RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-00713-MR
ADDRESS: 1535 ELM AVENUE

JUNE 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

BENDIX FIELD ENGINEERING CORPORATION
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DATE June 18, 1985

REA00713.GE:GE002

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

The location, DOE ID No. GJ-00713-MR, is a single-family residence located at 1535 Elm 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 contaminated material to be removed, and estimated cost of the proposed action.

1.2 Evaluation and Recommendation

The action recommended is the select 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, 8 cu. yd.; interior, 4 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is $6,028. Remedial action on this property will take approximately 10 days to complete.

The basement concrete wall (Area A) is not recommended for remedial action on this project as the EPA Standards for gamma or RDC are not exceeded.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 1535 Elm Avenue, Grand Junction, Colorado

Zoning: Residential (RMF-32)

Lot Size: Approximately 6,275 sf (0.14 acre)

Legal Description: Lot 8, Fox Subdivision, Section 12, 1S, 1W, City of Grand Junction, County of Mesa, State of Colorado.

Point of Reference: This property is located approximately 2 miles 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:	Elm Avenue
South:	Single-family residence
East:	Single-family residence
West:	Single-family residence

2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-family residence
Size:	Approximately 1,303 sf
Construction Date:	1954
Construction:	Single-story wood-frame with wood siding
Foundation:	Reinforced concrete stem wall on concrete footing
Footing Depth:	Approximately 30" to bottom of footing from grade
Basement:	Yes; partial basement, west half
Crawl Space:	Yes; partial crawl space, east half
Condition:	Good

Other Structures:

Type:	Garage
Size:	Approximately 333 sf
Construction:	Single-story, wood-frame
Foundation:	Concrete slab-on-grade, thickened edge
Condition:	Good

Type:	Metal shed
Size:	Approximately 76 sf
Construction:	Metal wall and roof panels on metal frame
Foundation:	Wood-frame floor set on bricks 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-00713-MR on February 6, 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 garage, the southern section of the driveway, the southwest sidewalk, and the wall in the northwest corner of the basement.

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, Memo of Understanding, team leader notes, and deconvolution graphs are included in the Appendix (Section 6.0).

3.2 Gamma Exposure-Rate Surveys

3.2.1 Exterior Findings

Background Readings: 11 to 13 uR/h
Highest Outside Gamma Reading (HOG): 25 uR/h

Exterior radium-concentration measurements are presented in Appendix Table 3.1. Grid-point survey results are shown in Appendix Figure 3.1. Appendix Figure 3.2 presents the ranges of elevated gamma readings and indicates areas of possible contamination.

3.2.2 Interior Findings

Background Readings: 10 to 12 uR/h
Highest Inside Gamma Reading (HIG): 13 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. Appendix Figures 3.3a, 3.3b, and 3.3c show interior exposure rates and locations of these measurements.

3.3 Boreholes, Soil Samples, and Other Measurements

Areas which displayed elevated gamma levels were further investigated; these areas are shown in Appendix Figures 3.3a, 3.3b, 3.3c, and 3.4. Data from these investigations are included in Appendix Tables 3.1 and 3.2.

3.4 Radon/Radon Daughter Concentration (RDC)

Determined by CDH: 0.008 gross working level (WL). No additional RDC measurements were taken by Bendix.

3.5 Extent of Contamination

Appendix Figures 3.5a, 3.5b, and 3.5c show identified areas and estimated depths of contamination on this property, based on assessments of all measurements taken. As noted in these figures, areas recommended for remedial action that contain identified residual radioactive materials are:

(AREA A) The concrete wall at the north side of the basement is contaminated. The wall is approximately 72 inches high, 144 inches wide, and 4 inches thick. This area is not recommended for remedial action because the EPA Standards for gamma or RDC are not exceeded.

(AREA B) The 4-inch-thick concrete floor pad in the garage is contaminated (approximately 320 sf).

(AREA C) A portion of the 4-inch-thick concrete driveway and sidewalk slabs is contaminated. The fill material beneath the concrete is also contaminated. The total depth of contamination is 10 inches (approximately 209 sf).

(AREA D) The lawn adjacent to the driveway is contaminated to a depth of 6 inches (approximately 60 sf).

(AREA E) An isolated section of concrete on the north edge of the property is contaminated. The concrete is 3 inches thick (approximately 16 sf).

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

Option 1:
The recommended remedial action for this property, DOE ID No. GJ-00713-MR, includes removal of select areas identified as containing radioactive material (as discussed in Section 3.5 and shown in Appendix Figures 3.5b and 3.5c) 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 $6,028.

This remedial action will result in select removal of identified residual radioactive materials.

Owner preference is to begin remedial action no earlier than the summer of 1986. The date should be verified with the owner. 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 Grard 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 Grid-Point Exposure Rates
Figure 3.2	Exterior Gamma Scan
Figure 3.3a	Interior Gamma Exposure Rates and Sample Locations
Figure 3.3b	Interior Gamma Exposure Rates and Sample Locations
Figure 3.3c	Interior Gamma Exposure Rates and Sample Locations
Figure 3.4	Exterior Sample Locations
Figure 3.5a	Interior Estimated Extent of Contamination
Figure 3.5b	Interior Estimated Extent of Contamination
Figure 3.5c	Exterior Estimated Extent of Contamination

Official Survey Report
Memo of Understanding
Team Leader Notes
Deconvolution Graphs (Apparent Radium-226 Concentration)

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	Spectr.	Chem Ra-226 (pCi/g)	Comments
13	135241	00	DS	10.6		*	Front sidewalk
		00-03	SS			19.1	Concrete core
		03	TC	4.7		*	DC = 3 inches
		06	TC	4.3		*	Based on the
		09	TC	4.1		*	deconvolution graph
		12	TC	4.1		*	
		15	TC	4.0		*	
		18	BH	4.0	1.7	*	
		21	TC	4.0		*	
		24	TC	4.0		*	
		27	TC	4.0	2.2	*	
14	162266	00	DS	<1.0		*	North yard
		03	TC	4.1		*	DC = 0 inches
		06	TC	3.1		*	
		09	TC	3.4		*	
		12	TC	3.6		*	
		15	TC	3.7		*	
		18	BH	3.8	2.0	*	
		21	TC	3.9		*	
		24	TC	4.0		*	
		27	TC	4.0		*	
		30	BH	4.0	1.2	*	
		33	TC	4.0		*	
		36	TC	4.0		*	
		39	TC	4.0		*	
15	169241	00	DS	<1.0		*	Northwest corner
		03	TC	3.4		*	of house
		06	TC	3.5		*	DC = 0 inches
		09	TC	3.6		*	
		12	TC	3.6		*	
		15	TC	3.7		*	
		18	TC	3.8	<1.0	*	
		21	TC	3.8		*	
		24	TC	3.8		*	
		27	TC	3.9		*	
		30	TC	3.9	1.4	*	
		33	TC	3.9		*	
		36	TC	3.9		*	
16	177271	00	DS	1.1		*	By gas meter
		03	TC	3.5		*	DC = 0 inches
		06	TC	3.6		*	

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
16	177271	09	TC	3.5		*	
		12	TC	3.5		*	
		15	TC	3.6		*	
		18	TC	3.6		*	
		21	TC	3.7		*	
		24	TC	3.6		*	
		27	TC	3.7		*	
		30	TC	3.8		*	
		33	TC	3.8		*	
		36	TC	3.9		*	
17	201239	00	DS	8.4		*	West sidewalk
18	215271	00	DS	<1.0		*	Southeast corner
		03	TC	3.2		*	of the houses
		06	TC	3.3		*	DC = 0 inches
		09	TC	3.4		*	
		12	TC	3.3		*	
		15	TC	3.3		*	
		18	TC	3.4		*	
		21	TC	3.4		*	
		24	TC	3.5		*	
		27	TC	3.5		*	
		30	TC	3.6		*	
		33	TC	3.7		*	
		36	TC	3.7		*	
19	228241	00	DS	2.0		*	Southwest corner
		00-06	SS			3.8	of patio
		03	TC	4.4		*	DC = 6 inches
		06	TC	4.2		*	Based on the soil
		09	TC	3.9		*	sample analysis
		12	TC	3.7		*	
		15	TC	3.6		*	
		18	BH	3.7	<1.0	*	
		21	TC	3.6		*	
		24	TC	3.6		*	
		27	TC	3.6		*	
		30	BH	3.6	1.7	*	
		33	TC	3.7		*	

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
20	235231	00	DS	6.2		*	Concrete driveway
		00-04	SS			10.0	Core
		03	TC	6.5		*	DC = 10 inches
		06	TC	5.8		*	
		09	TC	4.8		*	
		12	TC	4.3		*	
		15	TC	3.9		*	
		18	BH	3.7	1.1	*	
		21	TC	3.7		*	
		24	TC	3.8		*	
		27	TC	3.9		*	
		30	BH	3.9	1.3	*	
		33	TC	3.9		*	
		36	TC	3.9		*	
21	238240	00	DS	7.0		*	Concrete driveway
		06	DS	4.2		*	Horizontal under the concrete driveway
22	238242	06	DS	1.8		*	Edge of the driveway
		12	DS	<1.0		*	DC = 6 inches
		00-06	SS			3.5	
23	250270	00	DS	<1.0		*	Southeast yard
		00-06	SS			2.0	Background
		03	TC	2.8		*	DC = 0 inches
		06	TC	3.2		*	
		09	TC	3.4		*	
		12	TC	3.5		*	
		15	TC	3.6		*	
		18	TC	3.7		*	
		21	TC	3.8		*	
		24	TC	3.9		*	
		27	TC	3.8		*	
		30	TC	3.9		*	
		33	TC	4.0		*	

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
24	252248	00	DS	<1.0		*	East side of the
		03	TC	3.0		*	garage
		06	TC	3.4		*	DC = 0 inches
		09	TC	3.8		*	
		12	TC	3.8		*	
		15	TC	3.7		*	
		18	BH	3.7	1.3	*	
		21	TC	3.5		*	
		24	TC	3.6		*	
		27	TC	3.6		*	
		30	BH	3.7	1.4	*	
		33	TC	3.7		*	

Tool 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 = 02-06-85
Team Leader = TC

RADRPT V85.1<850121.1434> Table 3.2

Radium Concentrations at Interior Locations

DOE ID No. GJ-00713-MR 1535 Elm Avenue

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g) Tot. Ct	In Situ Ra-226 (pCi/g) Spec. r.	Chem Ra-226 (pCi/g)	Comments
1		[65]	DS	<1.0		*	Northwest lower wall
2		00	DS	2.6		*	On the gravel pile
		06	DS	1.7		*	In the gravel pile
		00-06	SS			1.8	
3		[26]	DS	<1.0		*	West foundation wall
		00	DS	<1.0		*	footing
4		00	DS	<1.0		*	Middle east side
		06	DS	1.8		*	of the house
5		[60]	DS	10.5		*	North lower wall
6		00	DS	14.9		*	Dirt floor
		06	DS	1.9		*	
		00-02	SS			24.1	Concrete chips
		06-12	SS			2.6	Soil
7		00	DS	1.4		*	South wall
		06	DS	1.5		*	
8		00	DS	<1.0		*	Dirt floor
		00-06	SS			1.8	
9		00	DS	1.1		*	Front room
10		00	DS	5.8		*	Inside garage
11		00-04	SS			9.1	Core mid garage
		04-08	SS			2.3	Soil
		03	TC	5.0		*	DC = 4 inches
		06	TC	5.2		*	Based on the soil
		09	TC	4.7		*	sample analysis
		12	TC	4.2		*	
		15	TC	4.1		*	
		18	TC	4.0		*	
		21	TC	3.8		*	
		24	TC	3.7		*	
		27	TC	3.7		*	

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
11		30	TC	3.7		*	
		33	TC	3.8		*	
		36	TC	3.9		*	
		39	TC	3.9		*	
12		00	DS	3.9		*	

Tool 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 Horizontally On Wall
Date of Survey = 02-06-85
Team Leader = TC

Table 3.3
Summary of Interior Gamma Exposure Rates
DOE ID No. GJ-00713-MR 1535 Elm Avenue

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	06	15-17	15	06	16-19	16
CRAWL SPACE	05	13-15	14	09	13-15	14
ROOM A	09	10-12	11	09	11-12	11
ROOM B	06	10-11	11	06	11-11	11
ROOM C	08	10-11	11	08	10-12	11
ROOM D	09	10-11	10	09	10-13	11
ROOM E	03	10-10	10	03	10-11	11
ROOM F	09	09-11	10	09	10-11	11
ROOM G	06	09-11	10	07	11-13	12
GARAGE	09	11-17	14	09	19-23	21
SHED	05	11-12	11	05	11-12	11

*Exposure Rates and Room Locations Shown in Appendix Figures 3.3a, 3.3b, and 3.3c.

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-00713-MR

AREA	CALCULATIONS(ft)		SF		DEPTH(ft)		CF				CUBIC YARDS
INTERIOR											
	Concrete										
B	16	x 20	= 320	x	0.3	=	96				
			Volume of concrete			=	96	=	96/27	=	4
EXTERIOR											
	Concrete										
C	10	x 11	= 110								
	33	x 3	= 99								
			209	x	0.3	=	63				
E	4	x 4	= 16	x	0.3	=	5				
			Volume of concrete			=	68	=	68/27	=	3
	Contaminated Fill										
C	10	x 11	= 110								
	33	x 3	= 99								
			209	x	0.5	=	105				
D	15	x 4	= 60	x	0.5	=	30				
			Volume of contaminated fill			=	135	=	135/27	=	5
	TOTAL VOLUME - INTERIOR									=	4
	TOTAL VOLUME - EXTERIOR									=	8

See Appendix Figures 3.5b and 3.5c For Areas

Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-00713-MR

INTERIOR		
Saw-cut concrete garage slab 66 lf @ $1.50/lf	$	99
Remove concrete garage slab 320 sf @ $2.50/sf		800
Remove 6" fill beneath existing slab 1 cy @ $44.00/cy		44
Excavate 12" x 12" trench at garage perimeter 4 cy @ $44.00/cy		176
Undermine and shore wood-frame walls 74 lf @ $3.00/lf		222
Replace 4" compacted roadbase and 2" sand leveling course 1 cy @ $11.50/cy		12
Install 12" x 12" reinforced concrete thickened edge 4 cy @ $175.00/cy		700
Replace 4" interior concrete slab 320 sf @ $2.00/sf		640
Anchor wood-frame garage walls to slab Lump sum		50
TOTAL INTERIOR	$	2,743
EXTERIOR		
Remove 4" exterior contaminated slab 225 sf @ $2.00/sf	$	450
Remove identified residual radioactive material (manual) 5 cy @ $44.00/cy		220
Remove fill at north concrete pad 1 cy @ $44.00/cy		44
Replace roadbase 5 cy @ $11.50/cy		58
Replace exterior concrete 209 sf @ $1.50/sf		314

Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-00713-MR Page 2 of 2

Replace brick pavers (in lieu of concrete pad) 16 sf @ $6.00/sf		96
Replace topsoil 1 cy @ $9.50/cy		10
Replace sod 60 sf @ $.50/sf		30
	TOTAL EXTERIOR	$ 1,222
	TOTAL INTERIOR	$ 2,743
	ACCESS CONTROL	250
	SUBTOTAL	$ 4,215
	CONTINGENCY @ 10%	422
	SUBTOTAL	$ 4,637
	CONTRACTOR OVERHEAD & PROFIT @ 30%	1,391
	GRAND TOTAL	$ 6,028

RDJ061285
REA00713.GE:GE002:MJP

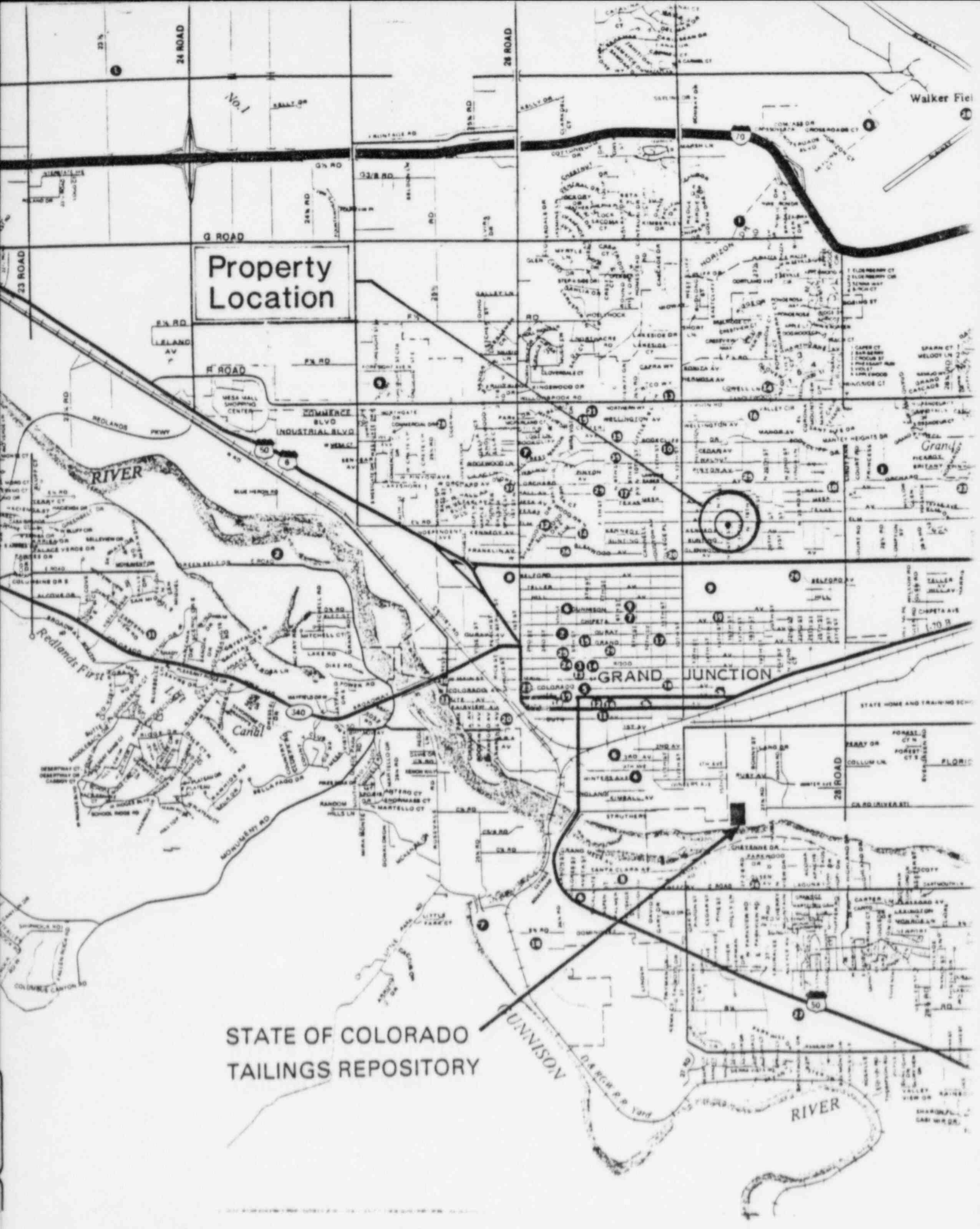
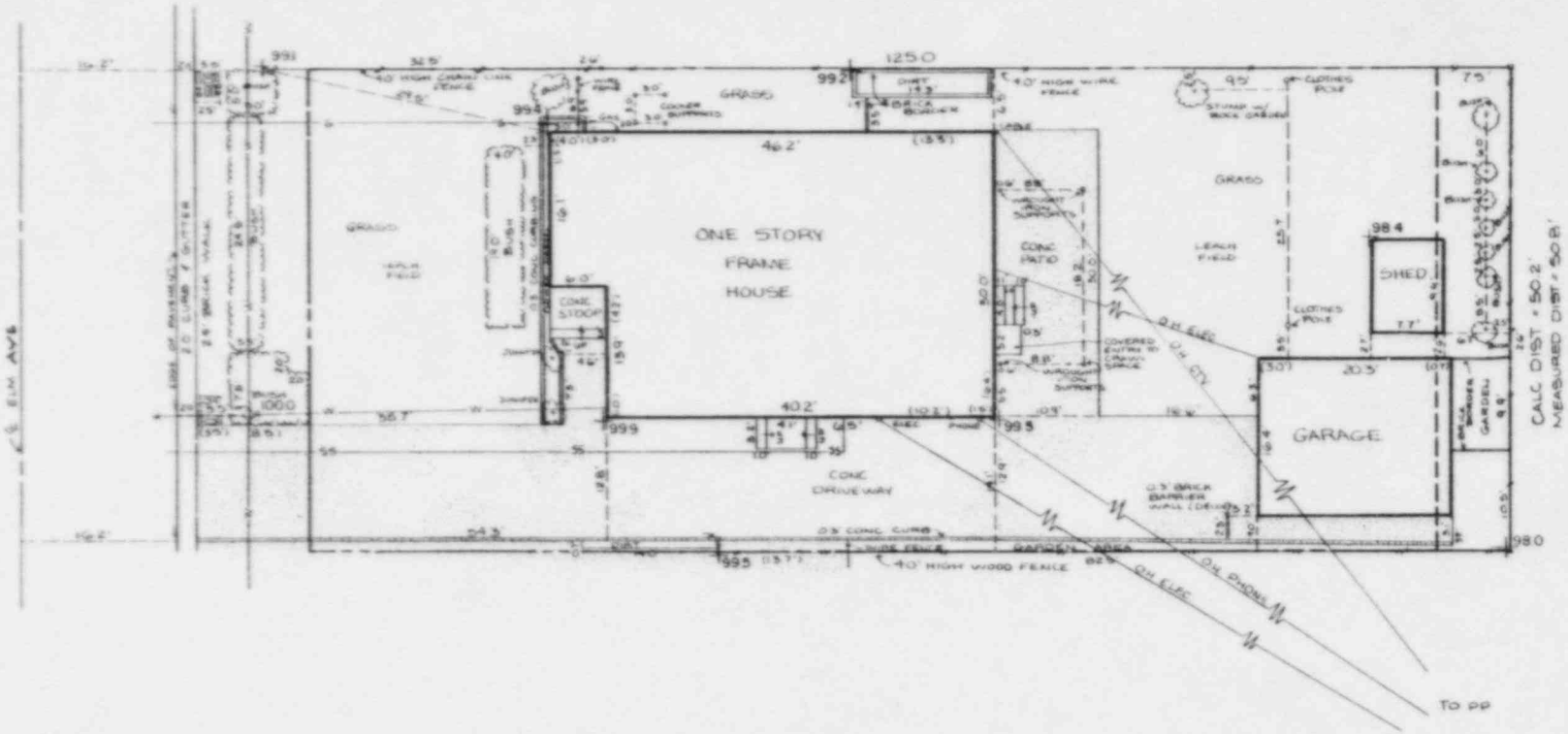


FIGURE 2.1
VICINITY MAP

GJ-00713-MR



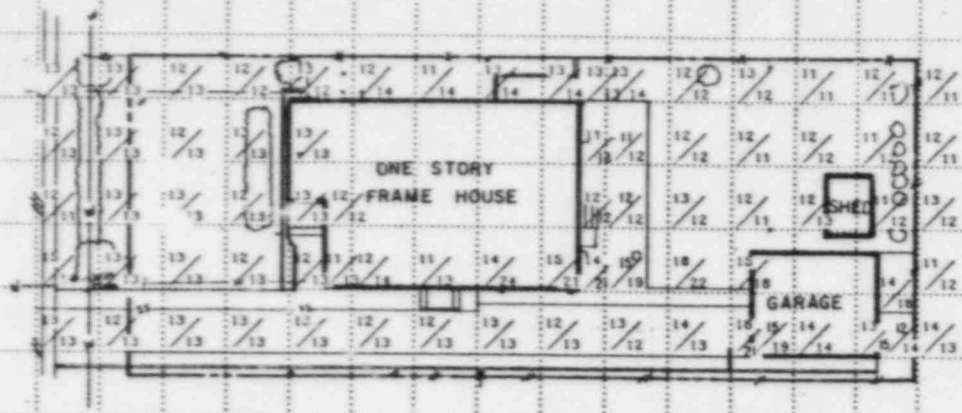
LOT 8, FOX SUBDIVISION, SECTION 12, 1 SOUTH, 1 WEST
CITY OF GRAND JUNCTION
MESA COUNTY, COLORADO

SCALE IN FEET
0 5 10 20 30

FIGURE 2.2 SITE PLAN

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	LOCATION NO.
GRAND JUNCTION AREA OFFICE, COLORADO	GJ 00713-MR
ADDRESS 1535 ELM AVENUE	Bendix Field Engineering Corporation
GRAND JUNCTION, COLO.	
OWNER	TELE
TENENT " "	TELE. "
SURV. RLB/1 24-85 DRAFT. KAS/1-25-85	CK. JAF 1-28-85
DRAWING NO. 3-C509-F1	SHEET 1 OF 1



LEGEND

13/16 GAMMA EXPOSURE RATE AT WAIST LEVEL / GAMMA EXPOSURE RATE AT GROUND LEVEL

X NO READING TAKEN

ALL READINGS IN μR/h

FIGURE 3.1

EXTERIOR GRID-POINT EXPOSURE RATES

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

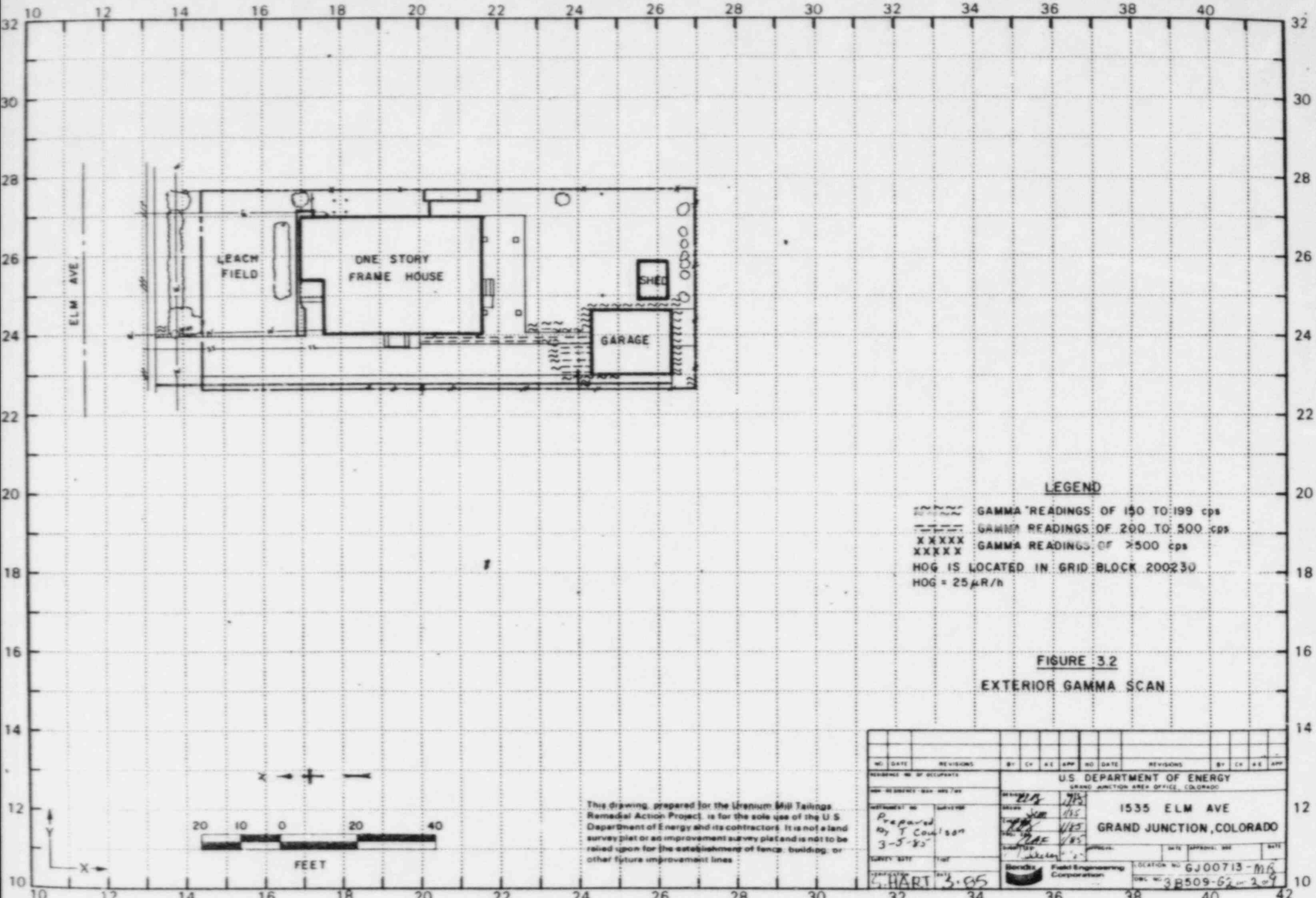
U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION AREA OFFICE, COLORADO

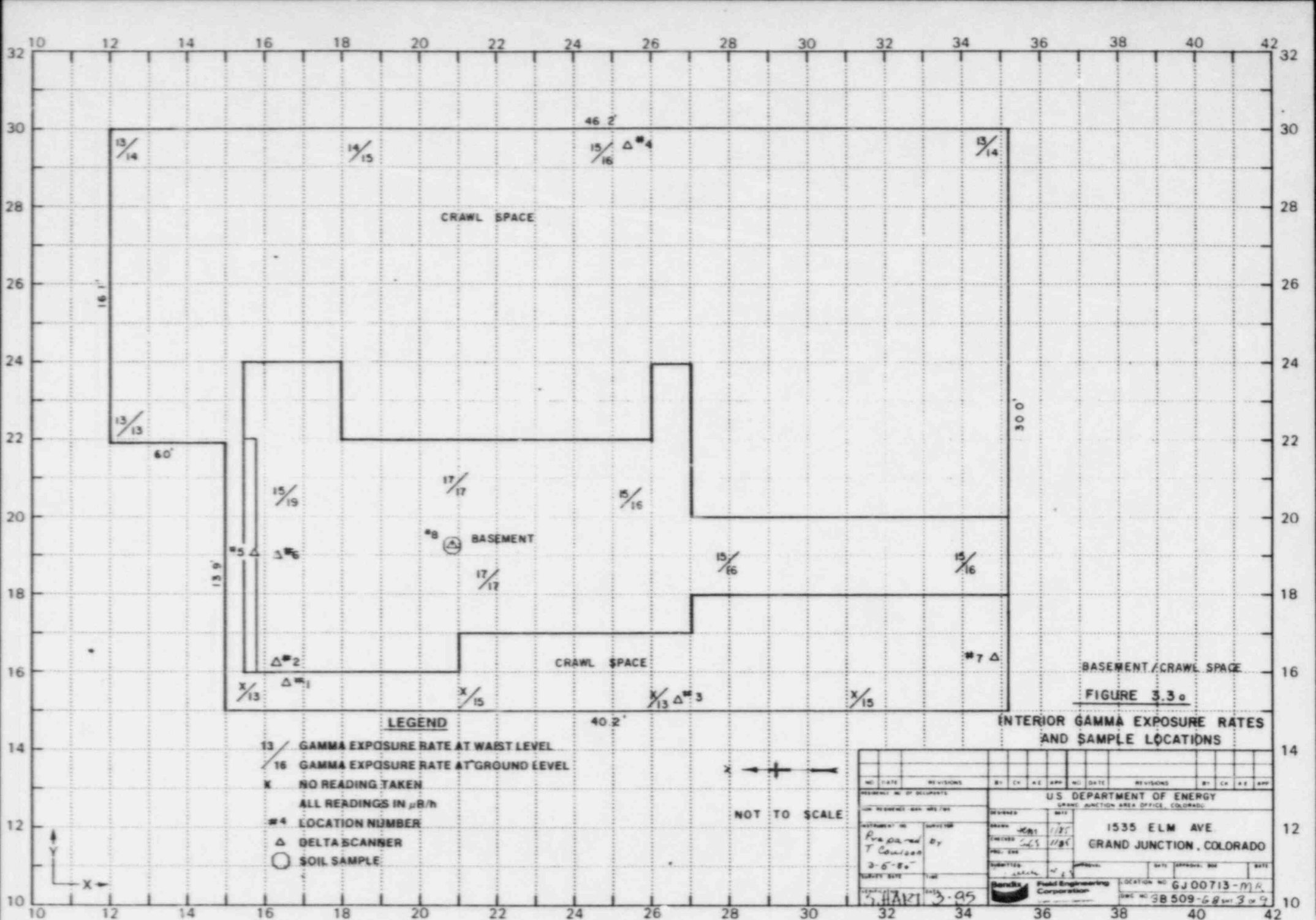
1535 ELM AVE
GRAND JUNCTION, COLORADO

Bendix Field Engineering Corporation

LOCATION NO. GJ00713-MR

DWG. NO. 3B 509-61 SH 1 OF 9


ELM AVE.
LEACH FIELD
ONE STORY FRAME HOUSE
SHED
GARAGE
LEGEND
GAMMA READINGS OF 150 TO 199 cps
GAMMA READINGS OF 200 TO 500 cps
XXXXX XXXXX GAMMA READINGS OF >500 cps
HOG IS LOCATED IN GRID BLOCK 200230
HOG = 25 μR/h
FIGURE 3.2
EXTERIOR GAMMA SCAN
20 10 0 20 40
FEET
Y
X
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.
Prepared by T Coulson 3-5-85
C. HART 3-85
U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION AREA OFFICE, COLORADO
1535 ELM AVE
GRAND JUNCTION, COLORADO
Bendix Field Engineering Corporation
LOCATION NO. GJ00713-MS
DWG. NO. 3B509-G2-3.0



BASEMENT/CRAWL SPACE

FIGURE 3.3 o

INTERIOR GAMMA EXPOSURE RATES AND SAMPLE LOCATIONS

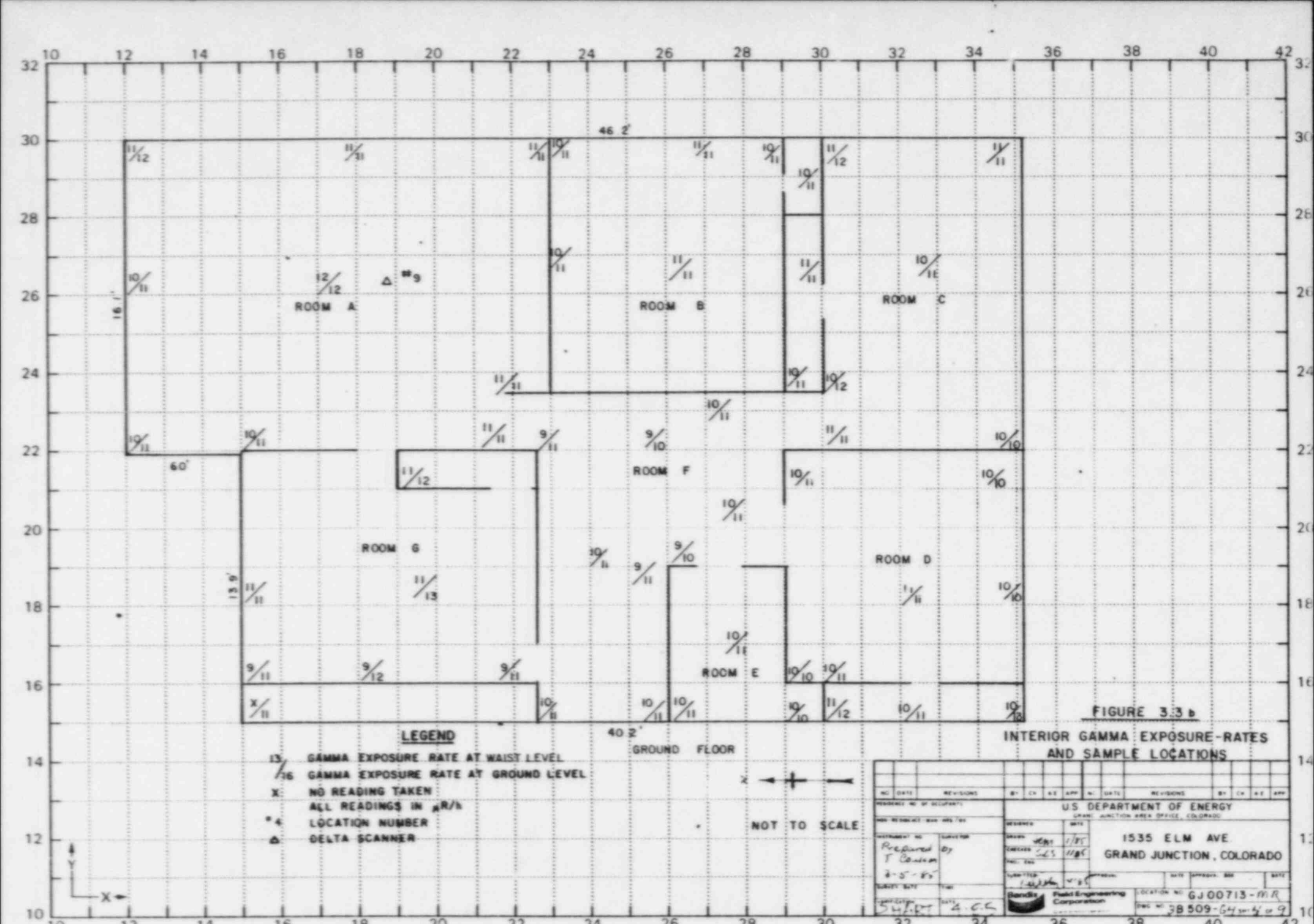


FIGURE 3.3 b

INTERIOR GAMMA EXPOSURE-RATES AND SAMPLE LOCATIONS

FIGURE 3.3 c

INTERIOR GAMMA EXPOSURE RATES
AND SAMPLE LOCATIONS

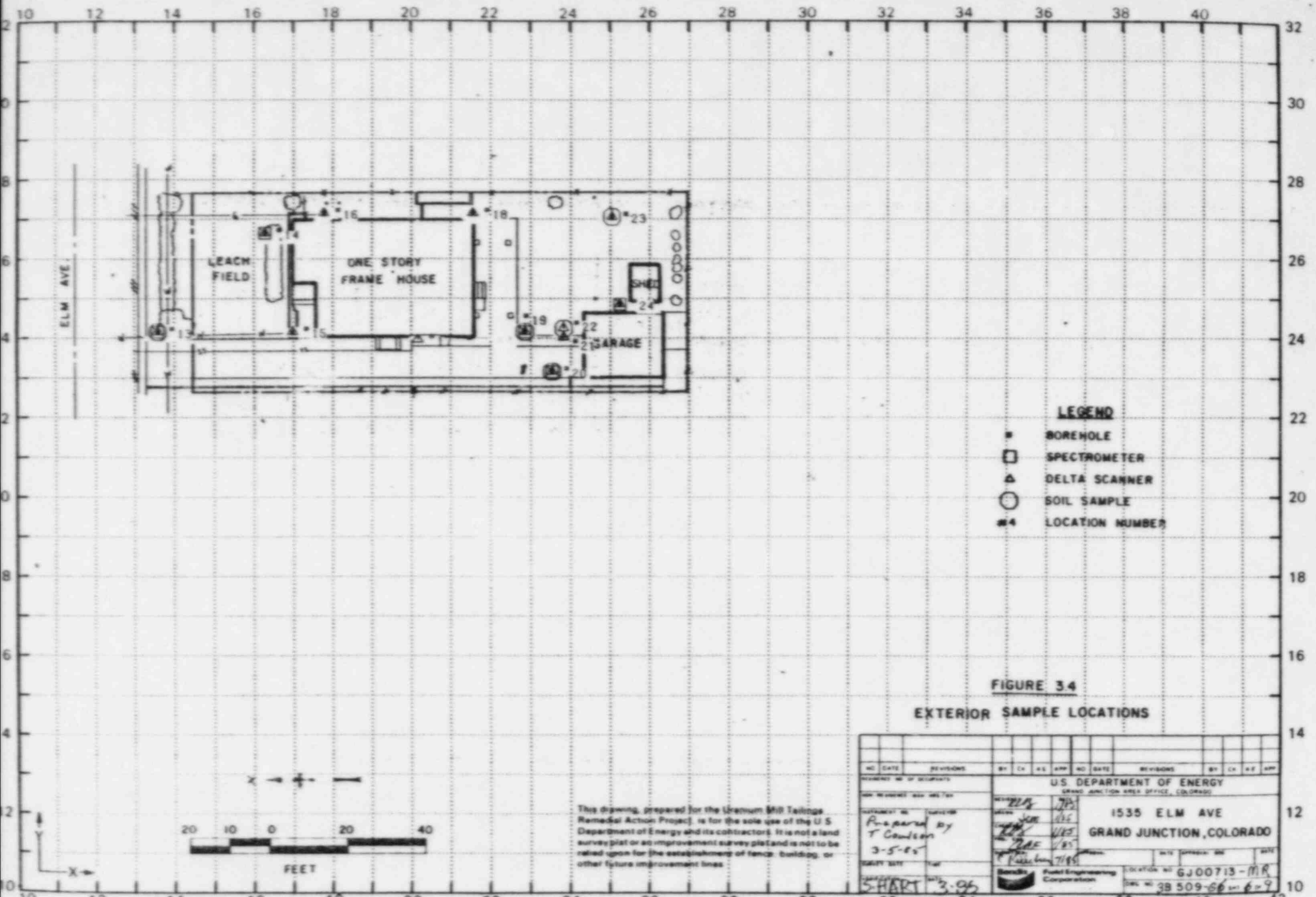


FIGURE 3.4

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.

Prepared by T Condron 3-5-85

SHART 3.06

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION AREA OFFICE, COLORADO

1535 ELM AVE
GRAND JUNCTION, COLORADO

Bendix Field Engineering Corporation

LOCATION NO. GJ00713-MR

DWG NO. 38 509-66 SH 6 of 9

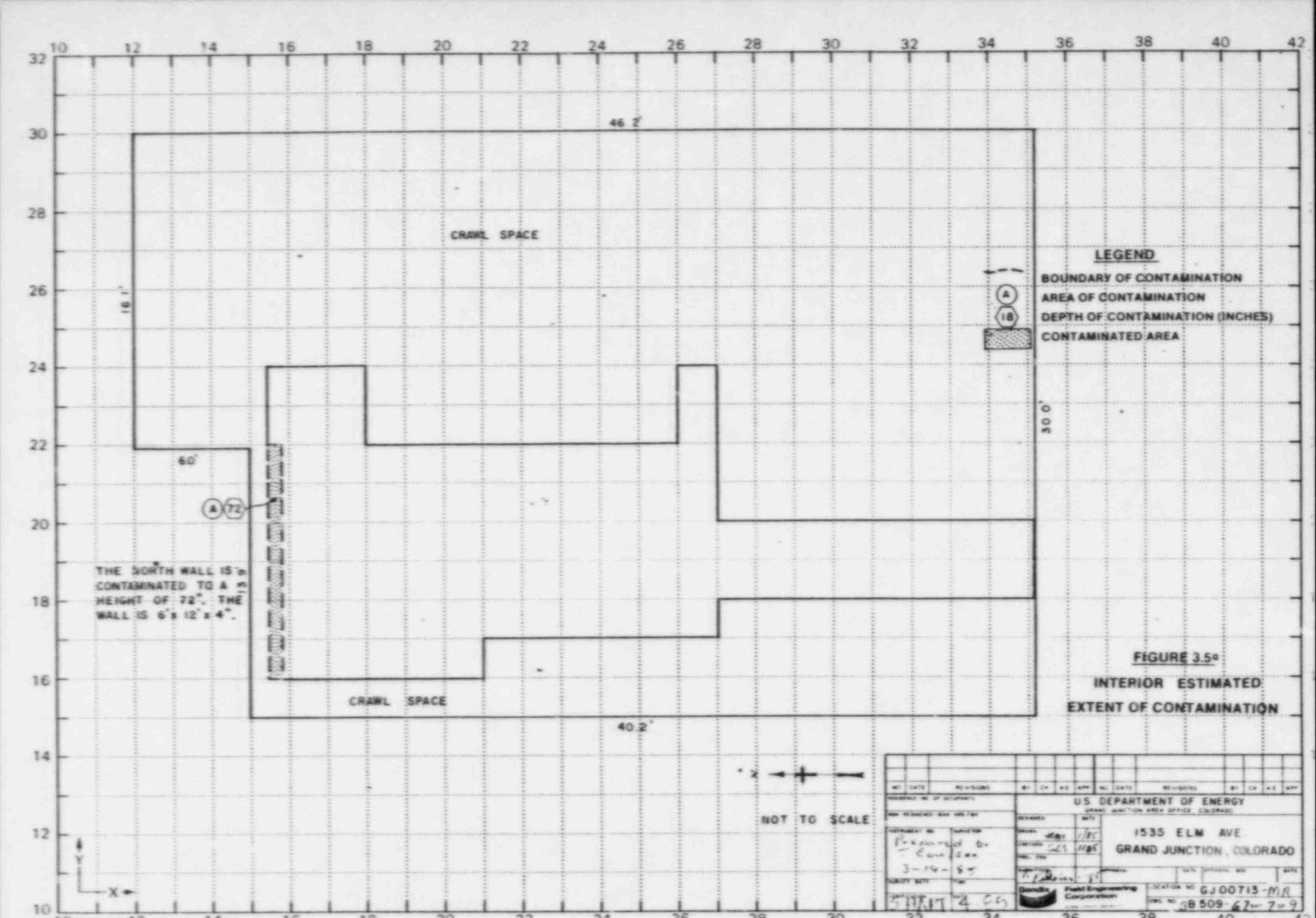


FIGURE 3.5a
INTERIOR ESTIMATED
EXTENT OF CONTAMINATION

U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION AREA OFFICE, COLORADO

1535 ELM AVE
GRAND JUNCTION, COLORADO

Bendix Field Engineering Corporation

GJ00713-MR
DWG. NO. 8509-67 SHT 2 OF 9

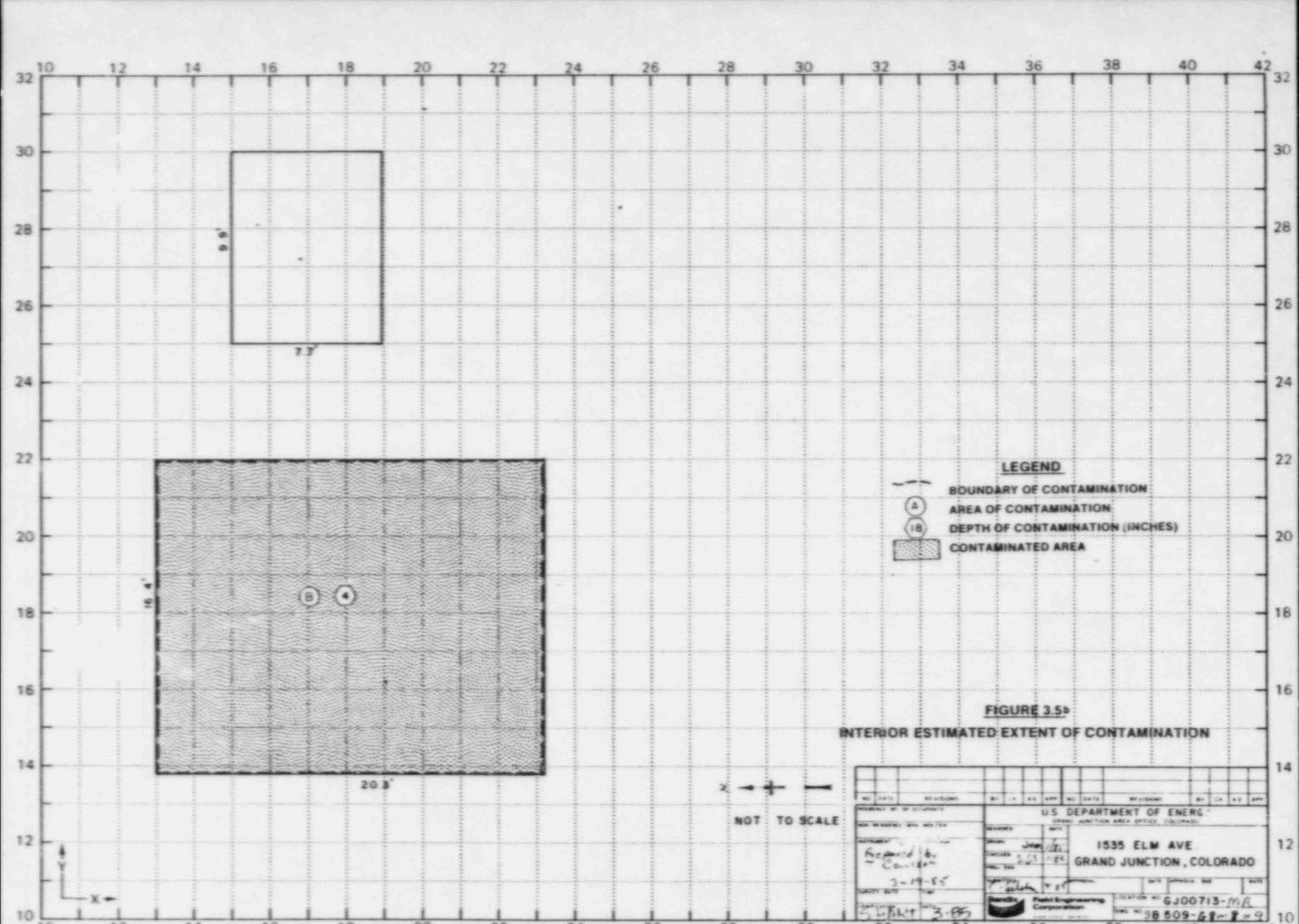


FIGURE 3.5b

INTERIOR ESTIMATED EXTENT OF CONTAMINATION

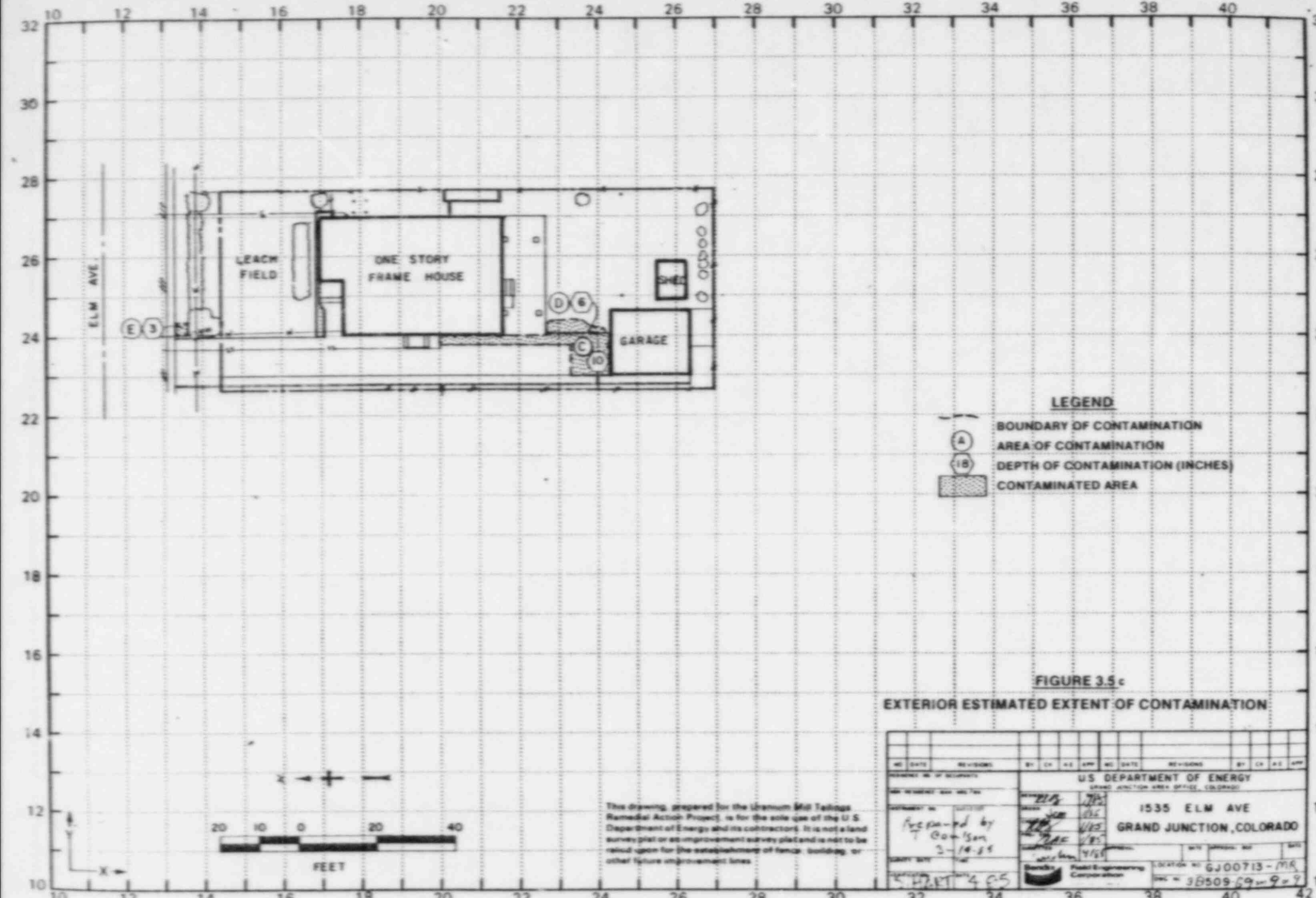


FIGURE 3.5 c

EXTERIOR ESTIMATED EXTENT OF CONTAMINATION

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U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION AREA OFFICE, COLORADO

1535 ELM AVE
GRAND JUNCTION, COLORADO

Prepared by T Goetsch 2-14-89

Bendix Field Engineering Corporation

LOCATION NO. GJ00713-TAC

DWG. NO. 3B509-09-9 SHEET 4 OF 5

3/85

DOE ID NO. GJ-00713-~~85~~ MR 90 ~~?~~ Date 3/23/85

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

Official Survey Report

Property Address 1535 Elm Avenue

Property Owner Paul Shaw

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.

[x] Residual radioactive materials found at the following locations:

[ ] In open areas.

[x] Under or around exterior improvements.

[x] Under or around a typically nonoccupied structure.

[x] 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.

[x] 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 = 13 uR/h
HOG = 25 uR/h

Bendix

Field Engineering Corporation

P.O. Box 1569
Grand Junction, CO
Tel (303) 242-8...

A Subsidiary of
The Bendix ...

March 26, 1985

Colorado Department of Health
222 South 6th Street
Grand Junction, Colorado 81501

ATTN: Coleen Campbell

Dear Coleen:

This letter is a follow-up of the Technical Review on Department of Energy Identification number GJ-00713-~~RS~~ MR 99 6.2.85 (1535 Elm Avenue), conducted on 7 March 1985.

The following points require clarification:

1. Thank you for the updated radon-daughter concentration working level information. This will be added to the folio.

2., 3., 4., 5., and 6.

   By mistake I sent you the wrong radium concentration, Table 3.2. After adding two locations to the basement I printed a new table, but by mistake I sent you the old one. The soil sample for the chips read 2.4.1 pCi/g. The locations will come out even and will include locations 10 and 11 on the new table which I am enclosing. I am also enclosing a copy of the interior sample locations to be sure you have a copy of the updated maps.

7. The note for location 16 should read, "Based on location 20."

8. The soil sample depth for location 21 is 0-inches - 6-inches.

9. At location 18 the note should read, "Based on the soil sample."

10. The note on Figure 3.3a now reads, "The concrete north wall is contaminated. The wall is approximately 6' x 12' x 4"."

Bendix

11. The partial basement is two feet from the foundation wall at its closest point to the foundation. It is not part of the foundation. The foundation and footing depths do extend to only 15 feet.

    There is a concrete porch on the north side of the house closest to the contaminated wall. To auger in this area would require a core through the porch slab, then you would still be approximately three feet from the contaminated wall. I feel the concrete chips taken from that wall prove that it is the concrete in the wall that is contaminated.

Thank you for your time and cooperation. If you have further questions or comments, please contact me at 242-8621, extension 472.

Yours very truly,

Terry Coulson

Terry Coulson
Radiologic Survey Team

TC:pr

Enclosure

INTERNAL MEMORANDUM

Bendix Field Engineering Corporation
Grand Junction Projects Office

Date: March 1, 1985

To: Files

From: Terry Coulson

Subject: Team Leader Notes - GJ-00713-~~R8~~ MA 6/12/85

Date: February 6, 1985

Address: 1535 Elm Avenue

Instruments

Scintillometers - C-1185, C-1184, C-1181, C-1149, C-1205, C-1195
Delta - 3942, 3937, 3943
Total Count - 1062, 3573, 3956
Spectrometer - C-03361

Team Members

M. Rangel	D. Fossey
S. Southern	C. Holmes
B. Wilkins	N. Wallace
D. Martz	H. Mattison
S. Larsen	M. Dexter
L. Kula	

This property was purchased by the Shaws' in the early 1960's. The house was built in the late 1940's. Mr. and Mrs. Shaw mentioned to me that they believed the 'basement' was a dug out crawl space. The main part of the basement is approximately 20-feet long and 7-feet wide, has a dirt floor and the majority of the walls are also made of dirt. The readings gathered from the dirt floor averaged 150 cps. The sewer system was installed before Mr. and Mrs. Shaw purchased this home and they are not aware of any leach fields or septic tanks.

The team members and myself gridded and scanned this property. We discovered high readings in the garage, driveway, and on the sidewalk to the garage. We also discovered high readings on the north wall of the basement.

There is a pile of bricks against the corner of the fence in the southwest corner of the property. When placing the crutch scintillometer between the fence and the pile of bricks, a reading of 150 - 160 cps was obtained.

Date: March 1, 1985

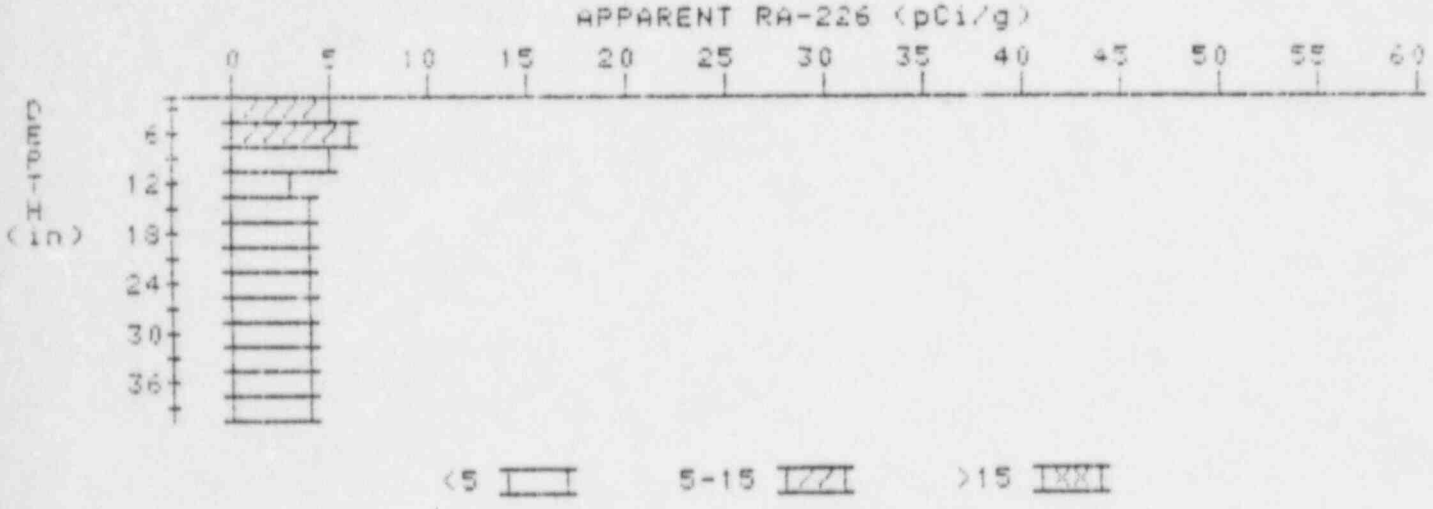
A revisit was made to property GJ-00713-RS to further investigate the pile of bricks in the southwest corner of the property. It was decided that the high readings were because of a natural product from the bricks.

The sewer line is not as shown on the maps, it extends south in the crawl space along the west side of the house to the alley.

DECON V85.1(850117.1233)

APPARENT RADIUM-226 CONCENTRATION 11
DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00713-MR
HOLE NUMBER: 11
LOCATION:

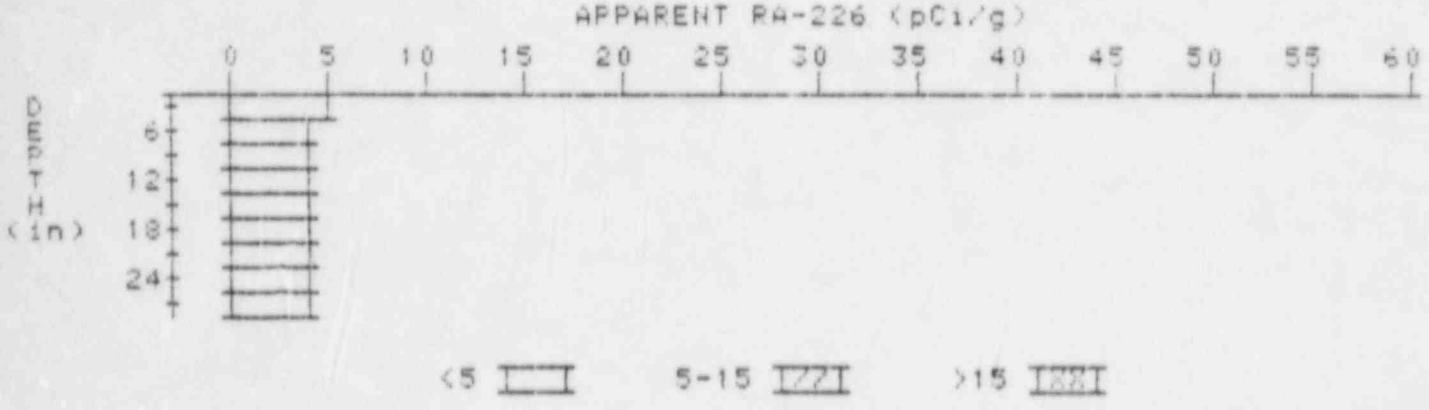


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.0	5.0
6	5.2	6.4
9	4.7	4.7
12	4.2	3.5
15	4.1	4.1
18	4.0	4.2
21	3.8	3.6
24	3.7	3.5
27	3.7	3.7
30	3.7	3.5
33	3.8	3.8
36	3.9	4.1
39	3.9	3.9

DECON V85.1(850117.1233)

APPARENT RADIUM-226 CONCENTRATION 13
DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00713-MR
HOLE NUMBER: 13
LOCATION: 135241

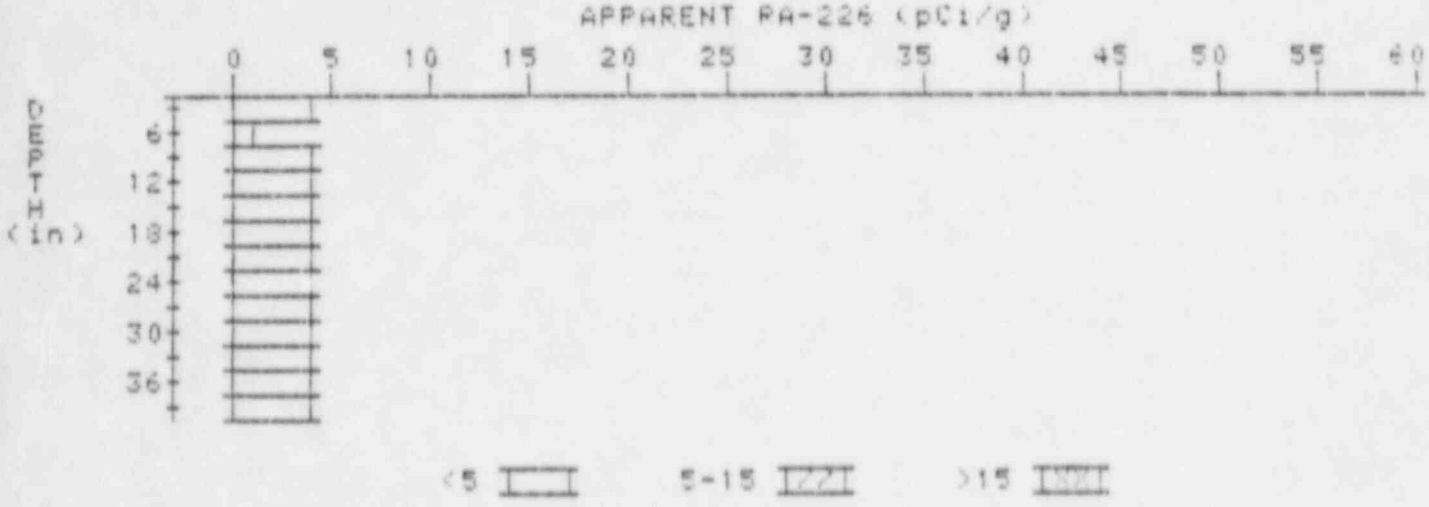


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.7	4.7
6	4.3	3.9
9	4.1	3.7
12	4.1	4.3
15	4.0	3.8
18	4.0	4.0
21	4.0	4.0
24	4.0	4.0
27	4.0	4.0

DECON V85.1(850117.1233)

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 14

PROPERTY NUMBER: GJ-00713-MR
HOLE NUMBER: 14
LOCATION: 162266

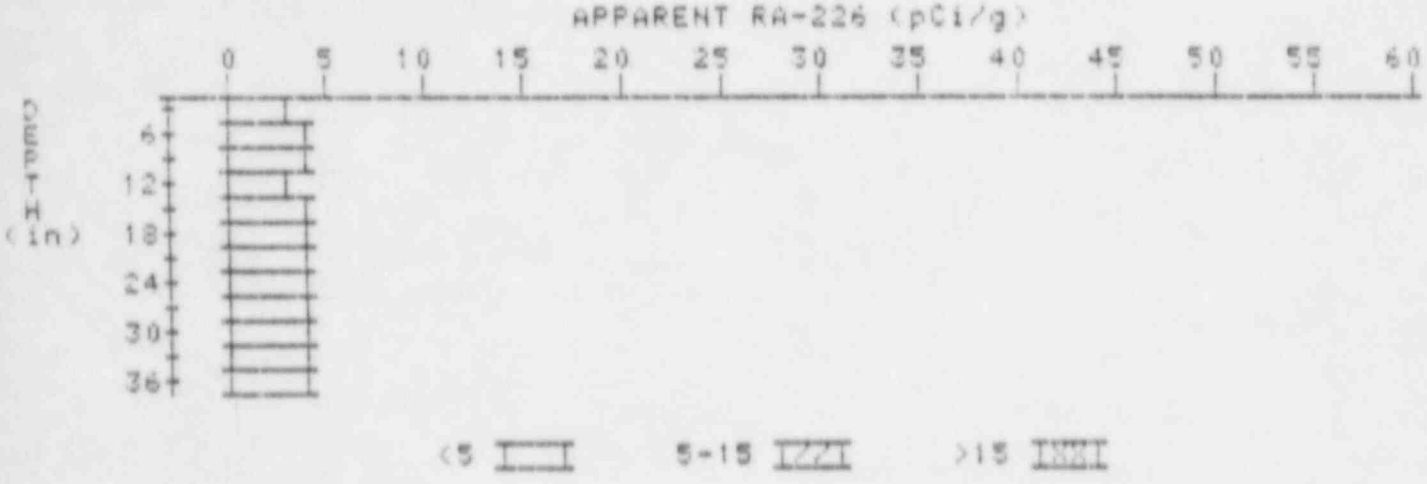


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.1	4.1
6	3.1	.0
9	3.4	3.6
12	3.6	3.0
15	3.7	3.7
18	3.8	3.8
21	3.9	3.9
24	4.0	4.2
27	4.0	4.0
30	4.0	4.0
33	4.0	4.0
36	4.0	4.0
39	4.0	4.0

DECON V85.1(850117.1233)

APPARENT RADIUM-226 CONCENTRATION 15
DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00713-MR
HOLE NUMBER: 15
LOCATION: 169241

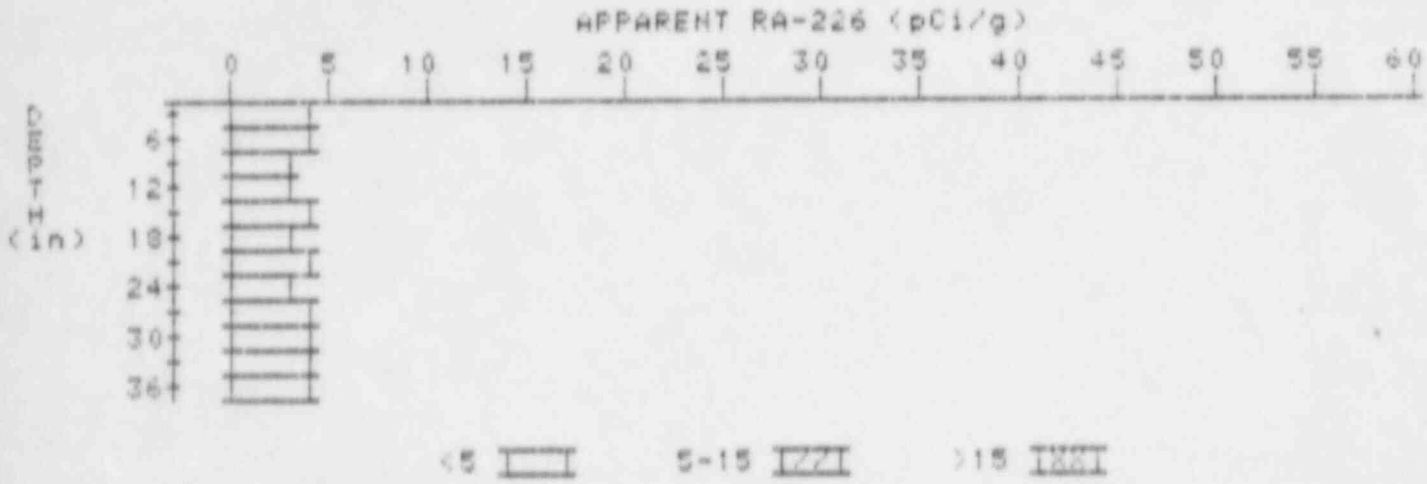


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.4	3.4
6	3.5	3.5
9	3.6	3.8
12	3.6	3.4
15	3.7	3.7
18	3.8	4.0
21	3.8	3.8
24	3.8	3.6
27	3.9	4.1
30	3.9	3.9
33	3.9	3.9
36	3.9	3.9

DECON V85.1(850117.1233)

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 16

PROPERTY NUMBER: GJ-00713-MP
HOLE NUMBER: 16
LOCATION: 177271

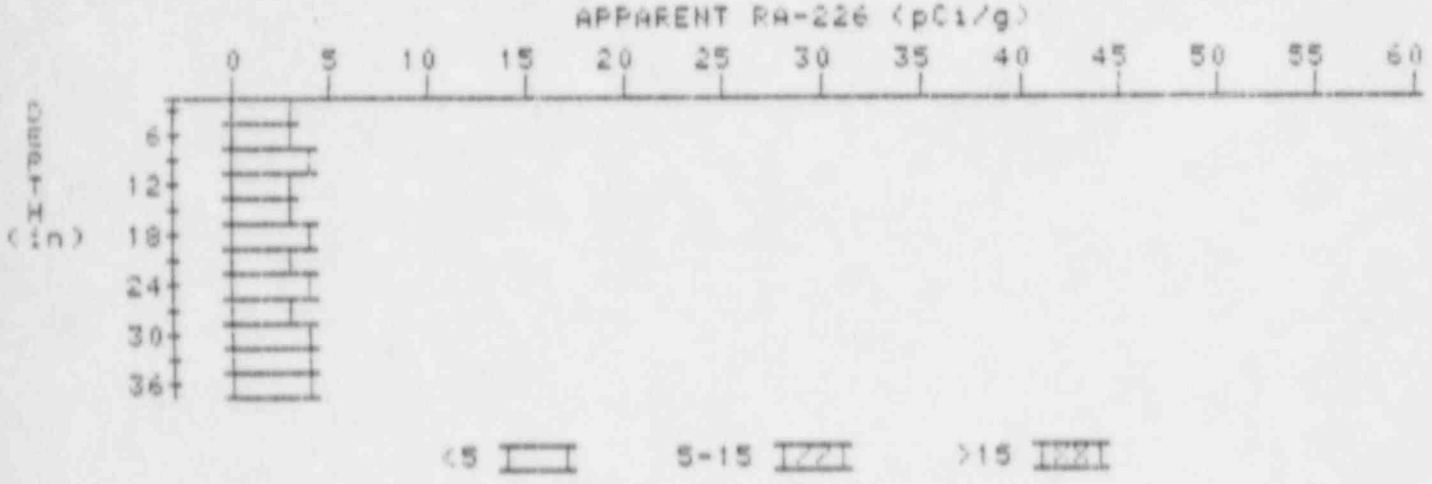


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.5	3.5
6	3.6	4.0
9	3.5	3.3
12	3.5	3.3
15	3.6	3.6
18	3.6	3.4
21	3.7	4.1
24	3.6	3.2
27	3.7	3.7
30	3.8	4.0
33	3.8	3.6
36	3.9	3.9

DECON V85.1(850117.1233)

APPARENT RADIUM-226 CONCENTRATION 18
DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00713-MR
HOLE NUMBER: 18
LOCATION: 215271

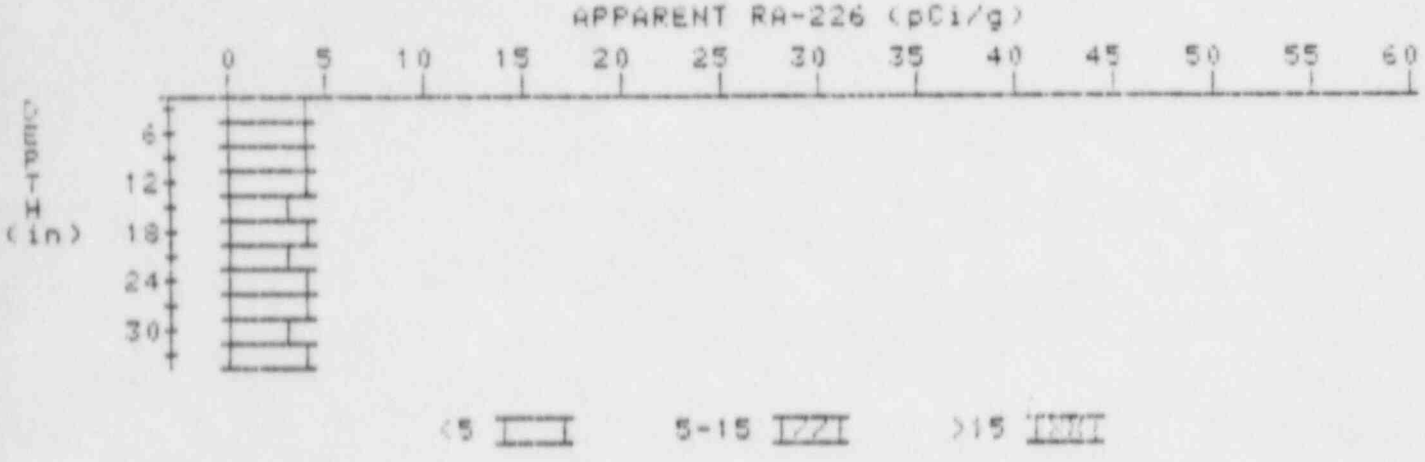


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.2	3.2
6	3.3	3.3
9	3.4	3.8
12	3.3	3.1
15	3.3	3.1
18	3.4	3.6
21	3.4	3.2
24	3.5	3.7
27	3.5	3.3
30	3.6	3.6
33	3.7	3.9
36	3.7	3.7

DECON V65.1(85-9117.1233)

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 19

PROPERTY NUMBER: GJ-00713-MR
HOLE NUMBER: 19
LOCATION: 228241

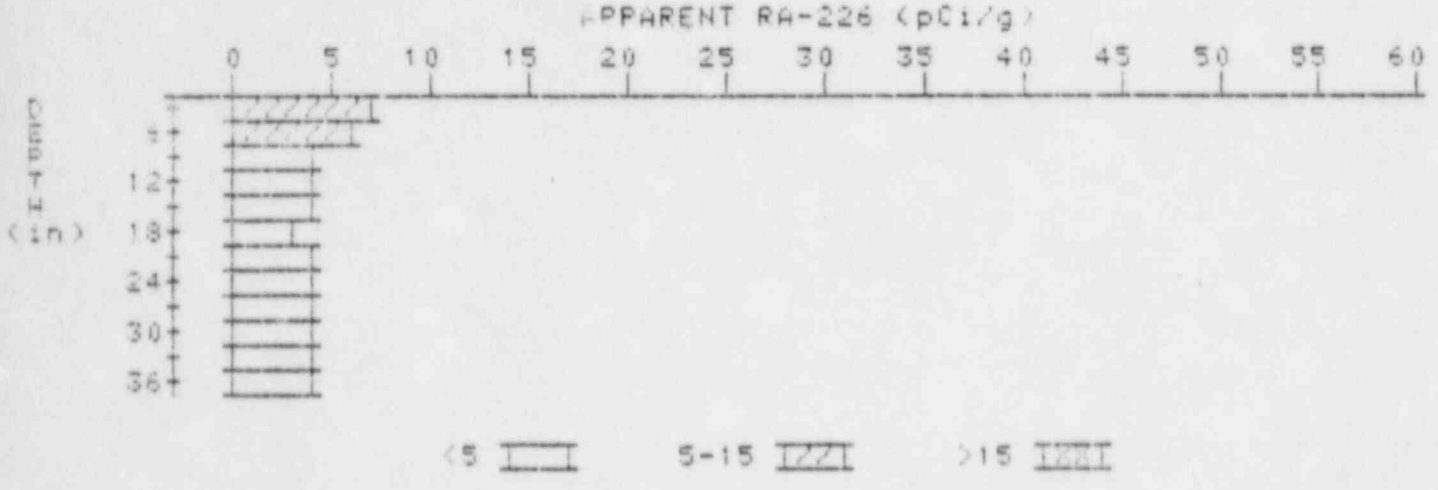


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.4	4.4
6	4.2	4.4
9	3.9	3.7
12	3.7	3.5
15	3.6	3.2
18	3.7	4.1
21	3.6	3.4
24	3.6	3.6
27	3.6	3.6
30	3.6	3.4
33	3.7	3.7

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION 20 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00713-MR
HOLE NUMBER: 20
LOCATION: 235231

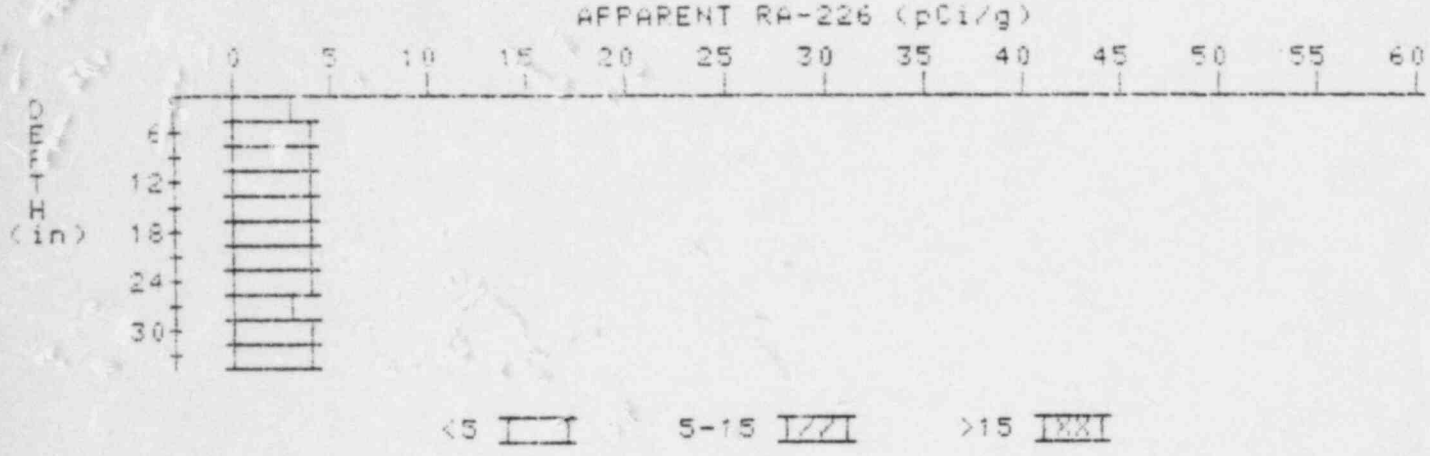


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	6.5	6.5
6	5.8	6.3
9	4.8	3.9
12	4.3	4.1
15	3.9	3.5
18	3.7	3.3
21	3.7	3.5
24	3.8	3.8
27	3.9	4.1
30	3.9	3.9
33	3.9	3.9
36	3.9	3.9

DECON /05.1(850117.1233)

APPARENT RADIUM-226 CONCENTRATION 23
DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00713-MP
HOLE NUMBER: 23
LOCATION: 25070

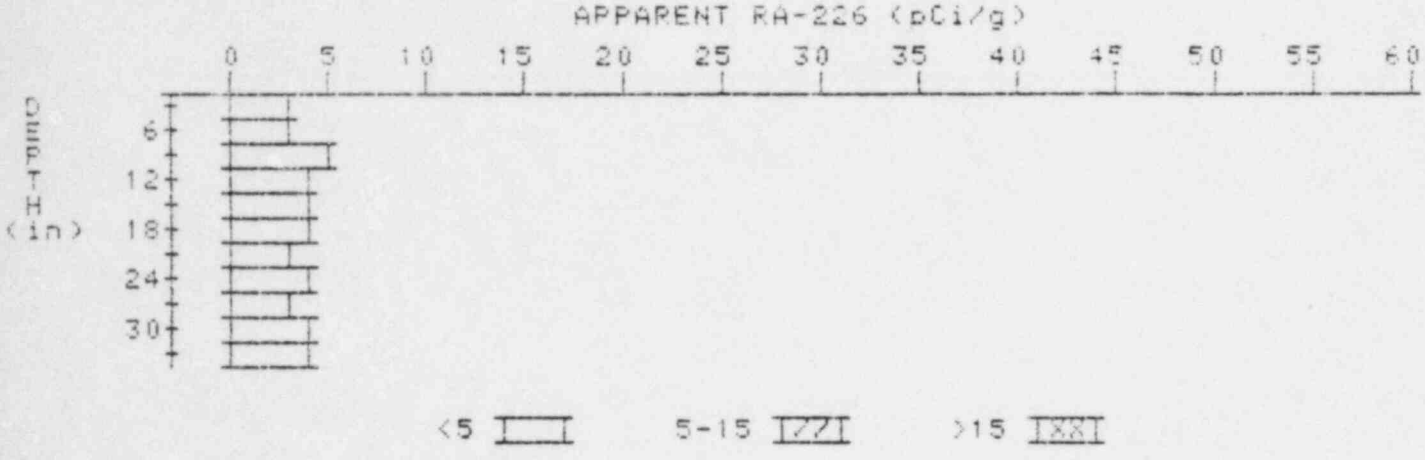


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.8	2.8
6	3.2	3.6
9	3.4	3.6
12	3.5	3.5
15	3.6	3.6
18	3.7	3.7
21	3.8	3.8
24	3.9	4.3
27	3.8	3.4
30	3.9	3.9
33	4.0	4.0

DECON V85.1<850117.1233>

APPARENT RADIUM-226 CONCENTRATION 24
DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-00713-MR
HOLE NUMBER: 24
LOCATION: 252248



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.0	3.0
6	3.4	3.4
9	3.8	4.5
12	3.8	4.0
15	3.7	3.5
18	3.7	4.1
21	3.5	3.0
24	3.6	3.8
27	3.6	3.4
30	3.7	3.9
33	3.7	3.7