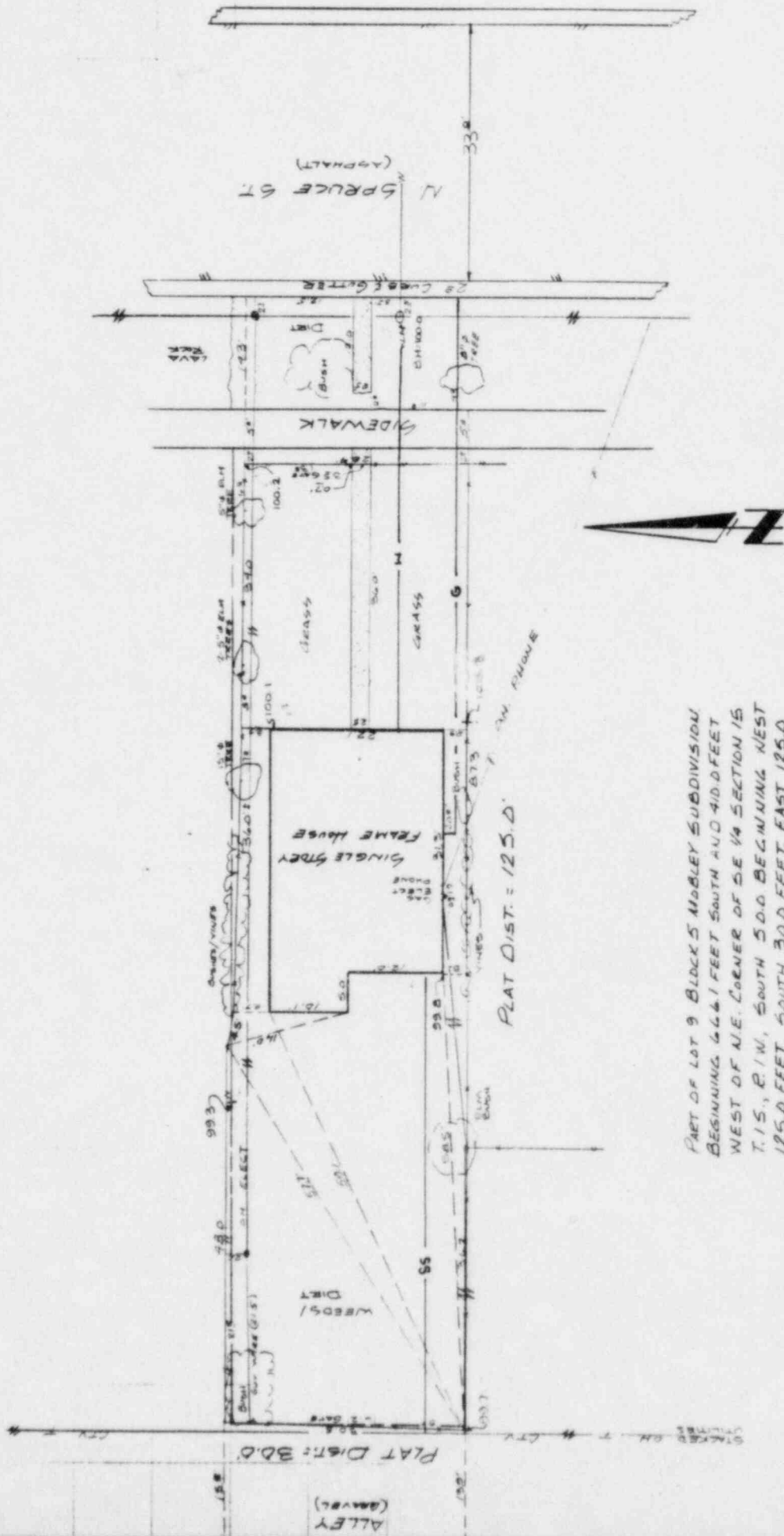
	GRAND TOTAL \$ 1,482
--	----------------------

=====

AAB090485  
REA13019/REA-AB010/AP







PART OF LOT 9 BLOCK 5 MOBLEY SUBDIVISION  
 BEGINNING 66.1 FEET SOUTH AND 40.0 FEET  
 WEST OF N.E. CORNER OF SE 1/4 SECTION 15  
 T.15, R.1W, SOUTH 500.0 BEGINNING NEST  
 125.0 FEET, SOUTH 30.0 FEET, EAST 125.0  
 FEET, NORTH TO BEGINNING CITY OF  
 GRAND JUNCTION, MESA COUNTY COLORADO.

FIGURE 2.2 SITE PLAN

U.S. DEPARTMENT OF ENERGY	DOE TO NO
GRAND JUNCTION PROJECT OFFICE, COLORADO	5713019 ES
ADDRESS	199 N SPRUCE ST.
	GRAND JUNCTION, COLORADO
SURV. P.L.S. 5/24/85	DATE 6/18/85
DRAWING NO. 3-C-755 F1	BY WCF/6-25-85
	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 plan or an improvement survey plan and is not to be relied upon for the establishment of legal boundaries or other matters requiring legal advice.

NO UTILITIES 7/3/85 JDT



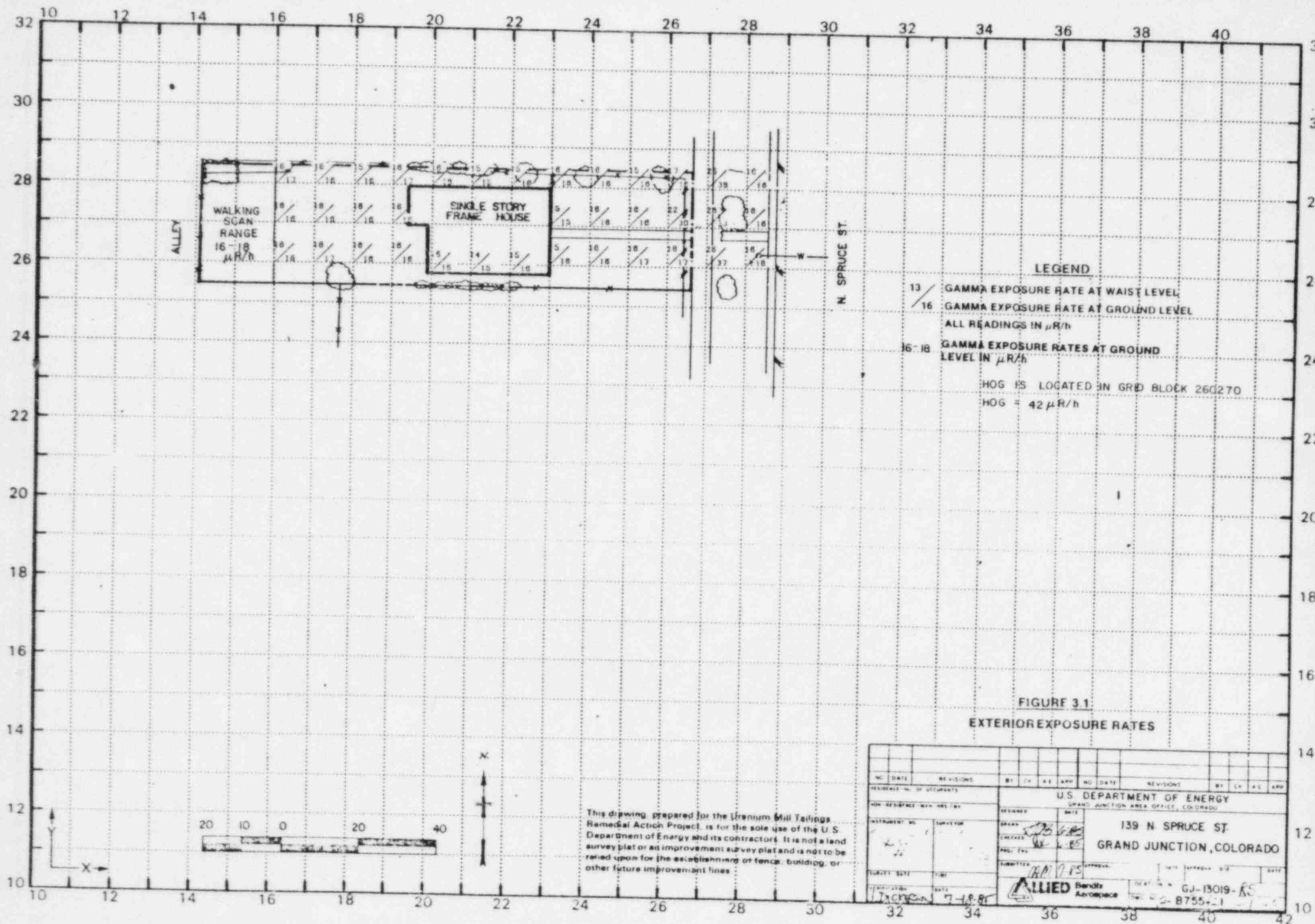


FIGURE 3.1  
EXTERIOREXPOSURE RATES

NO. DATE		REVISIONS		BY CH. A.E. APP. NO. DATE		REVISIONS		BY CH. A.E. APP.	
RESIDENCE NO. OF OCCUPANTS									
NON-RESIDENCE NO. AND TYPE									
INSTRUMENT NO.		SURVEYOR		DESIGNED		DATE		U.S. DEPARTMENT OF ENERGY GRAND JUNCTION AREA OFFICE, COLORADO	
TARGET SITE		TIME		DRAWN		DATE		139 N. SPRUCE ST. GRAND JUNCTION, COLORADO	
DATE		DATE		APPROVED		DATE		GJ-13019-RS	
7-18-81		7-18-81		ALLIED		Bentley Aerospace		8755-21	

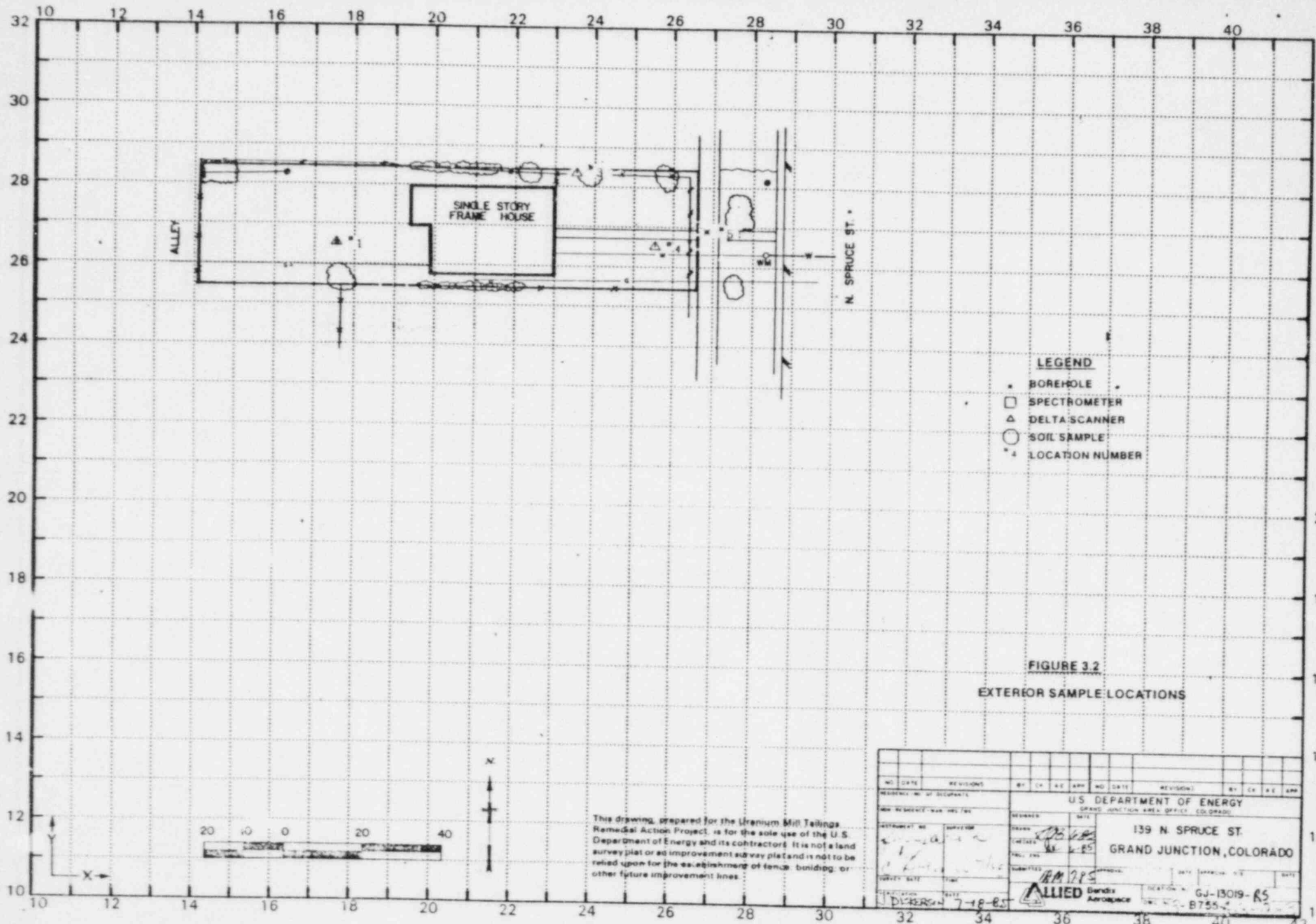


FIGURE 3.2  
EXTERIOR SAMPLE LOCATIONS

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		REVISIONS		BY	CHK	APP	NO.	DATE	REVISIONS		BY	CHK	APP
U.S. DEPARTMENT OF ENERGY SPRING JUNCTION AREA OFFICE, COLORADO													
ATTACHMENT NO. 1				SURVEYOR J. L. ...				DRAWN J. L. ...				139 N. SPRUCE ST. GRAND JUNCTION, COLORADO	
SURVEY DATE 7-18-85				TIME 10:00 AM				APPROVAL J. L. ...				DATE 7-18-85	
LOCATION 139 N. SPRUCE ST.				BANDS B755				LOCATION NO. GJ-13019-R5				DATE 7-18-85	

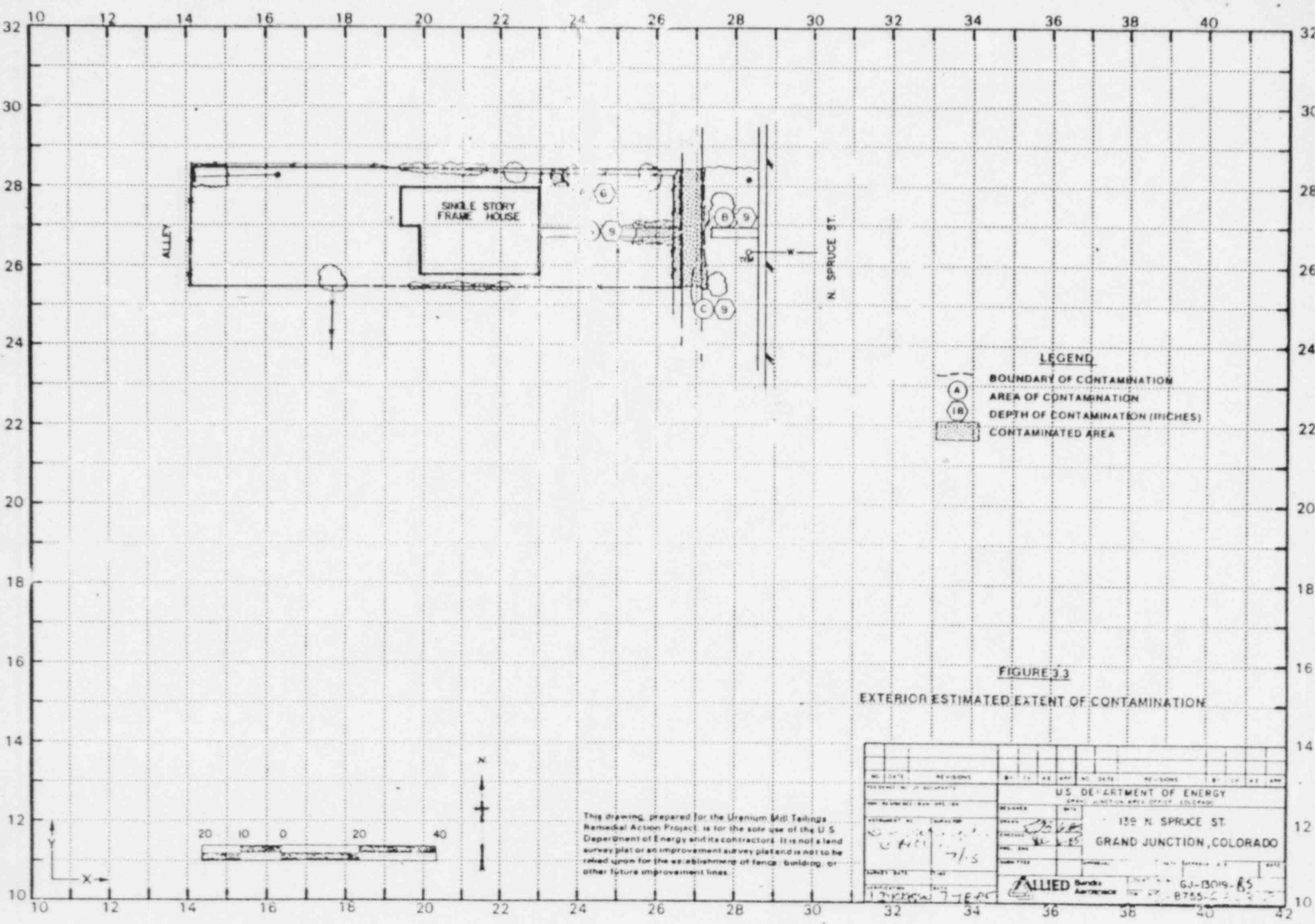


FIGURE 33  
EXTERIOR ESTIMATED EXTENT OF CONTAMINATION

NO. DATE		REVISIONS		BY		CH		AS		APP		NO. DATE		REVISIONS		BY		CH		AS		APP	
U.S. DEPARTMENT OF ENERGY GRAND JUNCTION AREA OFFICE, COLORADO 129 N. SPRUCE ST. GRAND JUNCTION, COLORADO																							
ATTACHED TO: SURVEY DRAWN BY: [Signature] CHECKED BY: [Signature] DATE: 7/5												QUANTITY: [Blank] UNIT: [Blank] SCALE: 1" = 40'											
SURVEY DATE: 12/27/74 SURVEY TIME: 7:45 AM												ALLIED SURVEYING & MAPPING, INC. 601-13019-85 8755-6											

3/85

DOE ID NO. GJ-13019-KS Date July 5, 1985

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

Official Survey Report

Property Address 139 North Spruce Street  
Property Owner Minnie Fuoco  
Address of Owner (if different from above) 411 32 Road; Clifton, Colo  
Report Prepared By Carol Holmes

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 = 42 1/6 uR/h  
HOG = 16 4/2 uR/h

per B. Fuoco  
7.26.85  
mig

ALLIED Bendix  
Aerospace

Bendix Field Engineering Corporation  
Grand Junction Operations  
Grand Junction, Colorado

Date: July 1, 1985

To: Files

From: Carol Holmes

Subject: Team Leader Notes - GJ-13019-RS

Address: 139 North Spruce Street

Owner: Minnie Fuoco

Team Members

C. Holmes (Team Leader)  
G. Larsen  
M. Johnson

P. Hardy  
S. Larsen

Instruments

Crutch Scintillometer: C-1024, C-1158  
Total Count: C-1062  
Delta Scintillometer: C-4060, C-3936

This house appears to be abandoned; however, we were able to obtain access.

Neither the interior of the house nor the utility lines showed contamination; however, contamination was found in a small section of the sidewalk, east of the house, the city sidewalk, and a small deposit in the northeast yard.

The downhole scintillometer was used to check the utility lines and the foundation footing. All are uncontaminated. See data sheets for exact measurements.

Team Leader Notes  
Carol Holmes  
GJ-13019-RS  
July 1, 1985  
Page 2

The city sidewalk and approximately 10 feet of the proximal sidewalk from the house appears to be from the same pour. Also the gamma readings from the two sidewalks are comparable.

7/26/85 - MJP

Carol Holmes went to 135 N. Spruce (adjacent property on North property line) to take readings for possible spillover. There is no spillover on this property.



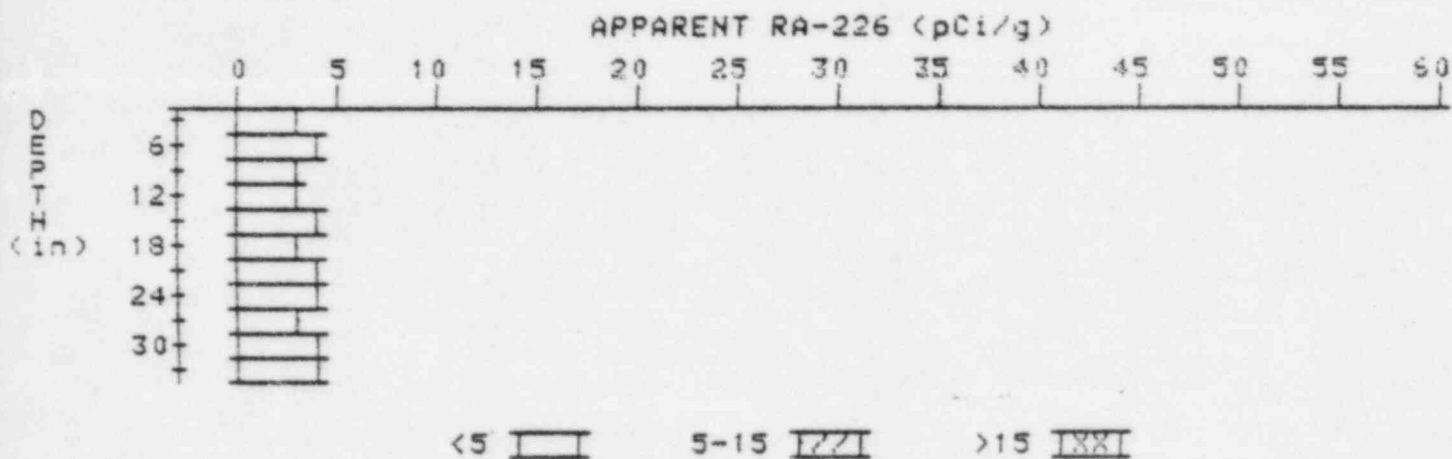
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

1

PROPERTY NUMBER: GJ-13019-RS

HOLE NUMBER: 1

LOCATION: 175265



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.2	3.2
6	3.4	3.8
9	3.4	3.4
12	3.4	3.2
15	3.5	3.7
18	3.5	3.3
21	3.6	3.8
24	3.6	3.6
27	3.6	3.4
30	3.7	3.7
33	3.8	3.8

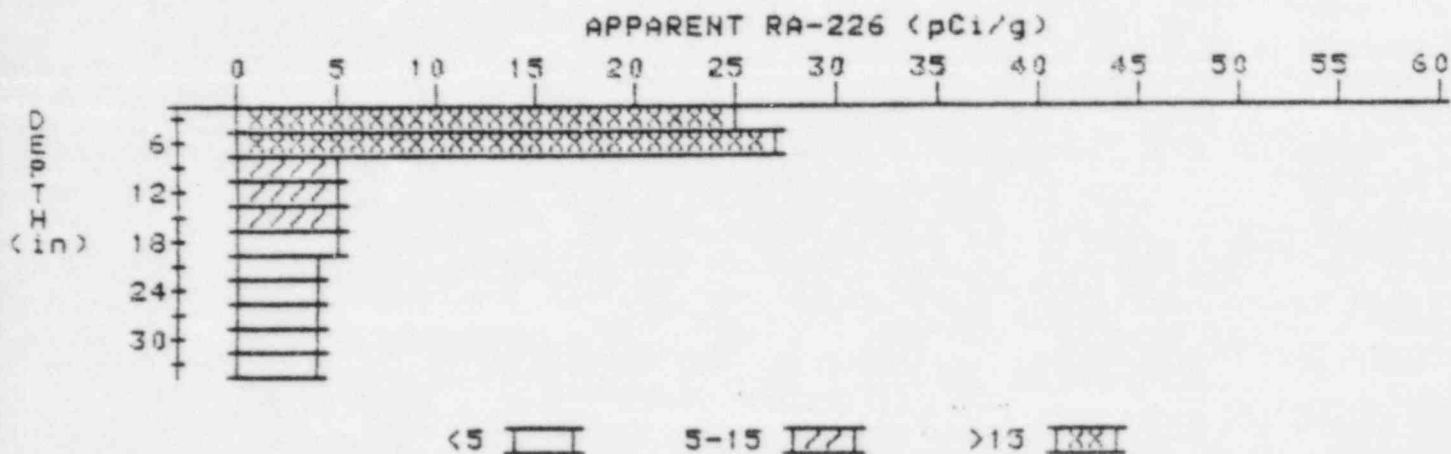
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

5

PROPERTY NUMBER: GJ-13019-RS

HOLE NUMBER: 5

LOCATION: 268269



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	25.0	25.0
6	20.6	27.0
9	12.6	5.5
12	8.6	5.0
15	6.6	5.0
18	5.5	4.6
21	4.9	4.4
24	4.6	4.4
27	4.4	4.2
30	4.3	4.3
33	4.2	4.2



