

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-05884-MR
ADDRESS: 613-1/2 28-3/4 ROAD

JUNE 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

BENDIX FIELD ENGINEERING CORPORATION
P.O. Box 1569
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APPROVED BY

Michael H. Tucker

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DOE PROJECT ENGINEER

DATE

June 14, 1985

REA05884:REA-508

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

The location, DOE ID No. GJ-05884-MR, is a single-family residence located at 613-1/2 28-3/4 Road, 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, 61 cu. yd.; interior, 13 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is \$6,839. Remedial action on this property will take approximately 21 days to complete.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 613-1/2 28-3/4 Road, Grand Junction, Colorado

Zoning: Agricultural

Lot Size: Approximately 36,000 sf (0.82 acre)

Legal Description: Beg. 330' W & 872' N of SE Corner SW1/4SE1/4, Section 6, 1S 1E, W171', S80', W159', N160', E330', S80' to Beg., except E40' for Road R.O.W., County of Mesa, State of Colorado.

Point of Reference: This property is located approximately 3 miles northeast 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:	None

Bordering Properties:

North:	Single-family residence
South:	Single-family residence
East:	28-3/4 Road
West:	Open field

2.2 Existing Facilities and Structures

Primary Structure:

Type:	Two-story residence
Size:	Approximately 1,400 sf
Construction Date:	1955
Construction:	Wood-frame
Foundation:	Concrete stemwalls
Footing Depth:	Not determined
Basement:	None
Crawl Space:	Yes - full
Condition:	Good

Other Structures:

Type:	Shed
Size:	Approximately 540 sf
Construction:	Wood-frame
Foundation:	Concrete grade beam
Footing Depth:	Approximately 12 inches to bottom of footing
Condition:	Good
Type:	Chicken coop
Size:	Approximately 175 sf
Construction:	Wood and wire
Foundation:	None
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-05884-MR on March 12, 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 yard and associated with the wood shed.

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 14 uR/h
Highest Outside Gamma Reading (HOG): 158 uR/h

Exterior radium-concentration measurements are presented in Appendix Tables 3.1a and 3.1b. Grid-point survey results are shown in Appendix Figures 3.1a and 3.1b. Appendix Figures 3.2a and 3.2b present the ranges of elevated gamma readings and indicate areas of possible contamination.

3.2.2 Interior Findings

Background Readings: 9 to 13 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, 3.3c, and 3.3d 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 3.3d, 3.4a, and 3.4b. Data from these investigations are included in Appendix Tables 3.1a, 3.1b, and 3.2.

3.4 Radon/Radon Daughter Concentration (RDC)

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

3.5 Extent of Contamination

Appendix Figures 3.5a and 3.5b 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 soil beneath the 4-inch-thick uncontaminated concrete slab in the shed is contaminated to a total depth of 12 inches (approximately 360 sf).
- (AREA B) Contamination in two isolated areas west of the shed extends to a depth of 6 inches (approximately 32 sf).
- (AREA C) North and east of the shed, contamination in the soil is 12 inches deep (approximately 600 sf).
- (AREA D) Contamination in the soil west of the primary structure and adjacent to Area C extends to depth of 6 inches (approximately 450 sf).
- (AREA E) Northwest of the primary structure, contamination extends to a depth of 12 inches (approximately 286 sf).
- (AREA F) In the driveway, south of the primary structure, contamination is 9 inches deep (approximately 120 sf).
- (AREA G) North of the primary structure the soil is contaminated to a depth of 6 inches (approximately 165 sf).
- (AREA H) Adjacent to the north side of the primary structure, the soil is contaminated to a depth of 15 inches (approximately 22 sf).
- (AREA I) East of the primary structure contamination in the soil extends to a depth of 12 inches (approximately 44 sf).
- (AREA J) In the driveway, southeast of the primary structure, contamination extends to a depth of 18 inches (approximately 176 sf).

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-05884-MR, includes removal of all areas identified as containing radioactive material (as discussed in Section 3.5 and shown in Appendix Figures 3.5a and 3.5b) 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 \$6,839.

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 3.1a	Radium Concentrations at Exterior Locations
Table 3.1b	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 3.1a	Exterior Grid-Point Exposure Rates
Figure 3.1b	Exterior Grid-Point Exposure Rates
Figure 3.2a	Exterior Gamma Scan
Figure 3.2b	Exterior Gamma Scan
Figure 3.3a	Interior Gamma Exposure Rates - Crawl Space
Figure 3.3b	Interior Gamma Exposure Rates - Ground Floor
Figure 3.3c	Interior Gamma Exposure Rates - First Floor
Figure 3.3d	Interior Gamma Exposure Rates and Sample Locations
Figure 3.4a	Exterior Sample Locations
Figure 3.4b	Exterior Sample Locations
Figure 3.5a	Interior Estimated Extent of Contamination
Figure 3.5b	Exterior Estimated Extent of Contamination

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

Radium Concentrations at Exterior Locations

DOE ID No. GJ-05884-MR

613 1/2 28 3/4 Road

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
3	270240	00	DS	1.5		*	Open field
		06	DS	<1.0		*	
		00-06	SS			2.3	Moist
		03	TC	3.4		*	Background
		06	TC	3.7		*	DC = 0 inches
		09	TC	3.7		*	
		12	TC	3.7		*	
		15	TC	3.8		*	
		18	TC	3.8		*	
		21	TC	3.8		*	
		24	TC	4.1		*	
		27	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 = 03-12-85
 Team Leader = DGD

Radium Concentrations at Exterior Locations

DOE ID No. GJ-05884-MR

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
4	131223	00	DS	3.3		*	West of shed
		06	DS	2.1		*	
		00-06	SS			4.2	Moist
5	155260	00	DS	3.4		*	DC = 6 inches
		06	DS	1.9		*	Based on all
		03	TC	4.4		*	data taken
		06	TC	4.5		*	
		09	TC	4.5		*	
		12	TC	4.4		*	
		15	TC	4.5		*	
		18	TC	4.5		*	
		21	TC	4.6		*	
		24	TC	4.6		*	
		27	TC	4.6		*	
		30	TC	4.7		*	
		33	TC	4.6		*	
		36	TC	4.7		*	
		39	TC	4.7		*	
		42	TC	4.7		*	
		45	TC	4.6		*	
		48	TC	4.6		*	
		51	TC	4.6		*	
		54	TC	4.5		*	
		57	TC	4.5		*	
6	155270	00	DS	1.4		*	
7	160218	00	DS	2.0		*	South of shed
8	160240	03	TC	16.8		*	North side of shed
		06	TC	19.6		*	
		09	TC	15.0		*	DC = 12 inches
		12	TC	9.9		*	Based on the
		15	TC	7.2		*	deconvolution graph
		18	TC	5.7		*	
		21	TC	5.1		*	
		24	TC	4.8		*	
		27	TC	4.7		*	
		30	TC	4.6		*	
		33	TC	4.5		*	
		36	TC	4.5		*	
		39	TC	4.5		*	
		42	TC	4.4		*	

Radium Concentrations at Exterior Locations

DOE ID No. GJ-05884-MR

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
8	160240	45	TC	4.4		*	
		48	TC	4.3		*	
		51	TC	4.3		*	
		54	TC	4.4		*	
		57	TC	4.3		*	
		60	TC	4.2		*	
		63	TC	4.2		*	
		66	TC	4.2		*	
		69	TC	4.3		*	
		72	TC	4.2		*	
		75	TC	4.1		*	
9	166233	03	TC	28.3		*	
		06	TC	24.1		*	
		09	TC	16.1		*	
		12	TC	10.6		*	
		15	TC	7.6		*	
		18	TC	6.3		*	
		21	TC	5.6		*	
		24	TC	5.1		*	
		27	TC	4.9		*	
		30	TC	4.7		*	
		33	TC	4.7		*	
		36	TC	4.5		*	
		39	TC	4.6		*	
		42	TC	4.5		*	
		45	TC	4.4		*	
		48	TC	4.3		*	
		51	TC	4.4		*	
		54	TC	4.4		*	
		57	TC	4.3		*	
10	185285	00	DS	3.3		*	
		06	DS	4.4		*	
		12	DS	3.0		*	
		18	DS	2.4		*	
		06-12	SS			5.9	
		12-18	SS			3.2	
11	190225	03	TC	5.7		*	
		06	TC	5.2		*	
		09	TC	5.1		*	
		12	TC	4.7		*	
		15	TC	4.6		*	

DC = 12 inches
Based on the
deconvolution graph

Northwest by swings
DC = 12 inches
Based on all data
taken

DC = 9 inches
Based on the
deconvolution graph

Radium Concentrations at Exterior Locations

DOE ID No. GJ-05884-MR

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
11	190225	18	TC	4.6		*	
		21	TC	4.7		*	
		24	TC	4.5		*	
		27	TC	4.7		*	
		30	TC	4.6		*	
		33	TC	4.6		*	
		36	TC	4.4		*	
12	190260	03	TC	3.1		*	
		06	TC	3.6		*	
		09	TC	3.8		*	
		12	TC	3.9		*	DC = 0 inches
		15	TC	3.9		*	
		18	TC	3.9		*	
		21	TC	4.0		*	
		24	TC	4.0		*	
13	193239	27	TC	4.0		*	
		03	TC	3.1		*	Water line
		06	TC	3.5		*	
		09	TC	3.7		*	DC = 0 inches
		12	TC	3.8		*	
		15	TC	3.9		*	
		18	TC	4.1		*	
		21	TC	4.2		*	
		24	TC	4.2		*	
		27	TC	4.3		*	
		30	TC	4.4		*	
14	200290	33	TC	4.4		*	
		36	TC	4.4		*	
		39	TC	4.5		*	
		00	DS	5.0		*	North of house
		06	DS	1.9		*	
15	220279	03	TC	4.4		*	
		06	TC	4.8		*	
		09	TC	5.0		*	DC = 15 inches
		12	TC	4.9		*	Based on the
		15	TC	4.7		*	deconvolution graph
		18	TC	4.5		*	
16	226242	00	DS	1.3		*	Front of house

Radium Concentrations at Exterior Locations

DOE ID No. GJ-05884-MR

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
17	226253	03	TC	3.0		*	
		06	TC	3.2		*	DC = 0 inches
		09	TC	3.4		*	
		12	TC	3.7		*	
		15	TC	3.7		*	
		18	TC	3.8		*	
18	227279	00	DS	3.9		*	Gas line
		06	DS	5.2		*	
		14	DS	2.5		*	
		24	DS	2.3		*	Gas line exposed
		06-12	SS			12.9	Moist
19	231280	00	DS	7.2		*	Northeast of house
		06	DS	4.1		*	
		12	DS	3.2		*	
		18	DS	2.0		*	
		06-12	SS			10.8	Moist
		12-18	SS			3.9	
20	240285	00	DS	1.4		*	
		06	DS	1.5		*	
21	260236	03	TC	5.0		*	
		06	TC	5.6		*	
		09	TC	5.5		*	DC = 12 inches
		12	TC	5.2		*	Based on the
		15	TC	4.9		*	deconvolution graph
		18	TC	4.7		*	
		21	TC	4.5		*	
		24	TC	4.3		*	
		27	TC	4.2		*	
		30	TC	4.3		*	
		33	TC	4.2		*	
		36	TC	4.2		*	
22	270220	03	TC	14.8		*	
		06	TC	13.8		*	DC = 18 inches
		09	TC	11.3		*	Based on the
		12	TC	9.0		*	deconvolution graph
		15	TC	7.1		*	
		18	TC	6.1		*	
		21	TC	5.6		*	
		24	TC	5.3		*	

Radium Concentrations at Exterior Locations

DOE ID No. GJ-05884-MR

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
22	270220	27	TC	5.0		*	
		30	TC	4.9		*	
		33	TC	4.7		*	
		36	TC	4.7		*	
		39	TC	4.6		*	
		42	TC	4.5		*	
		45	TC	4.5		*	
		48	TC	4.5		*	
		51	TC	4.4		*	
		54	TC	4.3		*	
		57	TC	4.4		*	

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 = 03-12-85
Team Leader = DGD

Radium Concentrations at Interior Locations

DOE ID No. GJ-05884-MR

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
1		00-04	SS			1.9	Concrete core
		04-12	SS			46.0	Soil under core
		03	TC	31.0		*	DC = 12 inches
		06	TC	35.0		*	Based on the
		09	TC	22.2		*	deconvolution graph
		12	TC	14.2		*	
		15	TC	9.9		*	
		18	TC	7.9		*	
		21	TC	6.9		*	
		24	TC	6.1		*	
		27	TC	5.6		*	
		30	TC	5.2		*	
		33	TC	5.0		*	
		36	TC	4.8		*	
		39	TC	4.8		*	
		42	TC	4.6		*	
		45	TC	4.6		*	
		48	TC	4.4		*	
		51	TC	4.3		*	
		54	TC	4.4		*	
		57	TC	4.4		*	
		60	TC	4.4		*	
		63	TC	4.3		*	
		66	TC	4.4		*	
2		00	DS	2.2		*	

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 = 03-12-85
Team Leader = DGD

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)
ROOM A	09	11-12	11	09	11-13	12
ROOM B	05	09-12	11	05	11-12	11
ROOM C	06	11-13	13	06	11-13	13
ROOM D	04	11-13	12	04	11-12	12
ROOM E	16	11-12	12	17	11-13	12
ROOM F	06	11-13	12	06	12-13	12
ROOM G	07	09-11	10	07	09-10	10
ROOM H	05	10-11	10	05	09-10	10
ROOM I	04	09-10	10	04	09-10	10
ROOM J	05	09-10	10	05	09-10	10
ROOM K	06	09-11	10	06	09-11	10
ROOM L	01	10-10	10	01	10-10	10
CRAWL SPACE	-	-	-	1	14-16	15
SHED	19	14-36	26	19	14-57	35
CHICKEN COOP	05	13-13	13	05	13-14	14

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

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-08554-MR

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<u>AREA</u>	<u>CALCULATIONS(ft)</u>	<u>SF</u>	<u>DEPTH(ft)</u>	<u>CF</u>	<u>CUBIC YARDS</u>
INTERIOR					
	Concrete				
A	20 x 18 =	360	x 0.3 =	108 =	108/27 = 4
	Contaminated Fill				
A	20 x 18 =	360	x 0.7 =	252 =	252/27 = 9
TOTAL VOLUME - INTERIOR					= <u>13</u>
EXTERIOR					
B	4 x 8 =	32	x 0.5 =	16	
C	20 x 30 =	600	x 1.0 =	600	
D	30 x 15 =	450	x 0.5 =	225	
E	22 x 13 =	286	x 1.0 =	286	
F	15 x 8 =	120	x 0.8 =	96	
G	11 x 15 =	165	x 0.5 =	83	
H	2 x 11 =	22	x 1.3 =	29	
I	4 x 11 =	44	x 1.0 =	44	
J	8 x 22 =	176	x 1.5 =	264	
TOTAL VOLUME - EXTERIOR					= 1643 = 1643/27 = 61
TOTAL VOLUME - INTERIOR					= 360 = 360/27 = 13

See Appendix Figure 3.5a and 3.5b For Areas

INTERIOR

Remove interior concrete slab 360 sf @ \$2/sf	\$ 720
Remove identified residual radioactive material 7 cy @ \$18.50/cy (machine)	130
2 cy @ \$44/cy (manual)	88
Replace 3/4" crushed rock 9 cy @ \$13.50/cy	122
Replace 4" concrete slab 360 sf @ \$2/sf	720
Remove/replace personal property items	500
	<hr/>
TOTAL INTERIOR	\$ 2,280

EXTERIOR

Remove identified residual radioactive material 53 cy @ \$14.50/cy (machine)	\$ 769
8 cy @ \$44/cy (manual)	352
Remove/replace personal property items	300
Replace roadbase 33 cy @ \$11.50/cy	380
Replace 2" of 3/4" crushed rock 8 cy @ \$13.50/cy	108
Replace topsoil 16 cy @ \$9.50/cy	152
Replace compost/topsoil 4 cy @ \$12.50/cy	50
Remove/replace sprinkler system 200 sf @ \$0.40/sf	80

Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-05884-MR

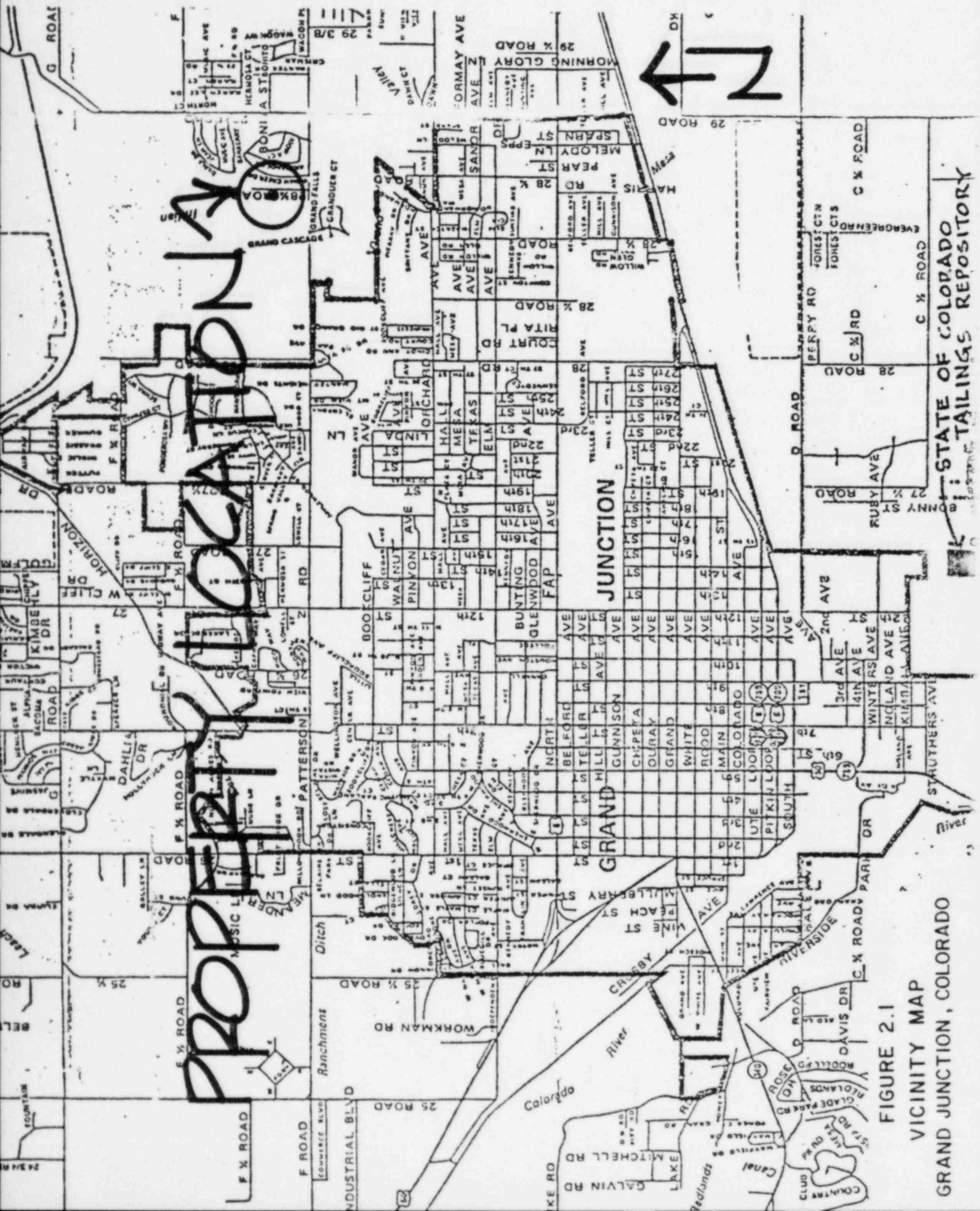
Page 2 of 2

Remove/replace wagon wheel and vine	60
Replace 5 shrubs @ \$30/shrub	150
	<hr/>
TOTAL EXTERIOR	\$ 2,401
TOTAL INTERIOR	2,280
ACCESS CONTROL	500
	<hr/>
SUBTOTAL	\$ 5,181
CONTINGENCY @ 10%	518
	<hr/>
SUBTOTAL	\$ 5,699
CONTRACTOR OVERHEAD & PROFIT @ 20%	1,140
	<hr/>
GRAND TOTAL	\$ 6,839

=====

JF050685

REA05884/REA-508/LAJ



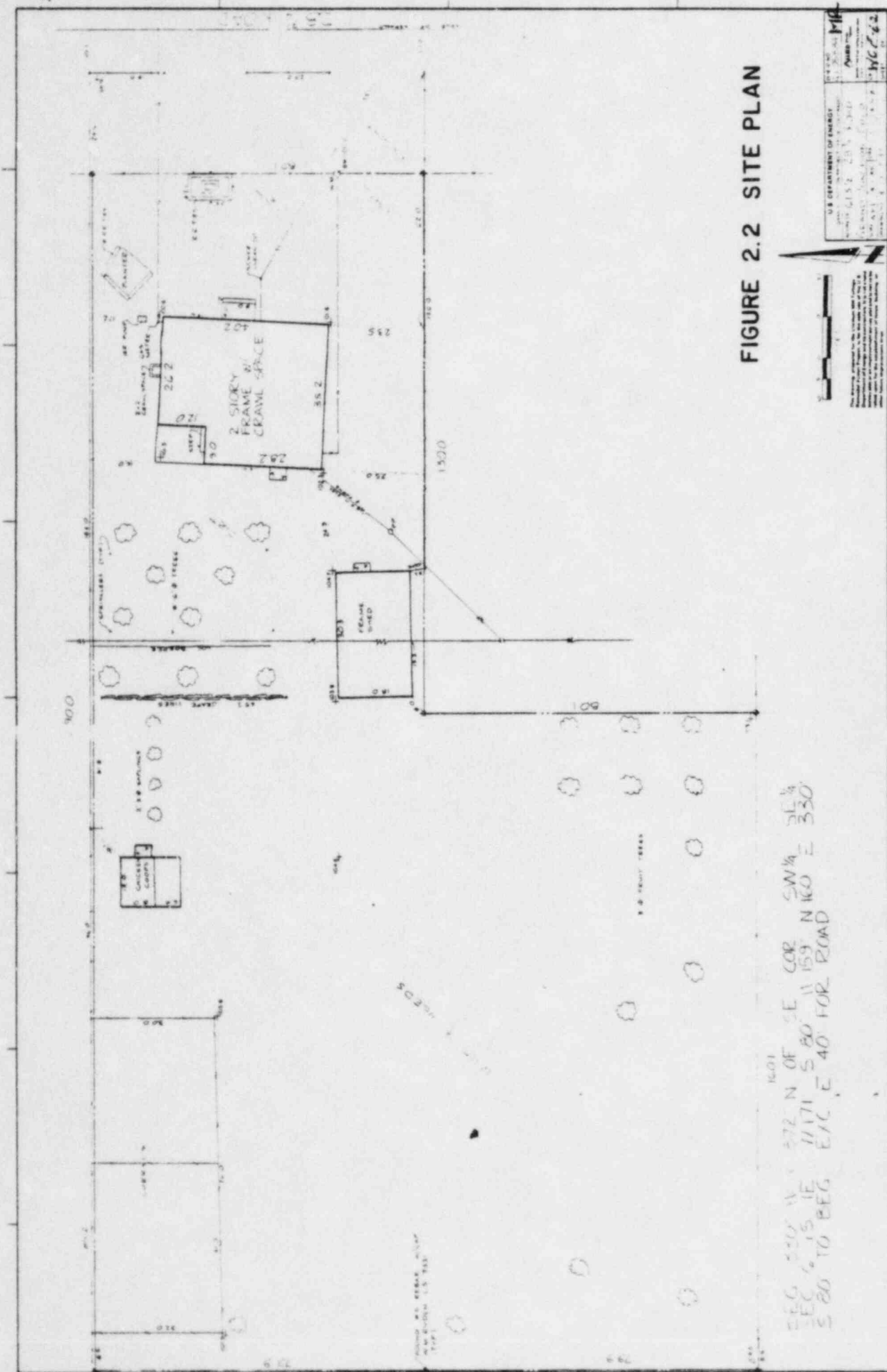
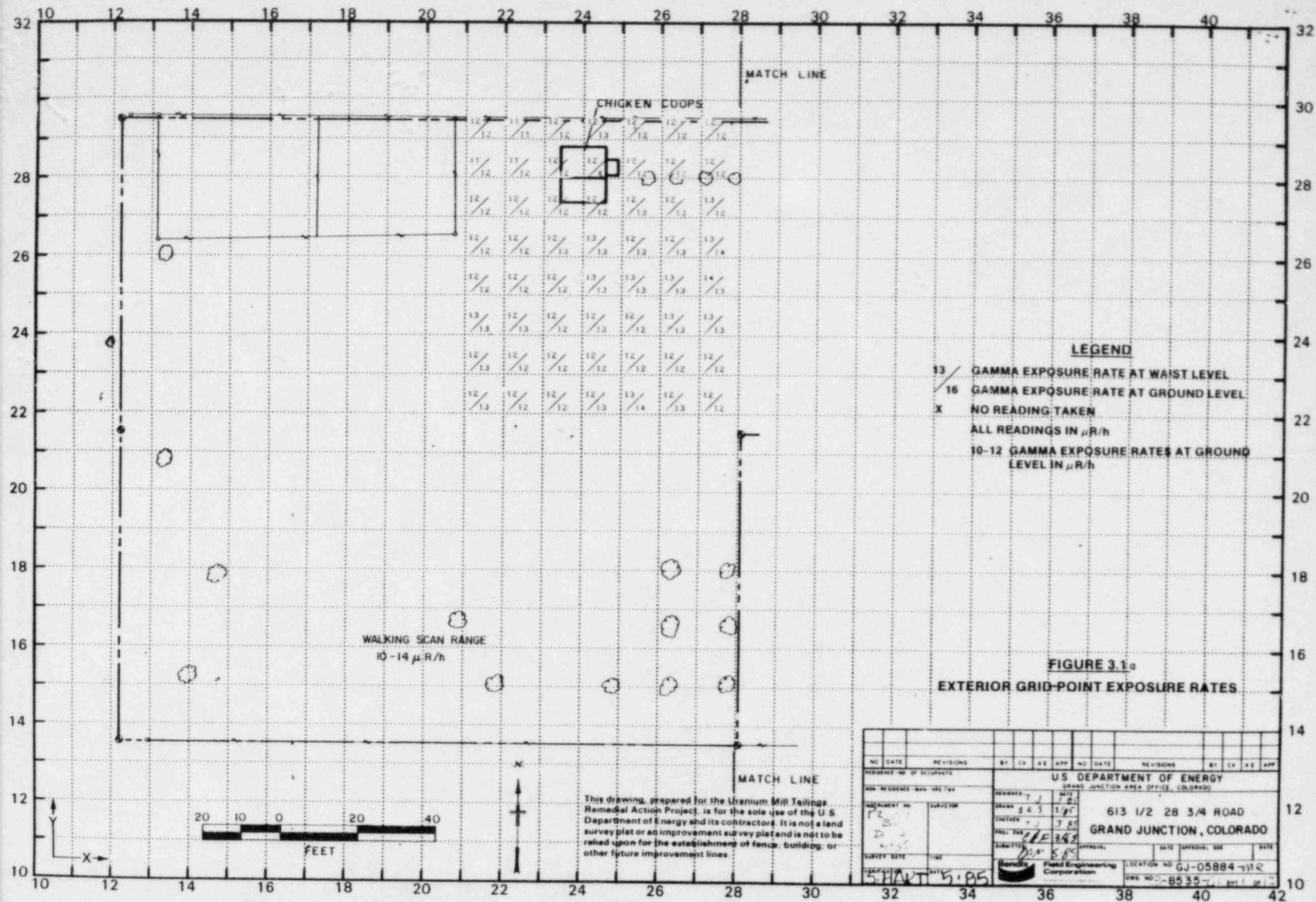
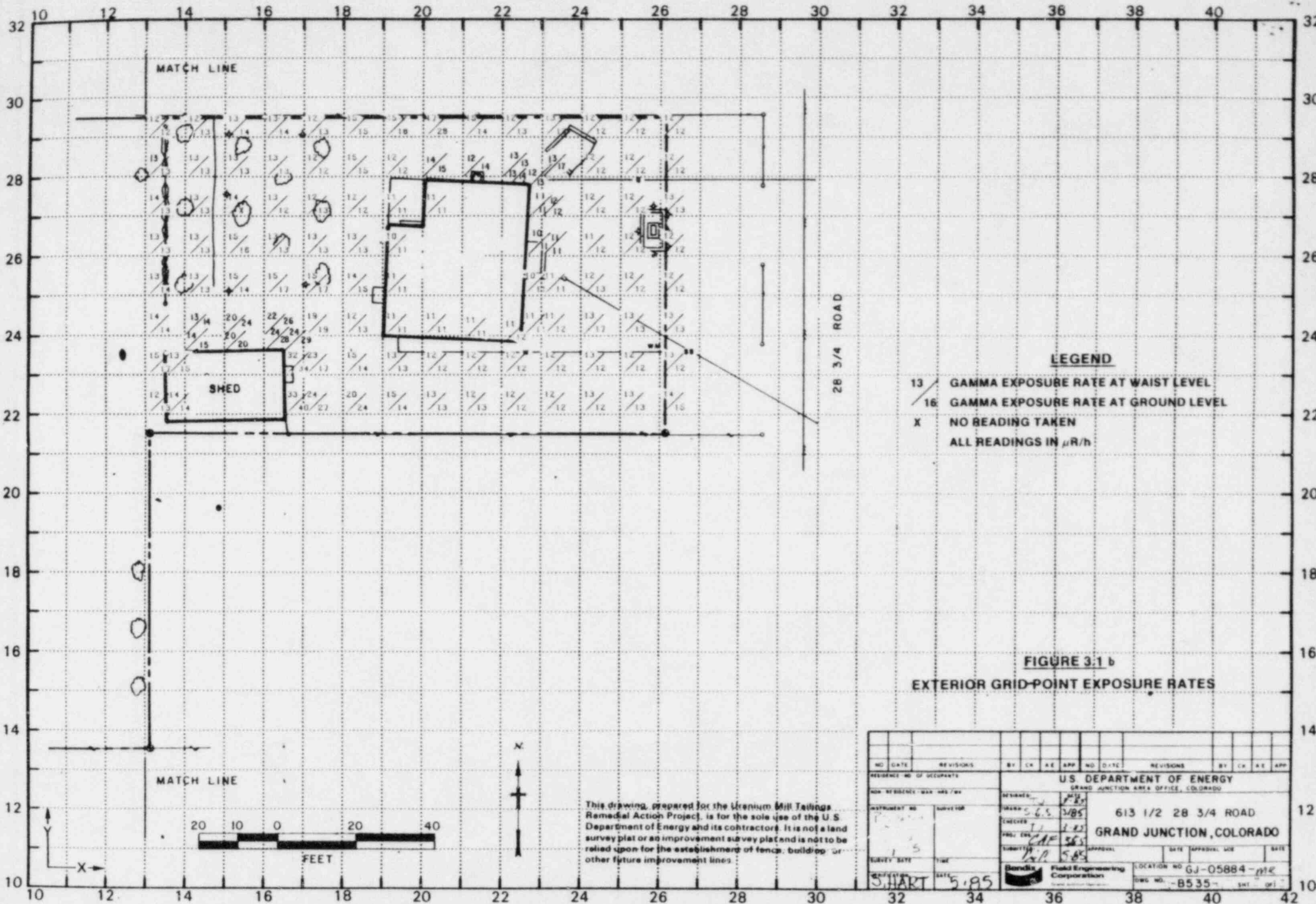
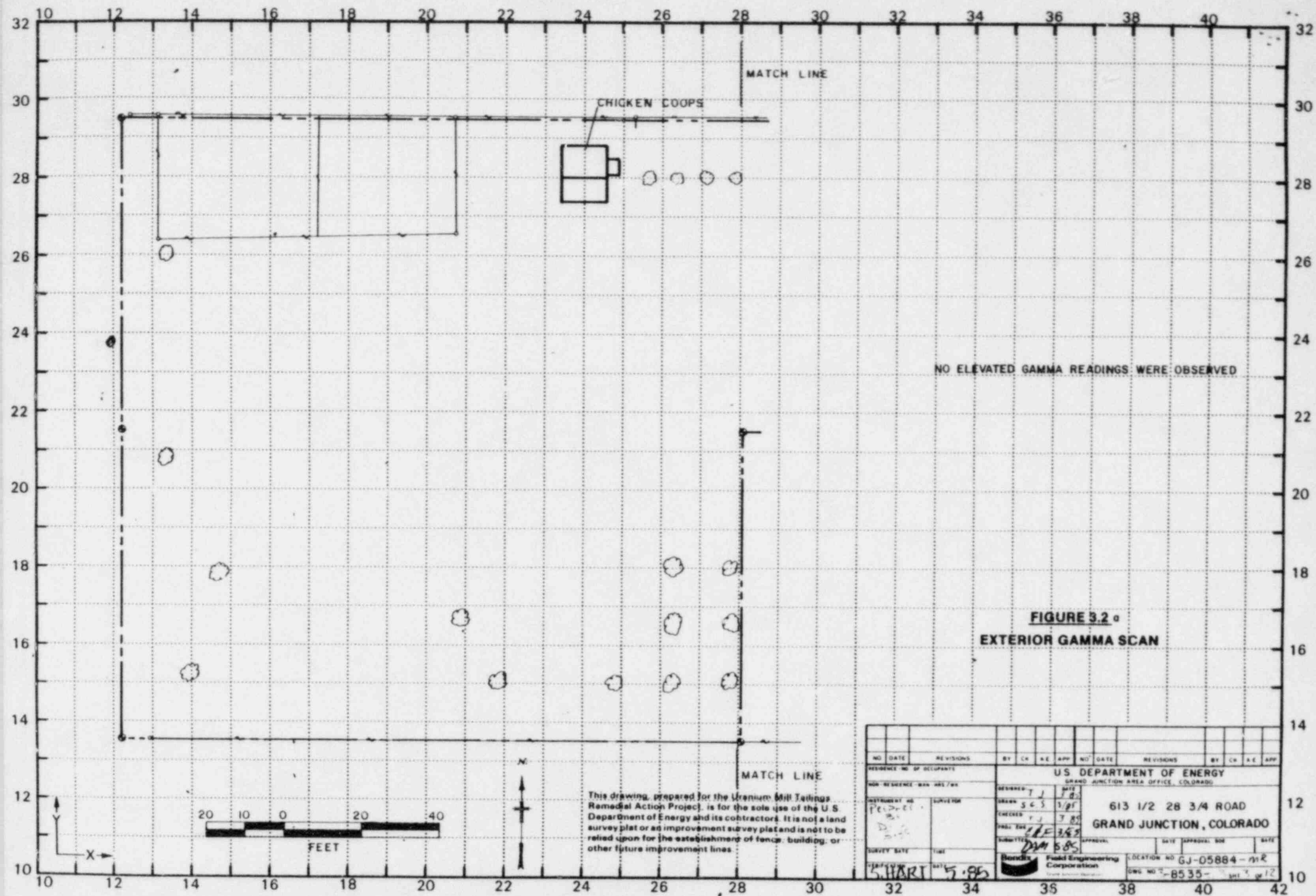


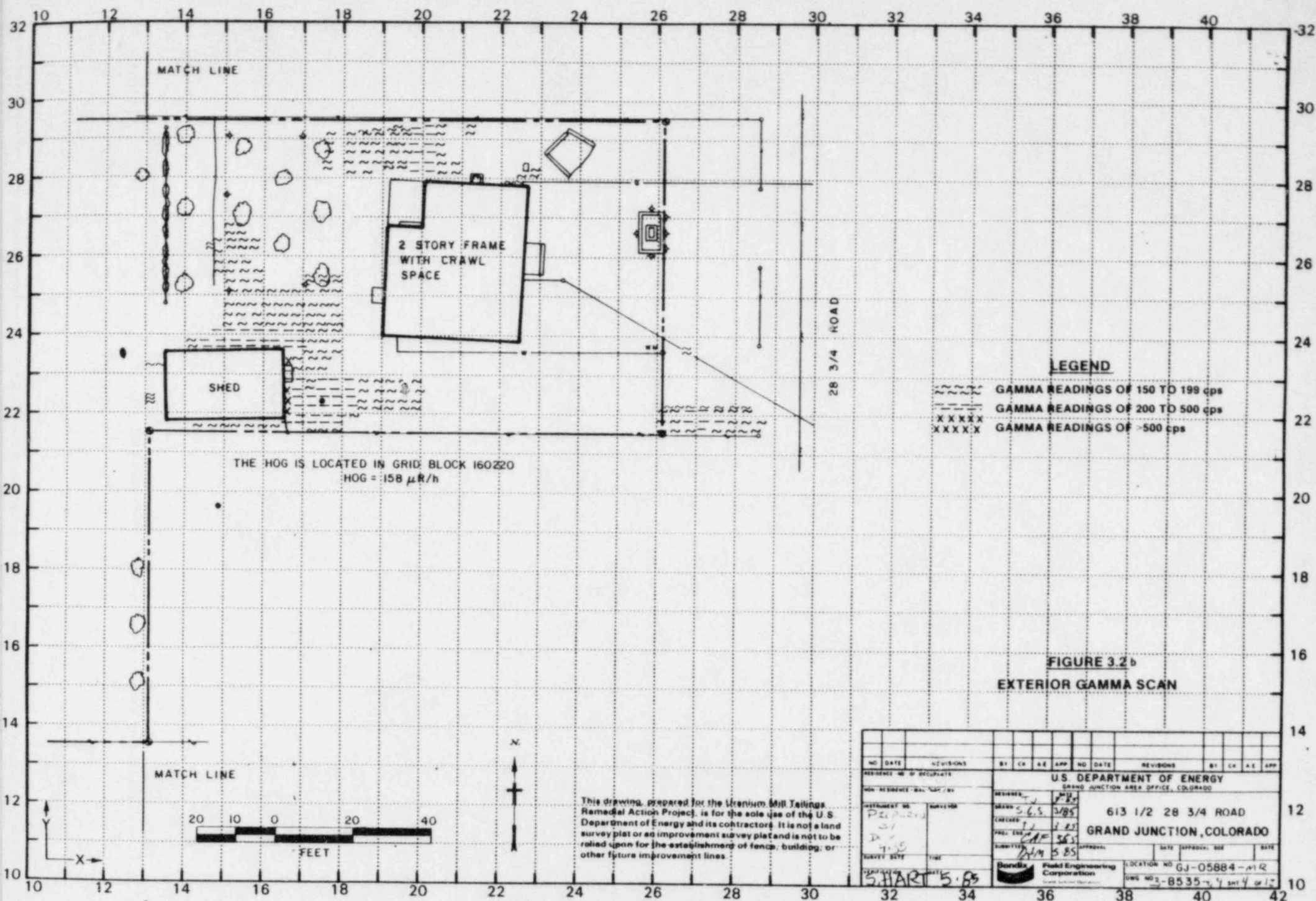
FIGURE 2.2 SITE PLAN

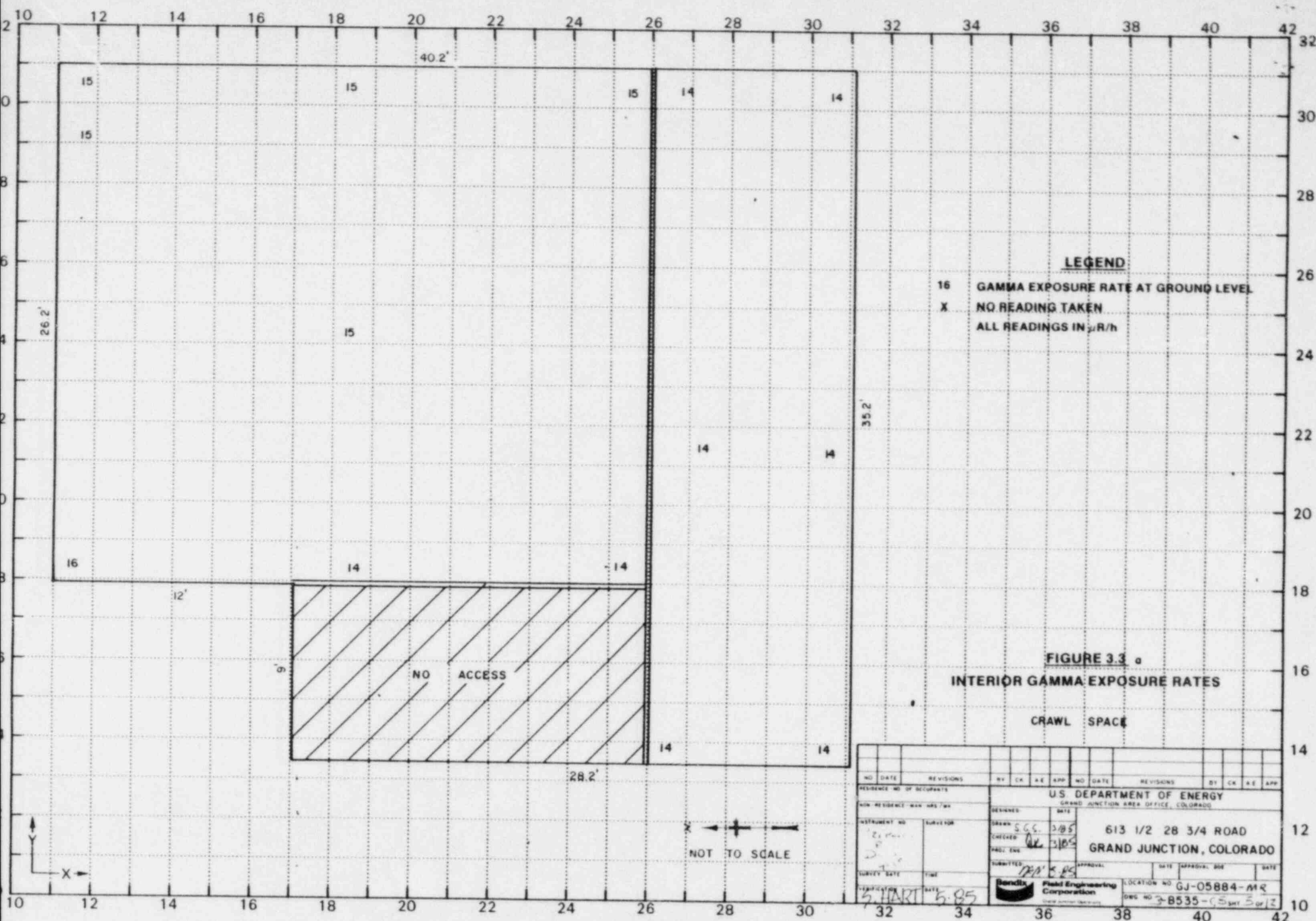
1601
 SEG 200' N OF SE COR SW 1/4 SE 1/4
 SEC 6, T5S, E 15, R 11W, S 80' || 159' N 160' E 350'
 S 80' TO BEG E/C, E 40' FOR ROAD

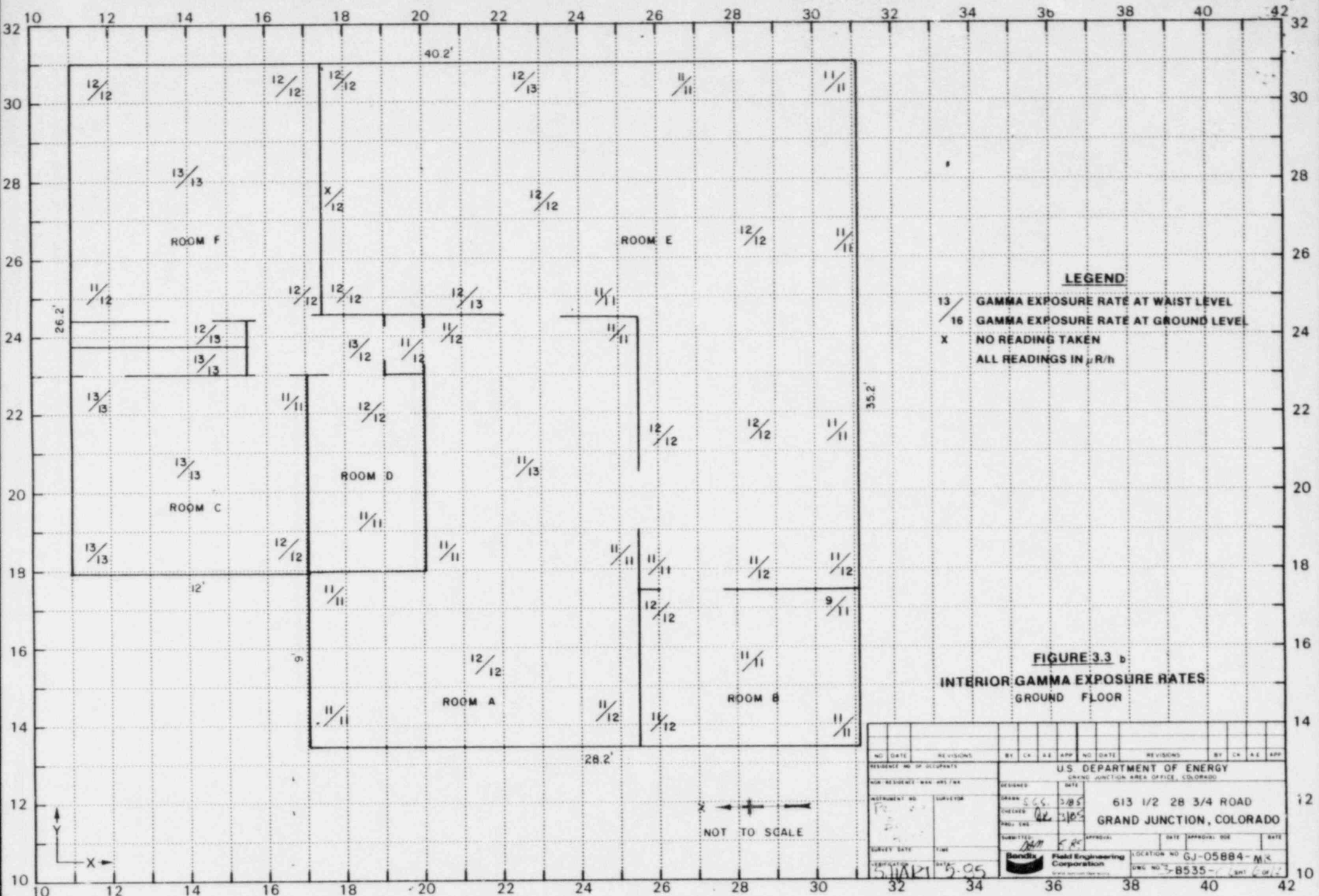




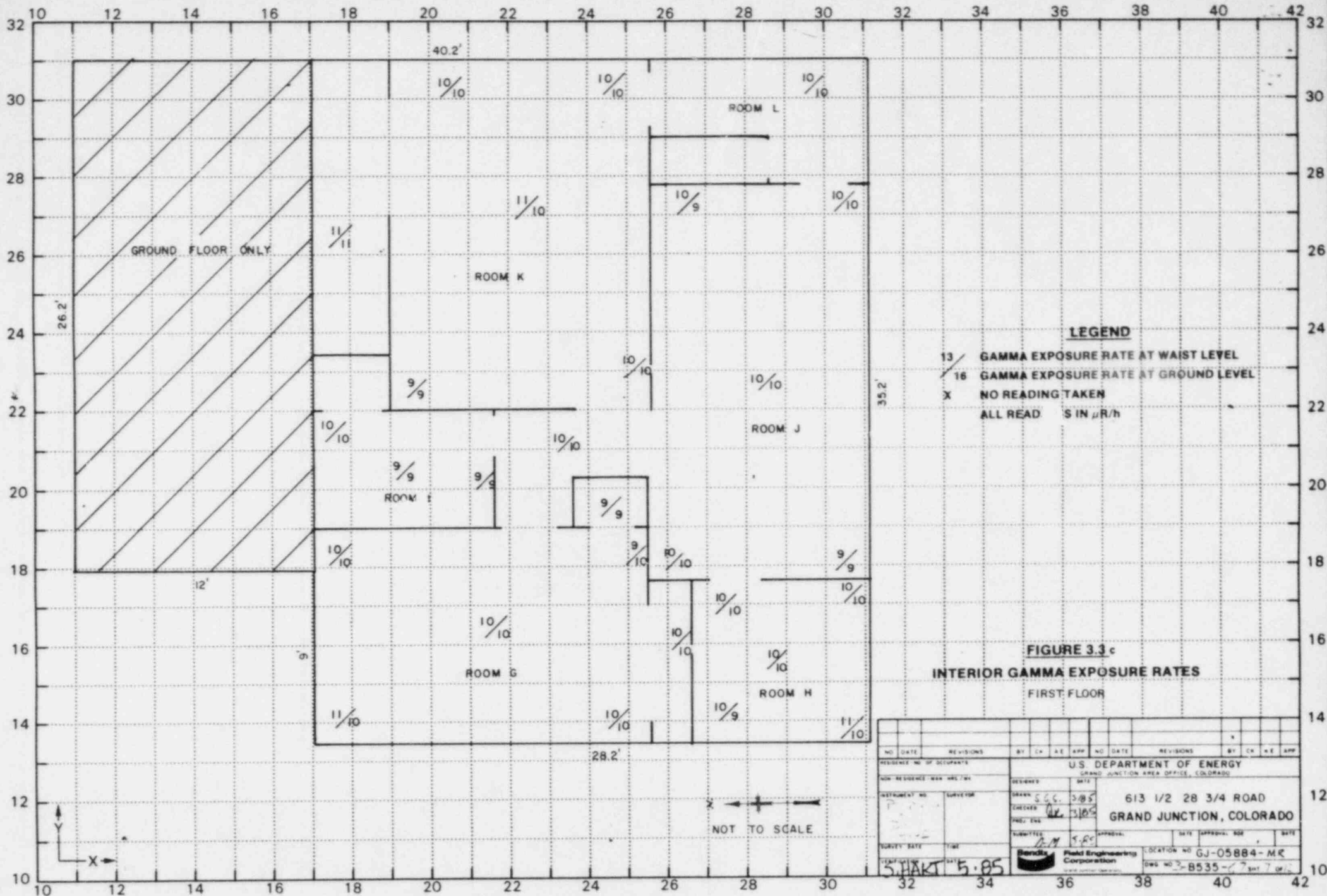




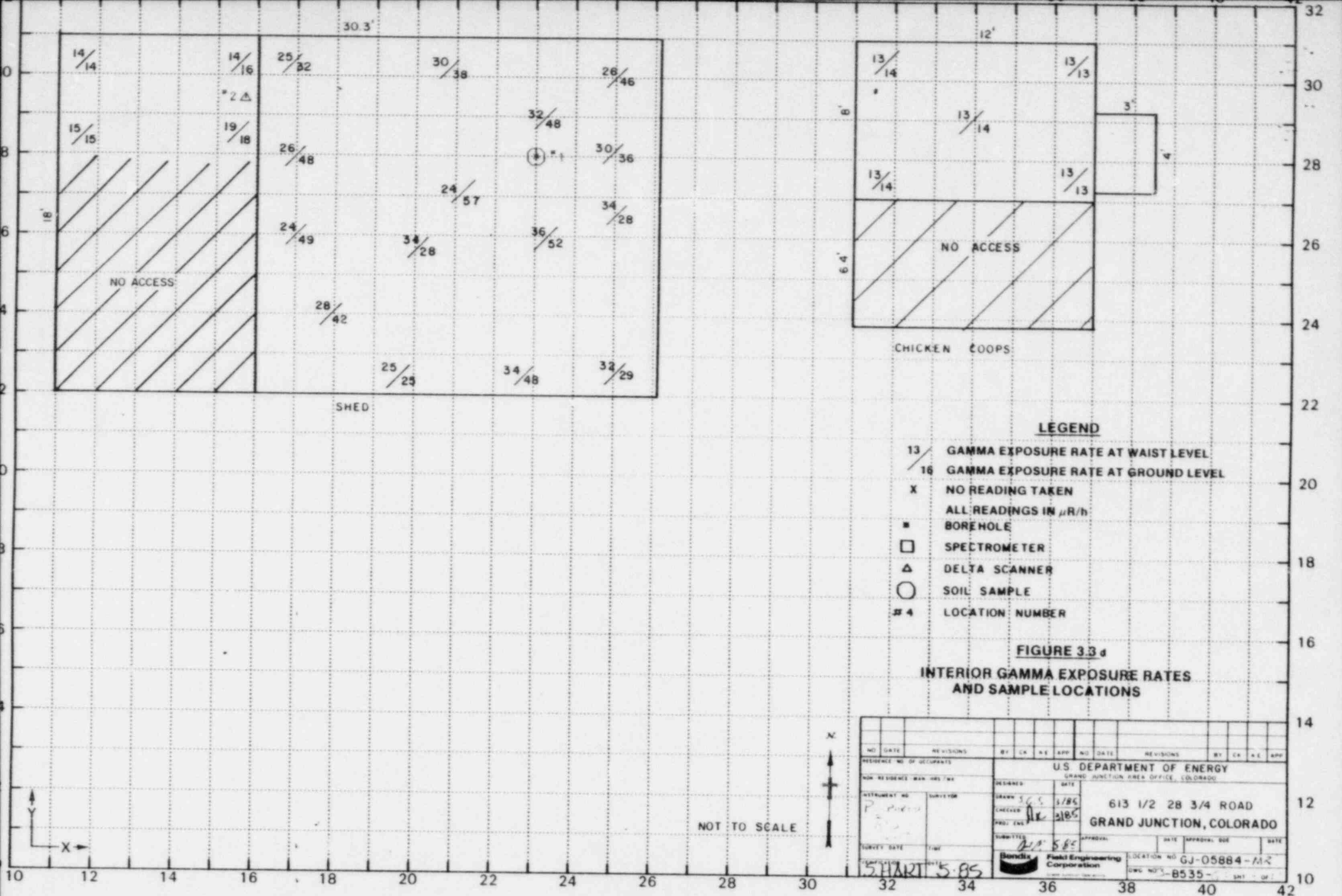


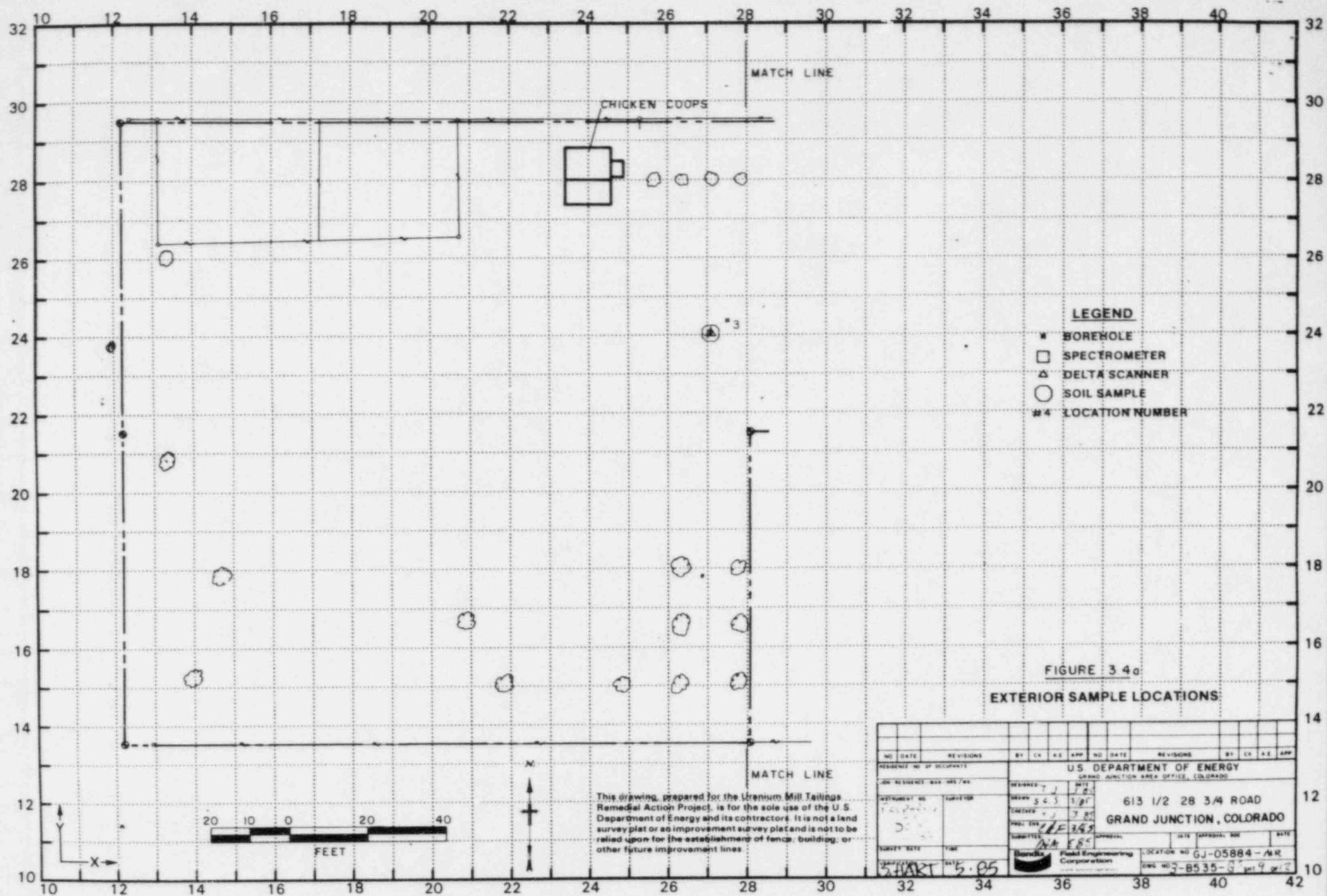


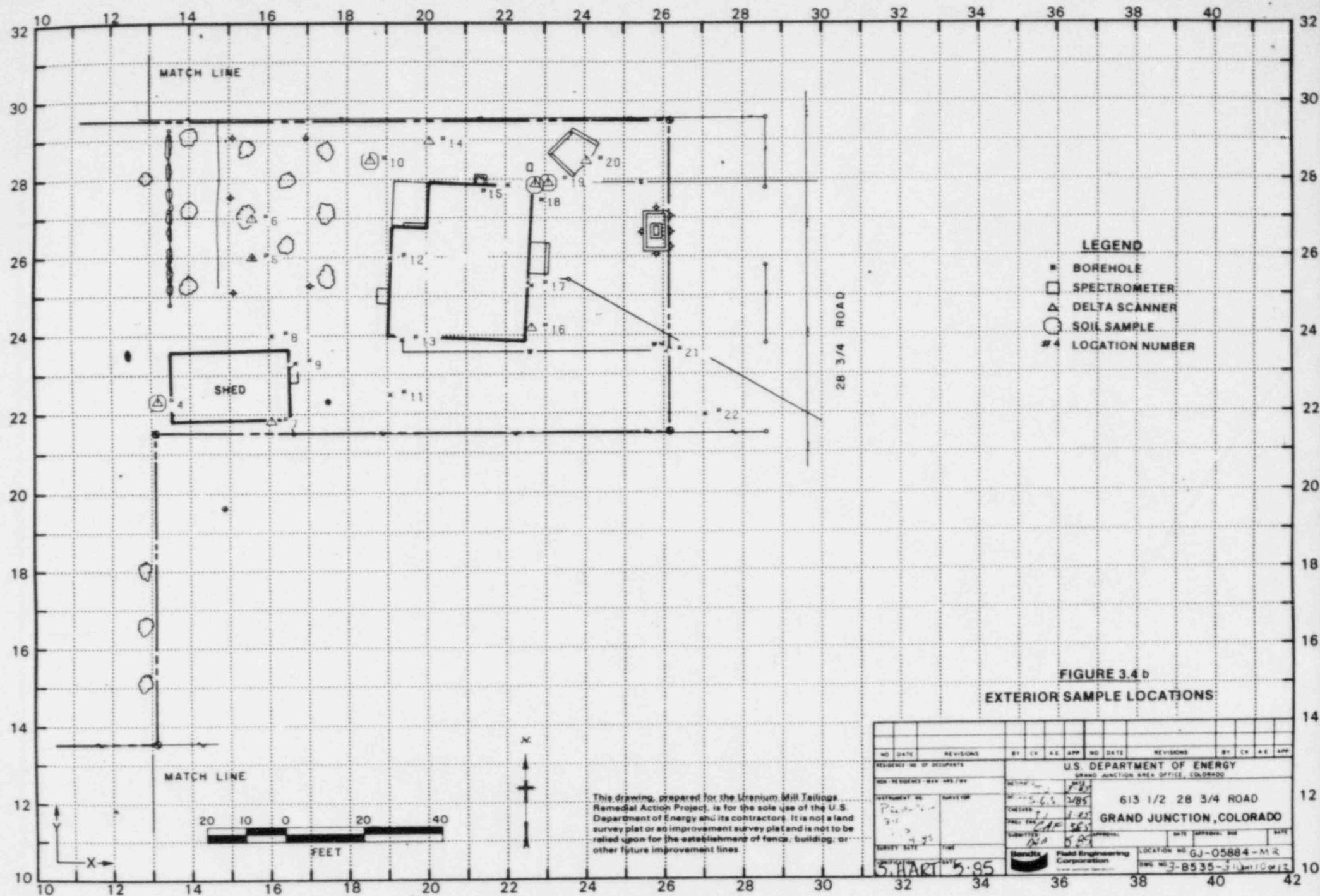
NO.	DATE	REVISIONS	BY	CHK	A.E.	APP.	NO.	DATE	REVISIONS	BY	CHK	A.E.	APP.
<p>RESIDENT NO. OF OCCUPANTS</p> <p>NON-RESIDENT NAME AND TIME</p> <p>INSTRUMENT NO. SURVEYOR</p> <p>TITLE DATE</p>													
<p>U.S. DEPARTMENT OF ENERGY</p> <p>GRAND JUNCTION AREA OFFICE, COLORADO</p> <p>DESIGNED DATE</p> <p>CHECKED DATE</p> <p>PAID DATE</p> <p>SUBMITTED DATE</p> <p>APPROVED DATE</p> <p>DATE APPROVAL DUE DATE</p>													
<p>613 1/2 28 3/4 ROAD</p> <p>GRAND JUNCTION, COLORADO</p> <p>LOCATION NO. GJ-05884-M</p> <p>DATE 5/11/85</p> <p>DATE 5/95</p> <p>DATE 5/95</p>													



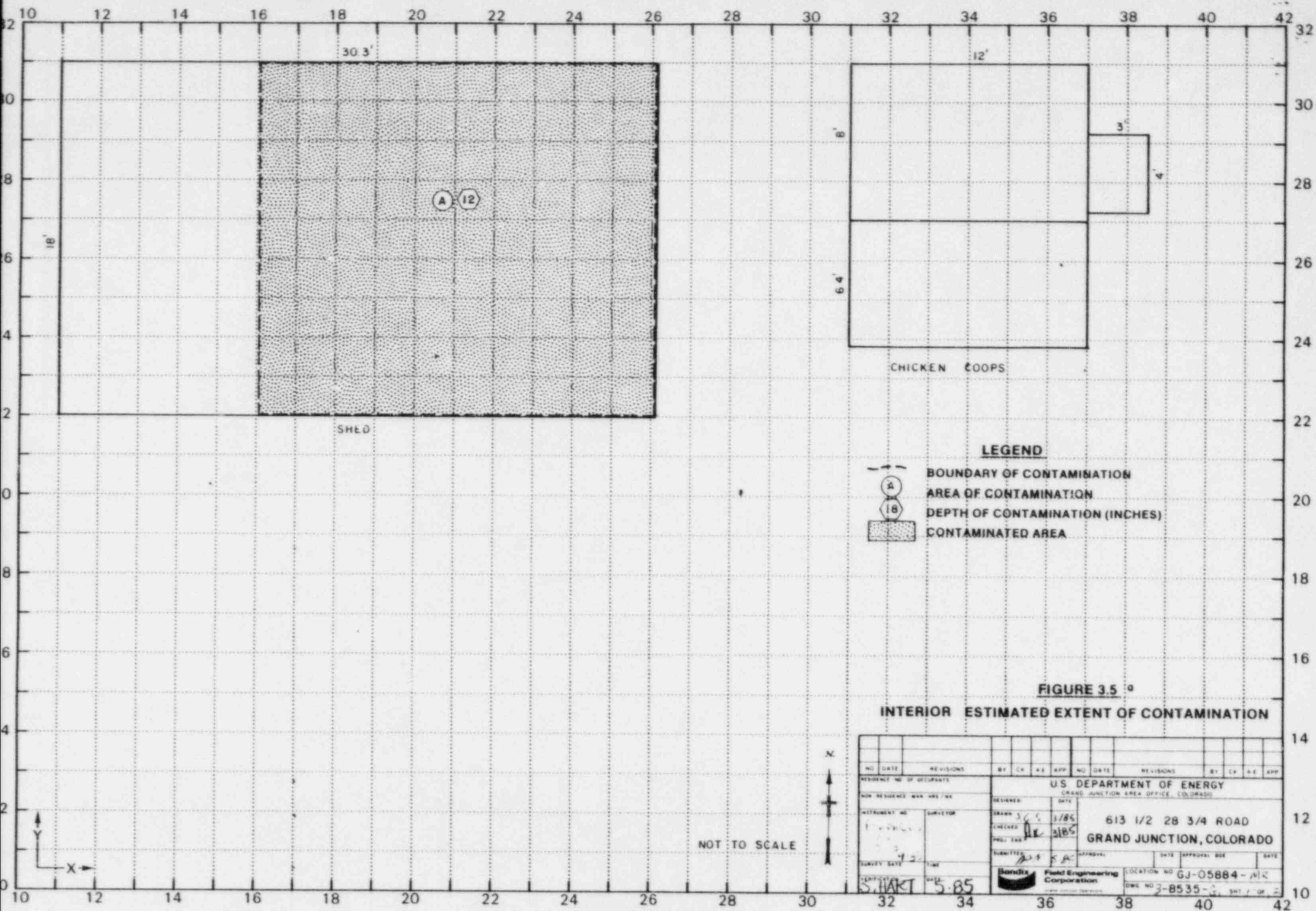
NO.	DATE	REVISIONS	BY	CHK	APP	NO.	DATE	REVISIONS	BY	CHK	APP
RESIDENCE NO. OF OCCUPANTS NON-RESIDENCE MAX. ARE./sq. ft.											
INSTRUMENT NO. SURVEYOR											
SURVEY DATE TIME											
U.S. DEPARTMENT OF ENERGY GRAND JUNCTION AREA OFFICE, COLORADO 613 1/2 28 3/4 ROAD GRAND JUNCTION, COLORADO											
DESIGNED: S.C.C. 3/85 CHECKED: J.E. 3/85 PREP. ENG. SUBMITTAL: S.C.C. APPROVAL: S.C.C. DATE: 3/85 SITE: 3/85 SIZE: 7' x 7'											
LOCATION NO. GJ-05884-ME DWS NO. 3-8535-7 DATE 7/85											







NO. DATE REVISIONS BY CK AS APP NO. DATE REVISIONS BY CK AS APP									
RESIDENT NO. OF OCCUPANTS					U.S. DEPARTMENT OF ENERGY				
MIN. RESIDENCE MAX. DWS / YR					GRAND JUNCTION AREA OFFICE, COLORADO				
INSTRUMENT NO.					613 1/2 28 3/4 ROAD				
SURVEYOR					GRAND JUNCTION, COLORADO				
DATE					DATE				
SURVEY SITE					DATE				
TIME					DATE				
5. PART 5.95					DATE				
Field Engineering Corporation					DATE				
LOCATION NO. GJ-05884-M R					DATE				
DWS NO. 3-8535-3					DATE				



LEGEND

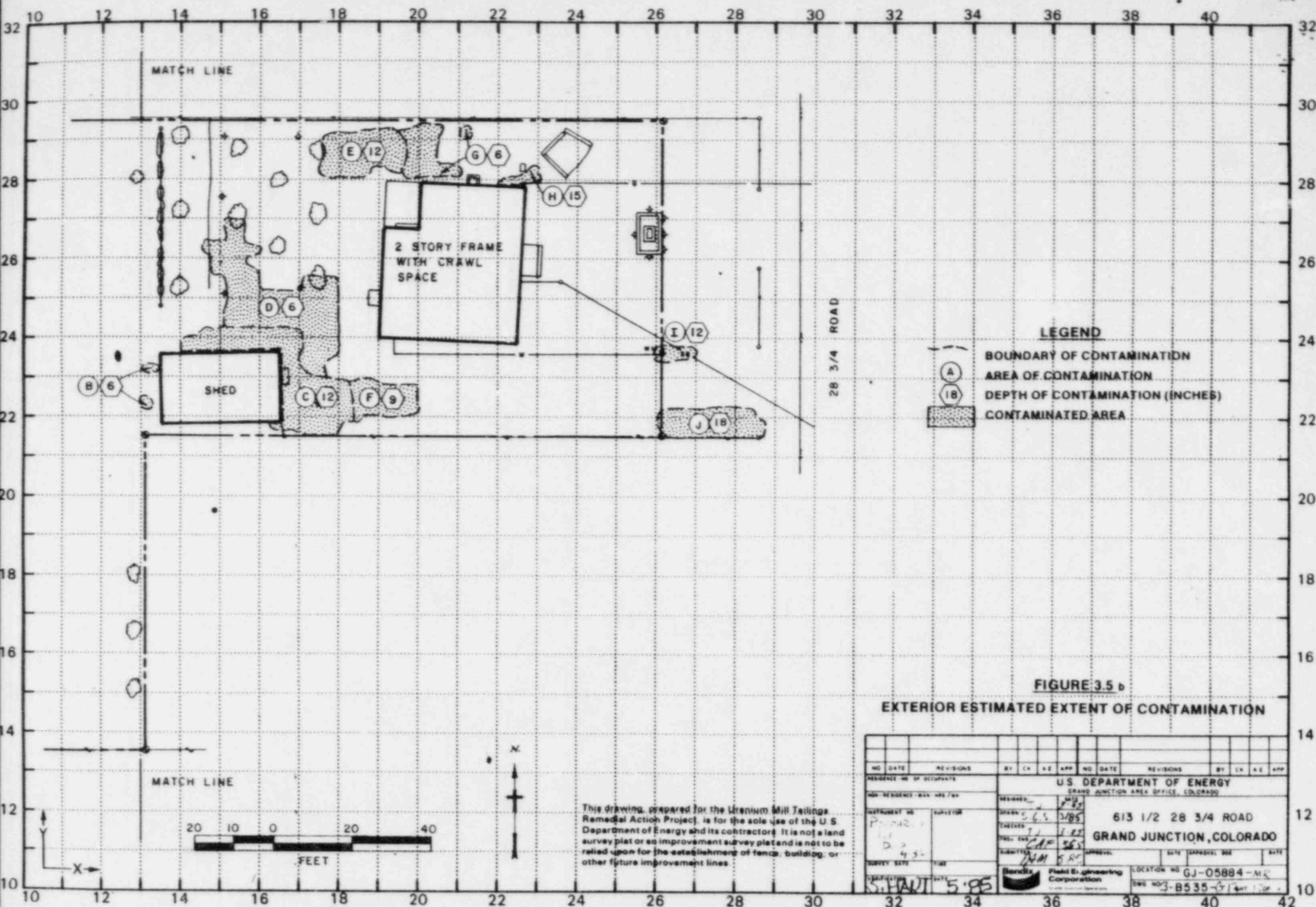
BOUNDARY OF CONTAMINATION
 AREA OF CONTAMINATION
 DEPTH OF CONTAMINATION (INCHES)
 CONTAMINATED AREA

FIGURE 3.5

INTERIOR ESTIMATED EXTENT OF CONTAMINATION

NO. DATE				REVISIONS				BY CR AE APP				NO. DATE				REVISIONS				BY CR AE APP											
RESIDENT NO. OF OCCUPANTS																U.S. DEPARTMENT OF ENERGY GRAND JUNCTION AREA OFFICE, COLORADO															
NON-RESIDENT MAX. AGE / SEX																613 1/2 28 3/4 ROAD GRAND JUNCTION, COLORADO															
INSTRUMENT NO.																DESIGNED: 3/85 CHECKED: 3/85 PROJ. ENG: 3/85															
SERV. DATE																SUBMITTED: 3/85 APPROVED: 3/85 DATE: 3/85															
DRAWN: S. HART																5-85 Feed Engineering Corporation LOCATION NO. GJ-05884-112 DWS NO. 2-8535-1, SHT. 2 OF 2															

NOT TO SCALE



3/35

DOE ID NO. GJ-05884-MR

Date 4-20-85

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

Official Survey Report

Property Address 613 1/2 28 3/4 Road

Property Owner Floyd Carpenter

Address of Owner (if different from above) _____

Report Prepared By David Dille

I. PRESENCE/ABSENCE OF RESIDUAL RADIOACTIVE MATERIALS

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

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

1 XX 1 In open areas.

1 XX 1 Under or around exterior improvements.

1 XX 1 Under or around a typically nonoccupied structure.

1 XX 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 XX 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 = 13 uR/h
HOG = 158 uR/h



Bendix
Aerospace

Bendix Field Engineering Corporation
P. O. Box 1569
Grand Junction, CO 81502-1569
Telephone (303) 242-8621
Telex: 454-338

April 25, 1985

Colorado Department of Health
222 S. 6th St.
Grand Junction, Colorado 81501

ATTN: Elaine Brummett

Dear Elaine:

The following comments are in order regarding the
Technical Review held on April 17, 1985 for DOE ID No.
GJ-05884-MA, 613 1/2 28 3/4 Road.

1. The southwest corner of the shed is inaccessible due to immobile obstructions.
2. North of the house next to the outside wall an auger hole was drilled and logged. A delta measurement was taken approximately 10' away from the southeast corner of the house. It showed no elevated readings.
3. Location #3 is shown on Figure 3.4a.
4. Surface gamma measurements in the area of the water line did not warrant further investigation.
5. A surface and a 6 inch delta measurement was taken in the planter northeast of the house indicating that contamination did not extend into the planter.
6. After reviewing the data taken at Location #20; a better assessment of the depth of contamination in Area J would be 18 inches. Figure 3.5b will be altered to reflect the change.

Colorado Department of Health
April 25, 1985
Page 2

If you have any questions or comments, please contact
me at 242-8621, ext. 462. Thank you for your time and
comments.

Very truly yours,

Billie J. Joust for David Dille
David G. Dille
RAD Technician

ALLIED Bendix
Aerospace

Bendix Field Engineering Corporation
Grand Junction Operations
Grand Junction, Colorado

Date: April 9, 1985

To: Files

From: David Dille

Subject: Team Leader Notes - GJ-05884-MR

Address: 613 1/2 28 3/4 Road

Owner: Floyd C. Carpenter

Occupancy: 4

Team Members

D. Dille (Team Leader)
M. Dexter
S. Southern
C. Adams
D. Bell

D. Martz
B. Beltz
P. Tuhey
B. Wilkins
M. Duran

Date: March 12, 1985

Colorado Department of Health (CDH) and Oak Ridge National Laboratory (ORNL) data indicate contamination in the yard. A Building Permit Survey was performed by CDH in August, 1984. Tailings from around the building site were removed at that time. The construction consisted of the removal of a garage on the west, expanding the existing structure in the same direction, and adding a second story to the home.

Mr. and Mrs. Carpenter informed us that all remaining contamination was away from the house. The survey was allowed to proceed with no restrictions. This house was originally built in 1955. The Carpenter's have owned this home since 1976, and have lived in the remodeled house for approximately two weeks. The remodeling contractor was Clark Sperber. The property size is 160-feet by 290-feet.

Team Leader Notes
David Dille
GJ-05884-RS
April 9, 1985
Page 2

All of the property was gamma scanned, including the horse corral and the crawl space.

All interiors were investigated. The shed has elevated gamma readings. A core and soil sample were taken at this shed and the hole was logged.

There is an out cropping of Mancos shale on this property with a contact gamma reading of 150 cps. Several samples of this shale were obtained.

All personnel were frisked.

Revisit

Team Members

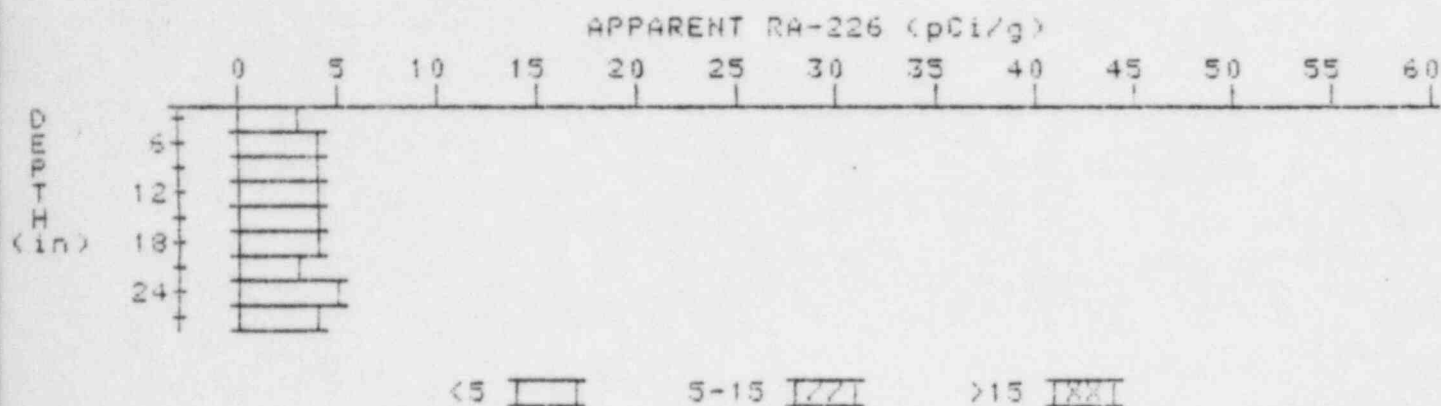
M. Duran
D. Dille (Team Leader)

Date: April 9, 1985

A return visit was made to take delta measurements in the shed and rear yard.

APPARENT RADIUM-226 CONCENTRATION 3 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-05884-MR
HOLE NUMBER: 3
LOCATION: 270240



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.4	3.4
6	3.7	4.2
9	3.7	3.7
12	3.7	3.5
15	3.8	4.0
18	3.8	3.8
21	3.8	3.3
24	4.1	4.6
27	4.1	4.1

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

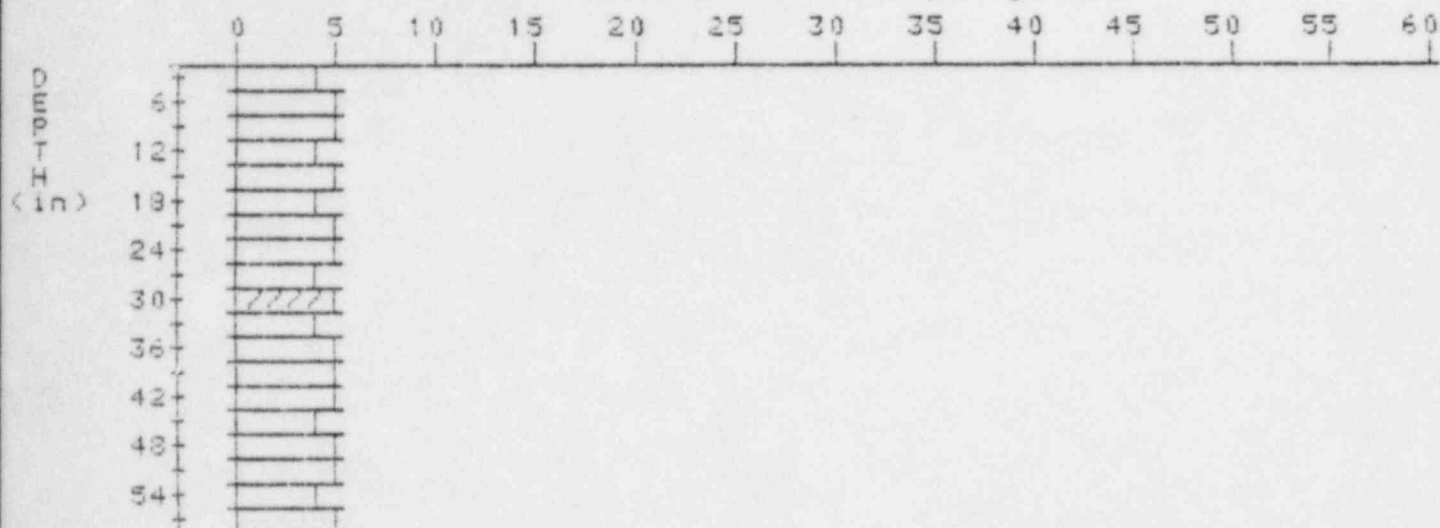
5

PROPERTY NUMBER: GJ-05884-MR

HOLE NUMBER: 5

LOCATION: 155260

APPARENT RA-226 (pCi/g)



<5 5-15 >15

Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.4	4.4
6	4.5	4.7
9	4.5	4.7
12	4.4	4.0
15	4.5	4.7
18	4.5	4.3
21	4.6	4.8
24	4.6	4.6
27	4.6	4.4
30	4.7	5.1
33	4.6	4.2
36	4.7	4.9
39	4.7	4.7
42	4.7	4.9
45	4.6	4.4
48	4.6	4.6
51	4.6	4.8
54	4.5	4.3

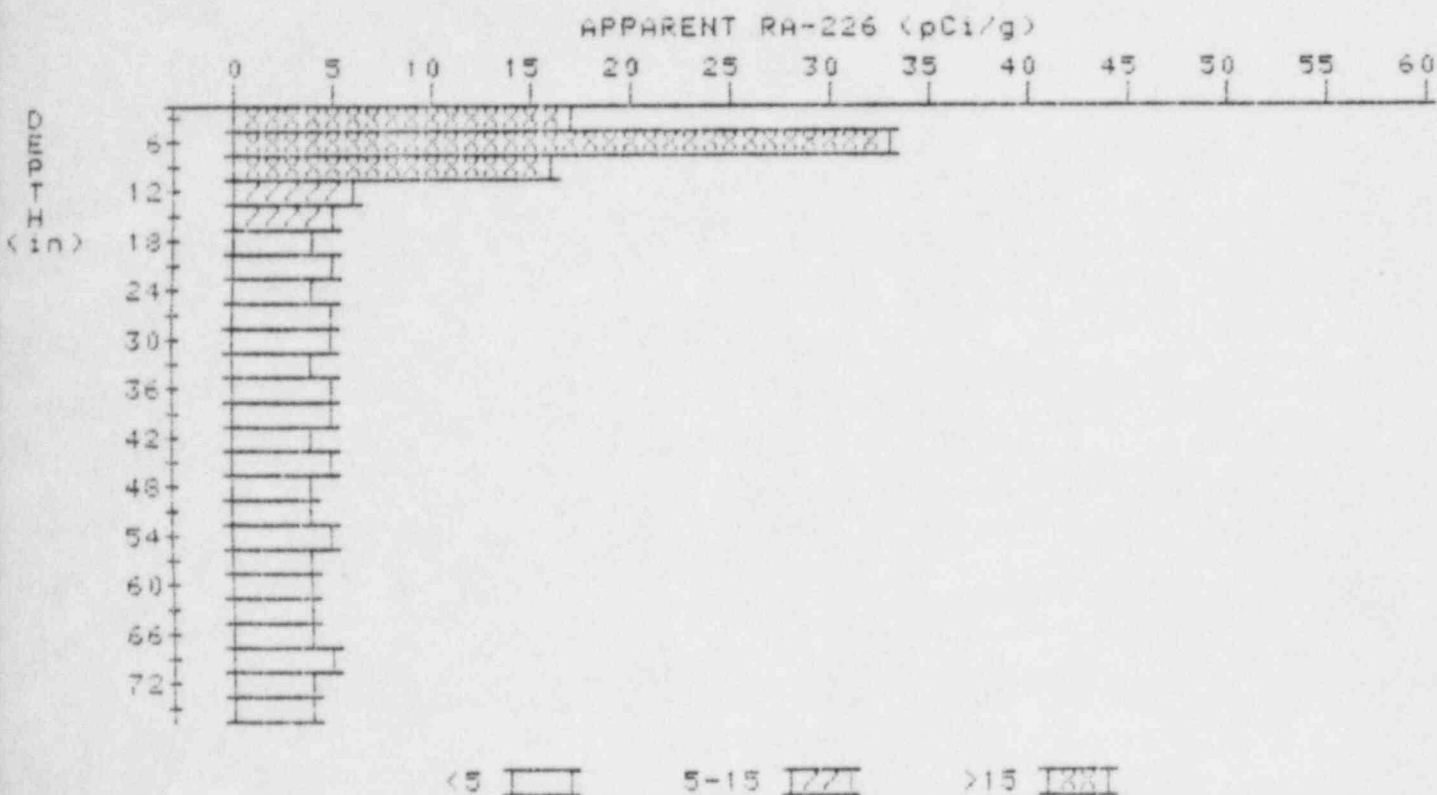
37

4.5

4.5

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 8

PROPERTY NUMBER: GU-05884-MR
HOLE NUMBER: 8
LOCATION: 160240



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	16.8	16.8
6	19.6	32.8
9	15.0	15.9
12	9.9	5.6
15	7.2	5.1
18	5.7	4.1
21	5.1	4.6
24	4.8	4.4
27	4.7	4.7
30	4.6	4.6
33	4.5	4.6
36	4.5	4.5
39	4.5	4.7
42	4.4	4.2

45
48
51
54
57
60
63
66
69
72
75

4.4
4.3
4.3
4.4
4.3
4.2
4.2
4.2
4.3
4.2
4.2

4.6
4.1
4.1
4.8
4.3
4.0
4.2
4.0
4.7
4.2
4.1

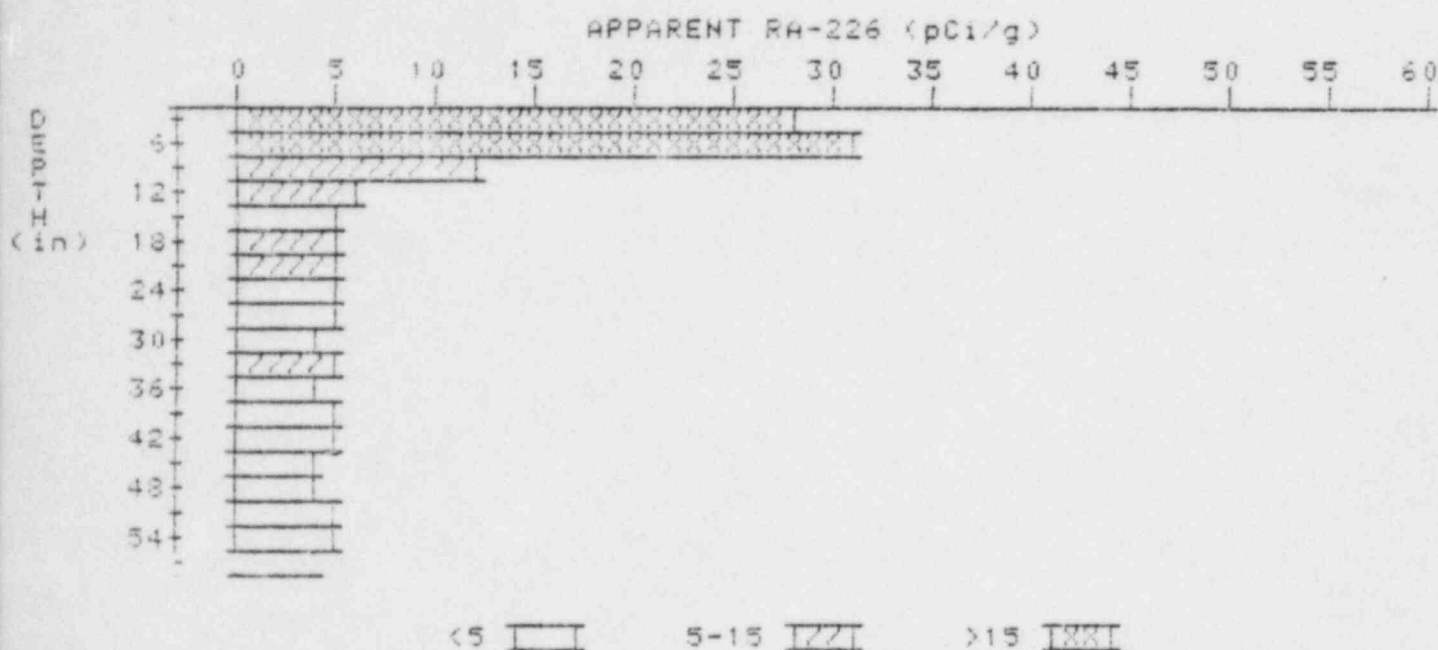
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

9

PROPERTY NUMBER: GJ-05884-MR

HOLE NUMBER: 9

LOCATION: 166233



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	28.3	28.3
6	24.1	30.9
9	16.1	11.7
12	10.6	6.2
15	7.6	4.6
18	6.3	5.2
21	5.6	5.2
24	5.1	4.6
27	4.9	4.9
30	4.7	4.3
33	4.7	5.1
36	4.5	4.0
39	4.6	5.0
42	4.5	4.5
45	4.4	4.4
48	4.3	3.9
51	4.4	4.6
54	4.4	4.6

57

4.3

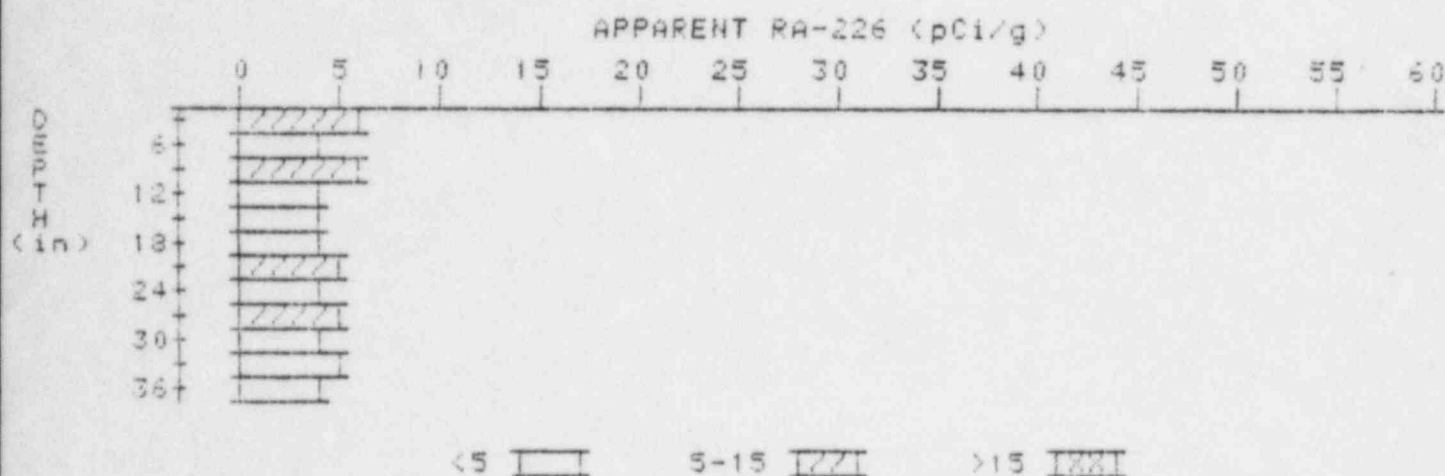
4.3

APPARENT RADIUM-226 CONCENTRATION 11 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-05084-MR

HOLE NUMBER: 11

LOCATION: 190225



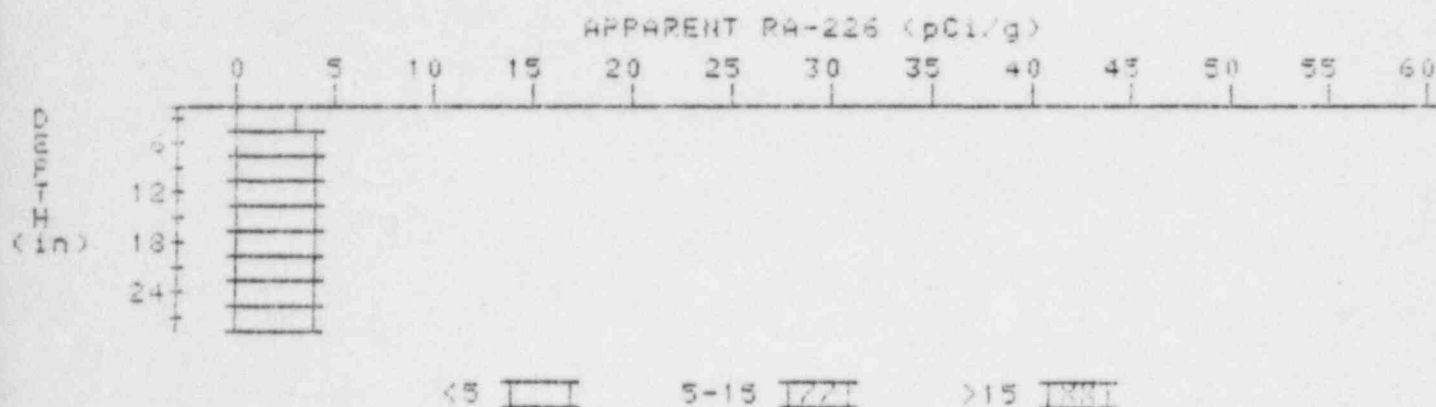
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.7	5.7
6	5.2	4.5
9	5.1	5.6
12	4.7	4.2
15	4.6	4.4
18	4.6	4.4
21	4.7	5.2
24	4.5	3.8
27	4.7	3.2
30	4.6	4.4
33	4.6	5.0
36	4.4	4.4

APPARENT RADIUM-226 CONCENTRATION 12 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-05684-MR

HOLE NUMBER: 12

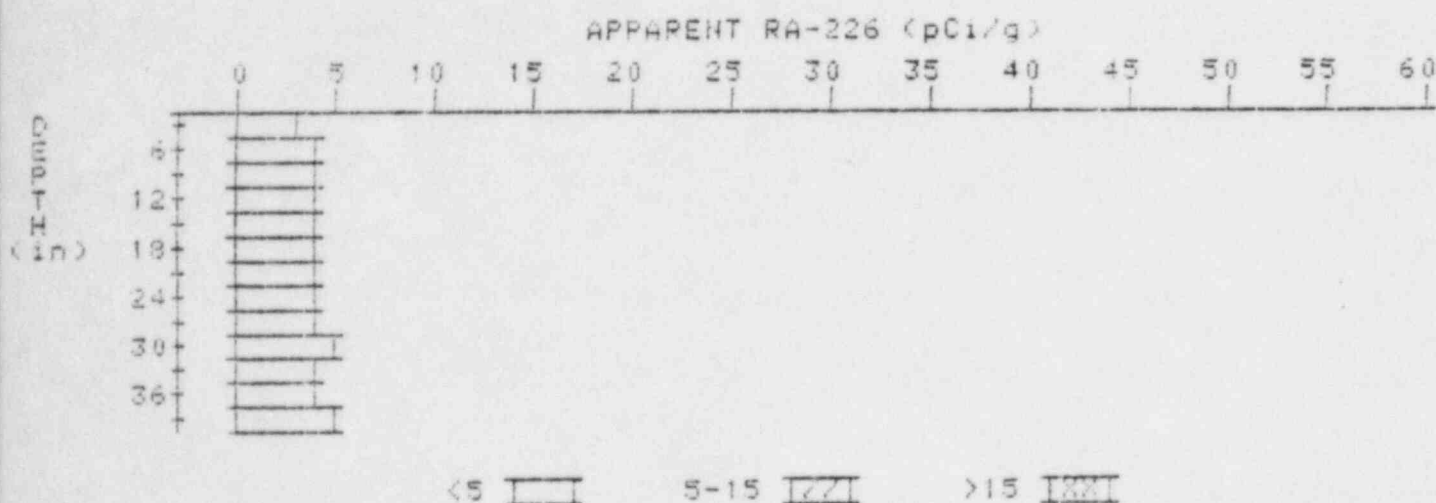
LOCATION: 190260



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.1	3.1
6	3.6	4.1
9	3.8	4.0
12	3.9	4.1
15	3.9	3.9
18	3.9	3.7
21	4.0	4.2
24	4.0	4.0
27	4.0	4.0

APPARENT RADIUM-226 CONCENTRATION 13 DECONVOLUTION GRAPH

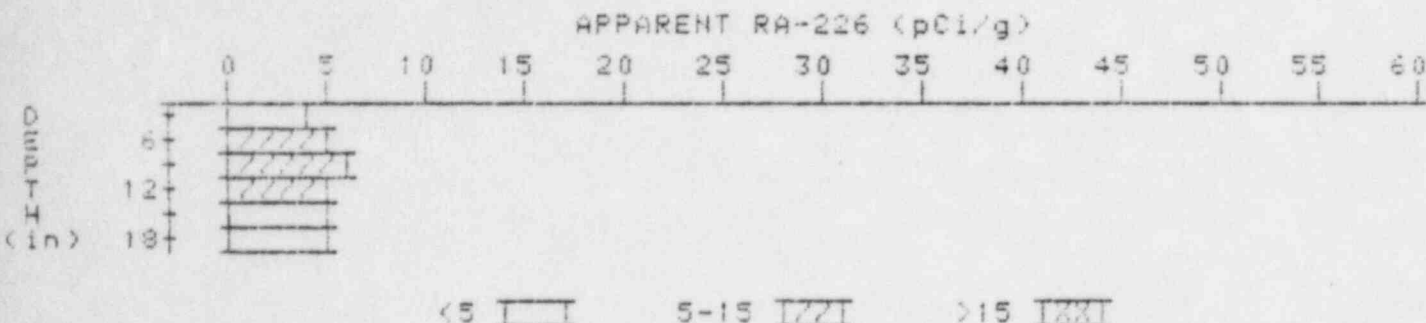
PROPERTY NUMBER: GJ-05884-MR
HOLE NUMBER: 13
LOCATION: 193239



Depth (in)	Apparent Radium-226 (pCi/g)	Apparent Radium-226 (pCi/g)
	Undeconvolved	Deconvolved
3	3.1	3.1
6	3.5	3.9
9	3.7	3.9
12	3.8	3.8
15	3.9	3.7
18	4.1	4.3
21	4.2	4.4
24	4.2	4.0
27	4.3	4.3
30	4.4	4.6
33	4.4	4.4
36	4.4	4.2
39	4.5	4.3

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

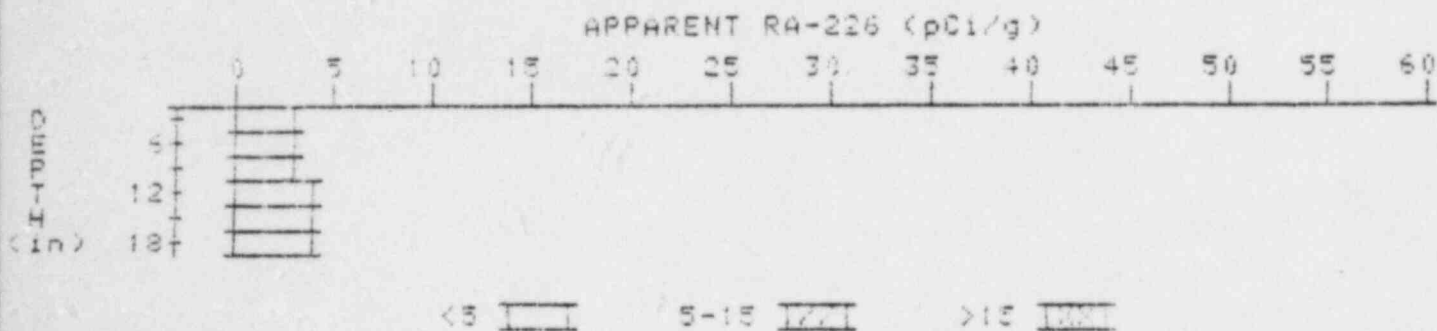
PROPERTY NUMBER: GJ-05864-MR
HOLE NUMBER: 15
LOCATION: 220279



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.4	4.4
6	4.8	5.2
9	5.0	5.5
12	4.9	5.1
15	4.7	4.7
18	4.5	4.5

APPARENT RADIUM-226 CONCENTRATION 17 DECONVOLUTION GRAPH

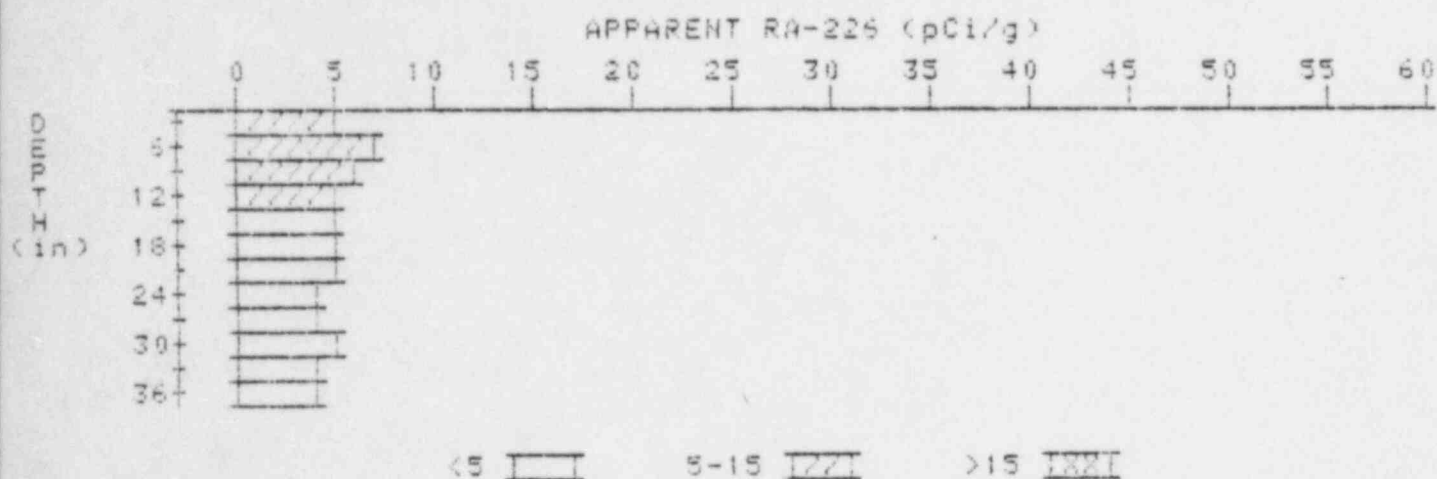
PROPERTY NUMBER: GJ-05884-MR
HOLE NUMBER: 17
LOCATION: 226253



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.0	3.0
6	3.2	3.2
9	3.4	3.2
12	3.7	4.2
15	3.7	3.5
18	3.3	3.3

APPARENT RADIUM-226 CONCENTRATION 21 DECONVOLUTION GRAPH

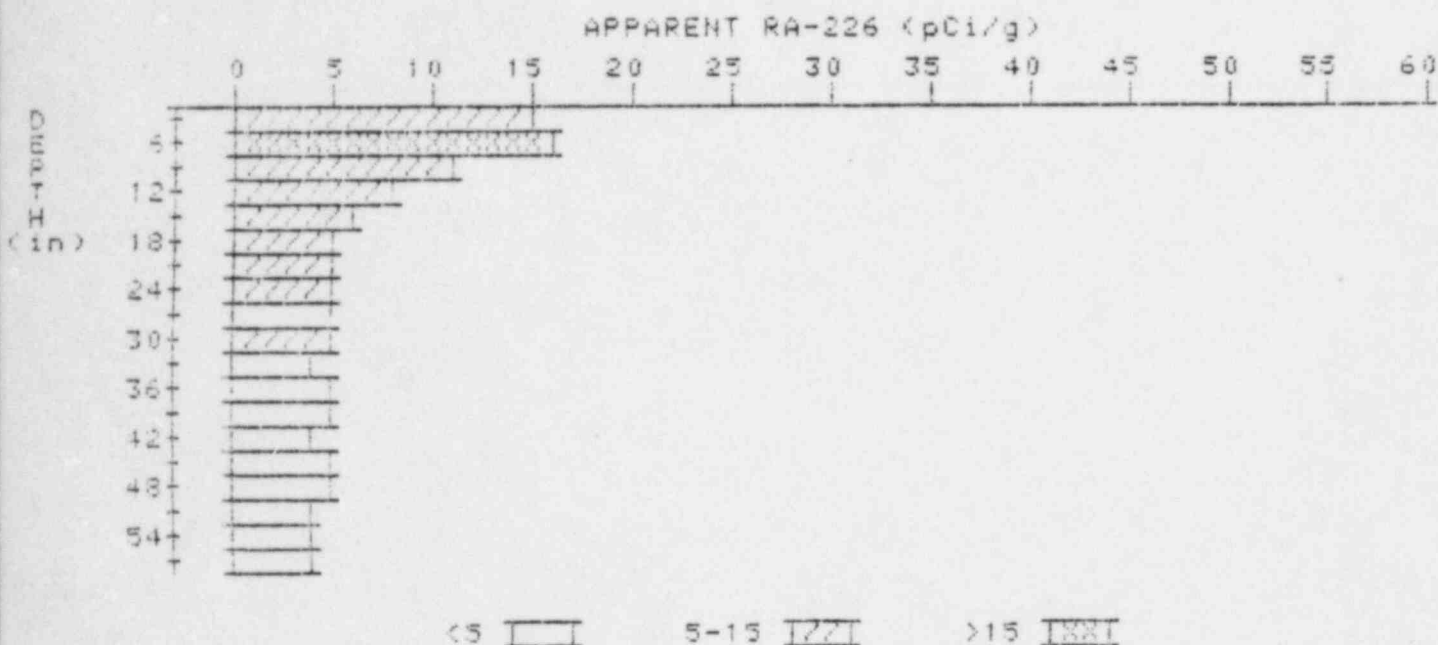
PROPERTY NUMBER: GJ-05084-MR
HOLE NUMBER: 21
LOCATION: 260236



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.0	5.0
6	5.6	5.6
9	5.5	5.9
12	5.2	5.2
15	4.9	4.7
18	4.7	4.7
21	4.5	4.5
24	4.3	4.1
27	4.2	3.8
30	4.3	4.7
33	4.2	4.0
36	4.2	4.2

APPARENT RADIUM-226 CONCENTRATION 22 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-05864-MR
HOLE NUMBER: 22
LOCATION: 270220



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	14.8	14.8
6	13.8	16.5
9	11.3	10.9
12	9.0	8.3
15	7.1	5.5
18	6.1	5.2
21	5.6	5.2
24	5.3	5.3
27	5.0	4.6
30	4.9	5.1
33	4.7	4.3
36	4.7	4.9
39	4.6	4.6
42	4.5	4.3
45	4.5	4.3
48	4.5	4.7
51	4.4	4.4
54	4.3	3.9

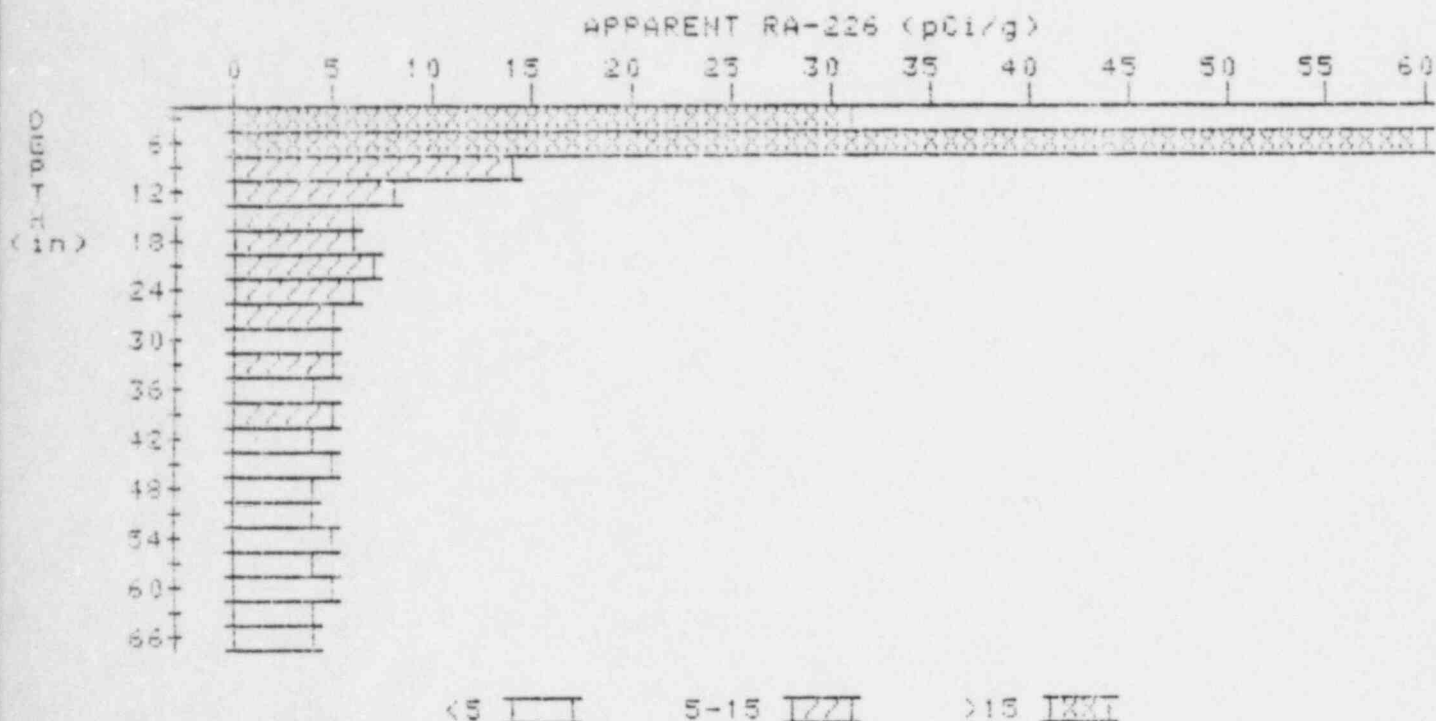
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

1

PROPERTY NUMBER: GJ-05884-MR

HOLE NUMBER: 1

LOCATION:



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	31.0	31.0
6	35.0	64.9
9	22.2	13.7
12	14.2	7.6
15	9.9	5.8
18	7.9	6.1
21	6.9	6.3
24	6.1	5.6
27	5.6	5.4
30	5.2	4.8
33	5.0	5.0
36	4.8	4.4
39	4.8	5.2
42	4.6	4.2
45	4.6	5.0
48	4.4	4.2

51
54
57
60
63
66

4.3
4.4
4.4
4.4
4.3
4.4

3.9
4.6
4.4
4.6
3.9
4.4