

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-08611-MR
ADDRESS: 204 COUNTRY CLUB PARK 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
Grand Junction, Colorado 81502

APPROVED BY

Michael H. Tucker

M. TUCKER
DOE PROJECT ENGINEER

DATE

June 24, 1985

REA08611:REA-607

8507150427 850625
PDR WASTE PDR
WM-54

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

The location, DOE ID No. GJ-08611-MR, is a single-family residence located at 204 Country Club Park 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

It is recommended that no remedial action be performed on this property (as discussed in Section 4.0) and that a Property Completion Report be prepared for use in the DOE certification process. The identified residual radioactive material found on this property is tailings; the estimated volume is: exterior, 5 cu. yd.; interior, 4 cu. yd.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 204 Country Club Park Road

Zoning: Residential

Lot Size: Approximately 23,700 sf (0.54 acre)

Legal Description: Lot 4 Replat of Block 2 Country Club Park Subdivision; Section 21 1S 1W, City of Grand Junction, County of Mesa, State of Colorado.

Point of Reference: This property is located approximately 2.5 miles west of the State of Colorado Tailings Repository. Appendix Figure 2.1 shows the property location relative to its surroundings.

Utilities: Utility locations are shown in Appendix Figure 2.2.

Electrical:	Overhead
Gas:	Underground
Telephone:	Overhead
Sewer:	Underground
Water:	Underground
Cable TV:	Overhead

Bordering Properties:

North:	Single-family residence
South:	Single-family residence
East:	Single-family residence
West:	Country Club Park Road

2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-story residence
Size:	Approximately 3,300 sf
Construction Date:	1946
Construction:	Wood-frame
Foundation:	Concrete slab-on-grade
Footing Depth:	Approximately 14" to bottom of footing from grade
Basement:	None
Crawl Space:	None
Condition:	Good

Other Structures:

Type:	Metal shed
Size:	Approximately 130 sf
Construction:	Metal
Foundation:	Wood mud-sill
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-08611-MR on April 18, 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 elevated gamma readings on the concrete slab of the porch, sidewalk, and garage.

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: 14 to 16 uR/h
Highest Outside Gamma Reading (HOG): 27 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: 13 to 17 uR/h
Highest Inside Gamma Reading (HIG): 30 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 Figure 3.3 shows 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 3.3 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: 0.011 gross working level (WL). No additional 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 5-inch-thick concrete porch slab is contaminated (approximately 255 sf).
- (AREA B) A 5-inch-thick concrete sidewalk, contiguous to the north side of Area A, is contaminated (approximately 30 sf).
- (AREA C) The 4-inch-thick concrete sidewalk, adjacent to the east side of Area A, is contaminated (approximately 60 sf).
- (AREA D) Northeast of the primary structure, the 32-inch high cinderblock wall is contaminated (approximately 145 sf).

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

We do not recommend decontamination and restoration of this property. It is recommended that no remedial action be performed and that a brief Property Completion Report be prepared for use in the DOE certification process.

4.2 Evaluation of Recommended Remedial Action

The recommendation that no remedial action be performed on this property is made because the levels of radioactivity on this property fall below the EPA standards (40 CFR 192):

The concentration of Radium-226 in soil averaged over any area of 100 square meters shall not exceed the background level by more than -

- (1) 5 pCi/g, averaged over the first 15 cm of soil below the surface, and
- (2) 15 pCi/g, averaged over 15-cm-thick layers of soil more than 15 cm below the surface.

Neither the interior RDC working level nor the highest interior gamma reading exceeds EPA Standard.

Appendix Table 4.1 presents the area and volume calculations of contamination present on the property. Appendix Table 4.2 presents the calculations for concentrations of Radium-226 in soil for this location.

5.0 REFERENCES

ARIX, A Professional Corporation, Procedures Manual for the Grand Junction Remedial Action Program, for Colorado Department of Health, Radiation Control Division, and the U.S. Department of Energy, 1983.

Bendix Field Engineering Corporation, Procedures Manual Radiologic Support Operations Grand Junction Vicinity Properties, (GJ-07), for U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, 1984.

Bendix Field Engineering Corporation, Engineering, Construction, and Land Support Manual Grand Junction Vicinity Properties Project, (GJ-08), for U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, 1984.

Bendix Field Engineering Corporation, Grand Junction Vicinity Properties Operating Manual, (GJ-16) for U.S. Department of Energy, Nuclear Energy Programs, Division of Remedial Action Projects, UMTRA, 1984.

Bendix Field Engineering Corporation, Vicinity Properties General Construction Specification, for U.S. Department of Energy, Nuclear Energy Programs, Division of Remedial Action Projects, UMTRA, 1984.

Bendix Field Engineering Corporation, Environmental Assessment of Preliminary Cleanup Activities at Offsite Properties Contaminated by Tailings from the Grand Junction Inactive Uranium Millsite, (GJ-04), for U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations, Albuquerque, New Mexico, 1983.

U.S. Department of Energy, Programmatic Memorandum of Agreement (DOE No. DE-GM04-84AL28460) between the U.S. Department of Energy, the Advisory Council on Historic Preservation, and the Colorado State Historic Preservation Officer, for UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, 1984.

U.S. Department of Energy, Vicinity Properties Management and Implementation Manual, for UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, 1984.

U.S. Environmental Protection Agency, Standards for Remedial Action at Inactive Uranium Processing Sites (40 CFR Part 192), Washington, D.C., 1983.

6.0 APPENDIX

This Appendix contains the following:

Appendix Tables:

Table 3.1	Radium Concentrations at Exterior Locations
Table 3.2	Radium Concentrations at Interior Locations
Table 3.3	Summary of Interior Gamma Exposure Rates
Table 4.1	Area and Volume Calculations
Table 4.2	Calculations for Concentration of Radium-226 in Soil

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 3.3	Interior Gamma Exposure Rates and Sample Locations
Figure 3.4	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 #GJ-08611-MR

204 Country Club Park Road

Page 1 of 2

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
3	195254	18	DS	<1.0		*	Sewer line/north primary structure
4	215182	10	DS	<1.0		*	Gas line
5	223249	[06]	DS	1.0		*	North side of patio wall
		00	DS	2.6		*	
6	230249	[24]	DS	1.2		*	Base of stucco wall On stucco wall
		00	DS	<1.0		*	
7	234181	36	DS	<1.0		*	Water line/south of primary structure
8	235213	00	DS	<1.0		*	North end of garage
		[18]	GS		1.3	*	
		00	GS		4.0	*	
9	236186	00	DS	<1.0		*	West side by garage door
10	237244	[06]	DS	2.3		*	East side wall of the patio
		00	DS	<1.0		*	
11	237245	06	DS	<1.0		*	Base of stucco wall
12	240220	00-04	SS			15.4	Core
		04-10	SS			1.2	Soil under sidewalk
		03	TC	5.9		*	DC = 4 inches
		06	TC	4.6		*	Based on the soil sample analyses
		09	TC	3.6		*	
		12	TC	3.0		*	
		15	TC	2.8		*	
		18	TC	3.0		*	
		21	TC	3.1		*	
		24	TC	3.3		*	
		27	TC	3.3		*	
13	242240	00	DS	<1.0		*	East wall of patio
		12	GS		3.0	*	
14	248237	[18]	GS		3.1	*	Wall of the patio
		[12]	GS		3.0	*	
		00	DS	<1.0		*	

Radium Concentrations at Exterior Locations

DOE ID #GJ-08611-MR

204 Country Club Park Road

Page 2 of 2

Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
15	254213	[06]	DS	<1.0		*	West side wall of garage
		00	DS	<1.0		*	
16	254228	00	DS	<1.0		*	
17	255223	[03]	SS			9.5	Mortar patio wall
18	258188	[12]	DS	1.7		*	East wall of garage
		00	DS	2.3		*	
19	258211	[18]	DS	1.4		*	East wall of garage
		00	DS	1.9		*	
20	258216	[06]	GS		3.7	*	Wall of patio
		00	DS	<1.0		*	
21	270170	00	DS	<1.0		*	Background
		00	GS		1.1	*	
		00-06	SS			<1.0	DC = 0 inches
		03	TC	2.5		*	
		06	TC	2.5		*	
		09	TC	2.4		*	
		12	TC	2.3		*	
		15	TC	2.3		*	
		18	TC	2.6		*	
		21	TC	2.9		*	
		24	TC	2.9		*	
		27	TC	2.8		*	
		30	TC	2.9		*	

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 = 04-18-85

Team Leader = TDH

Radium Concentrations at Interior Locations

DOE ID #GJ-08611-MR

204 Country Club Park Road

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		00-05	SS			15.5	Core
		05-11	SS			2.3	Clay & gravel
		03	TC	7.2		*	Inside screen
		06	TC	5.5		*	porch
		09	TC	3.9		*	DC = 5 inches
		12	TC	3.4		*	Based on the soil
		15	TC	3.0		*	sample analyses
		18	TC	3.1		*	
		21	TC	3.2		*	
		24	TC	3.4		*	
		27	TC	3.5		*	
		30	TC	3.6		*	
2		00	DS	<1.0		*	In garage

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 = 04-18-85
 Team Leader = TDH

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)
PORCH	11	11-24	19	11	24-30	27
GROUND FLOOR	*	*	*	*	13-17	*
GARAGE	*	*	*	*	13-16	*
SHED	*	*	*	*	12-13	*

=====

*Interior walking gamma scans were performed to confirm the absence of contamination. These areas and the ranges of gamma readings, as well as the exposure rates in the porch, are shown in Appendix Figure 3.3.

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-08611-MR

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>
INTERIOR									
A	15 x 17	=	255	x	0.4	=	102	=	102/27 = 4
EXTERIOR									
B	10 x 3	=	30	x	0.4	=	12		
C	20 x 3	=	60	x	0.3	=	18		
D	58 x 2.5	=	145	x	0.7	=	102		
							132	=	132/27 = 5
TOTAL VOLUME - EXTERIOR									= 5
TOTAL VOLUME - INTERIOR									= 4

See Appendix Figures 3.5a and 3.5b For Areas

$$C_{avg} = \frac{C_c \times A_c + C_b (100m^2 - A_c)}{100m^2}$$

Where

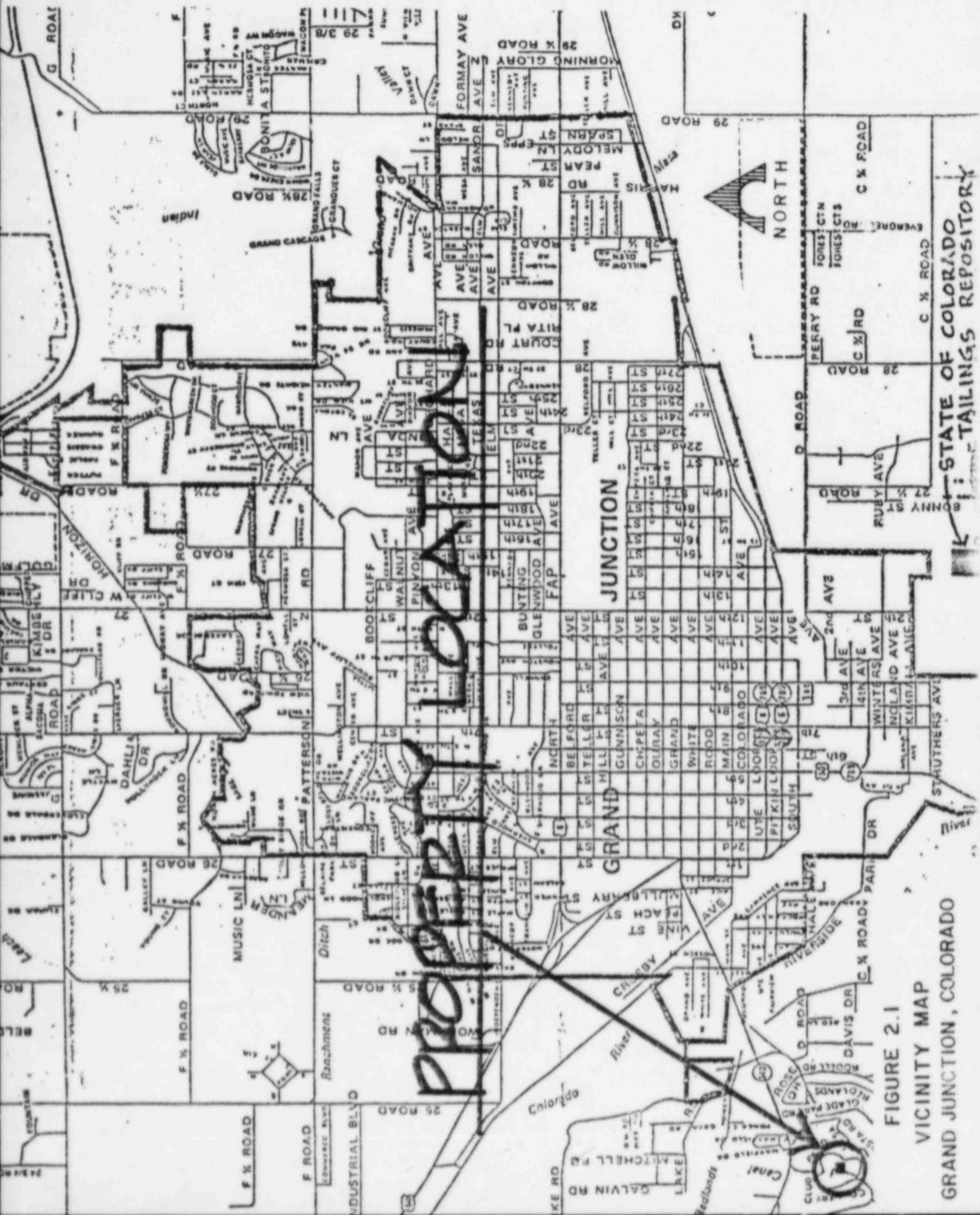
- C_{avg} = Concentration average (pCi/g)
- C_c = Concentration of Contamination (pCi/g)
- A_c = Area of Concentration (m^2)
- C_b = Background Concentration (pCi/g)

$$C_{avg} = \frac{21.84 \times 15.4 + 2 (100 - 21.84)}{100}$$

$$C_{avg} = 4.93 < 7$$

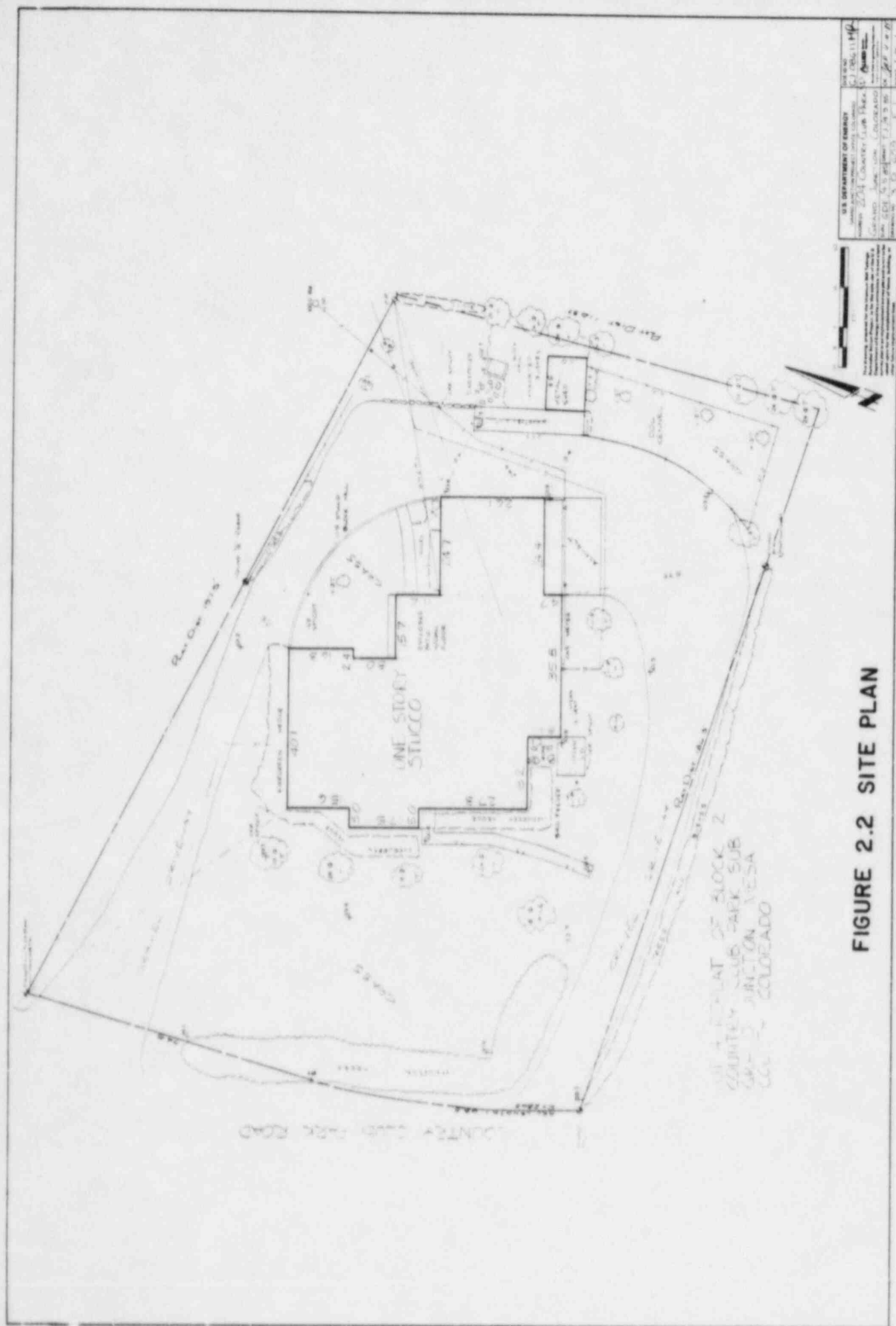
Therefore, concentration does not meet EPA Standards of 7 pCi/g

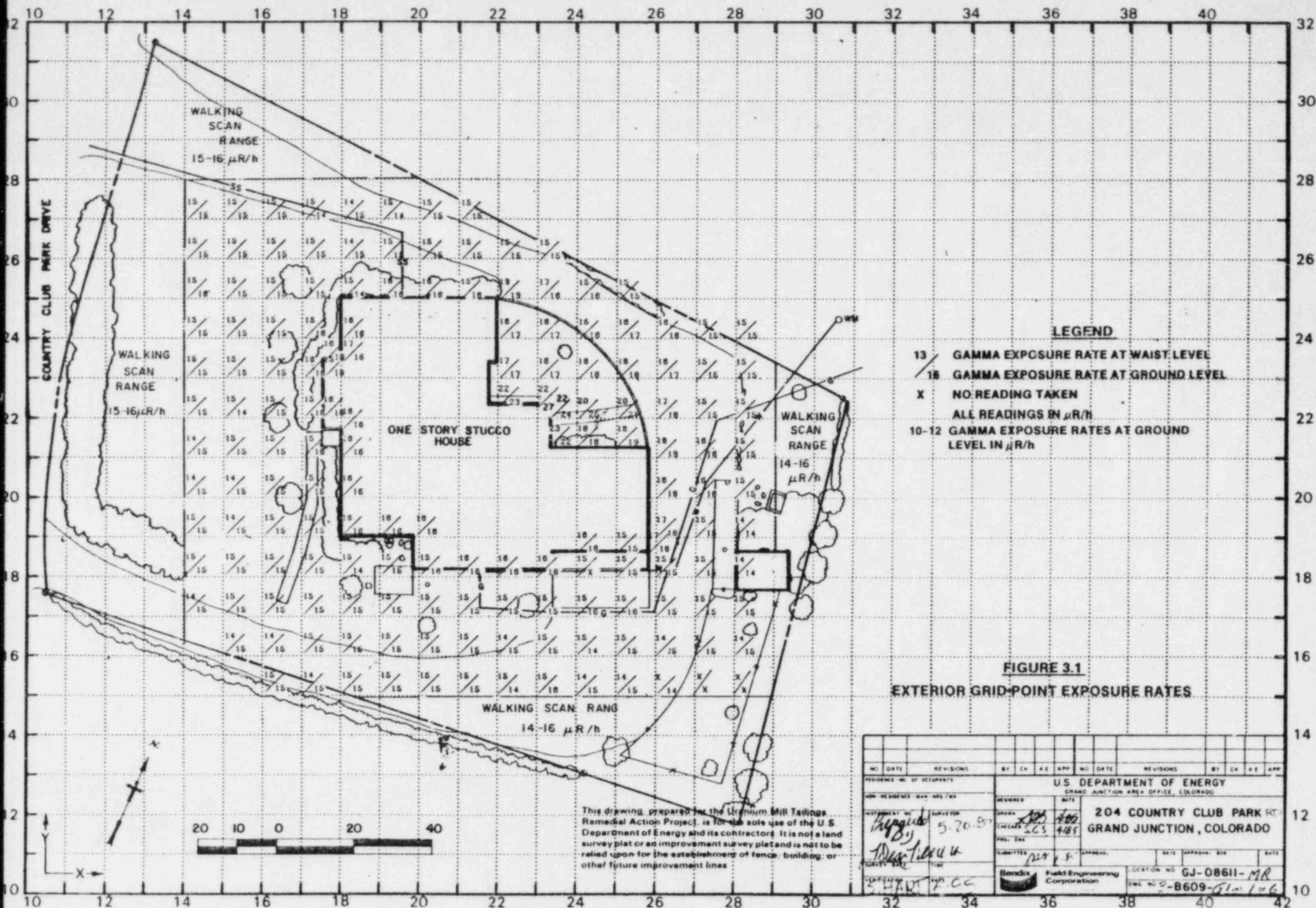
NOTE: Background Radium concentration for this area is 2 pCi/g



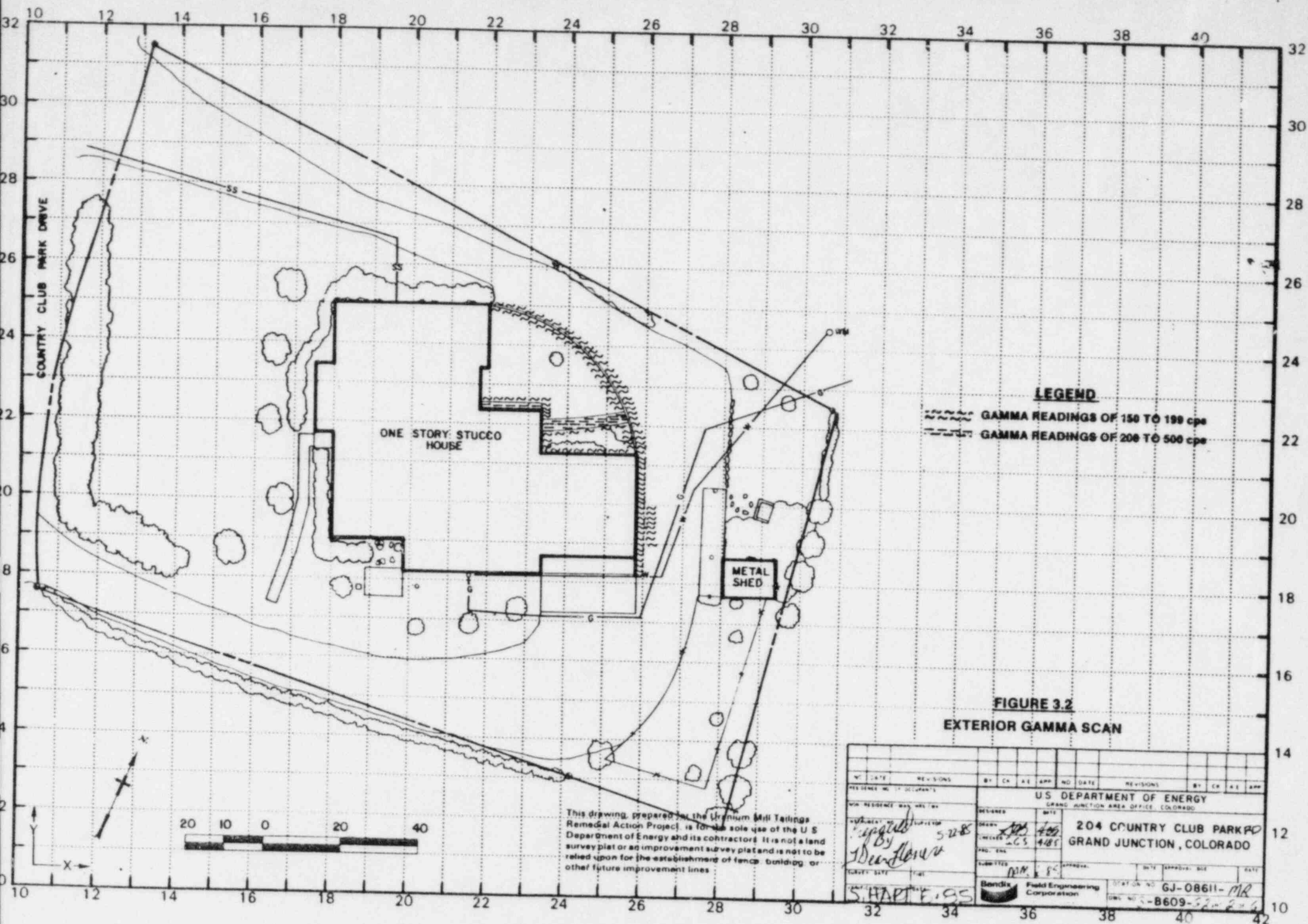
STATE OF COLORADO
TAILINGS REPOSITORY

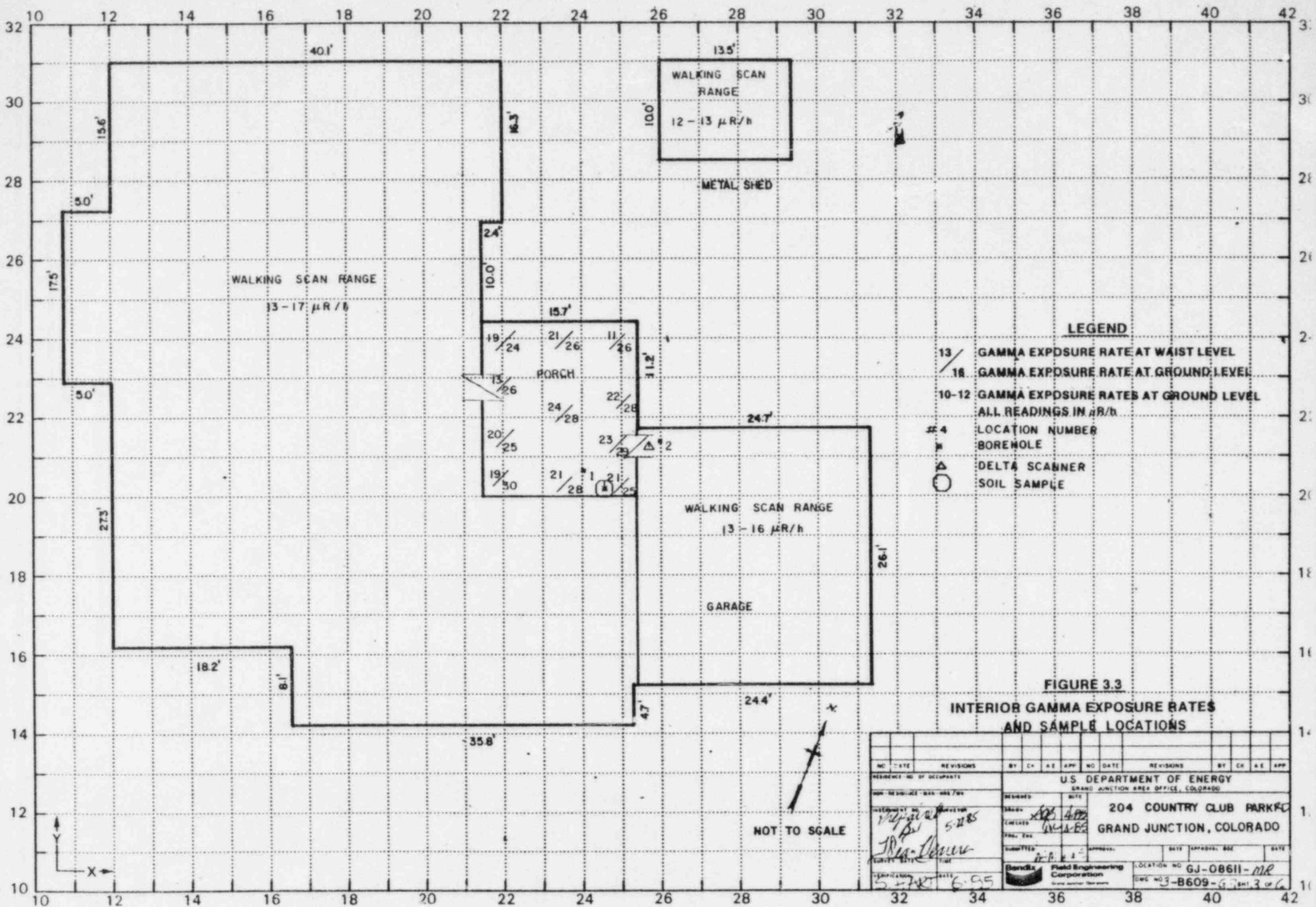
FIGURE 2.1
VICINITY MAP
GRAND JUNCTION, COLORADO

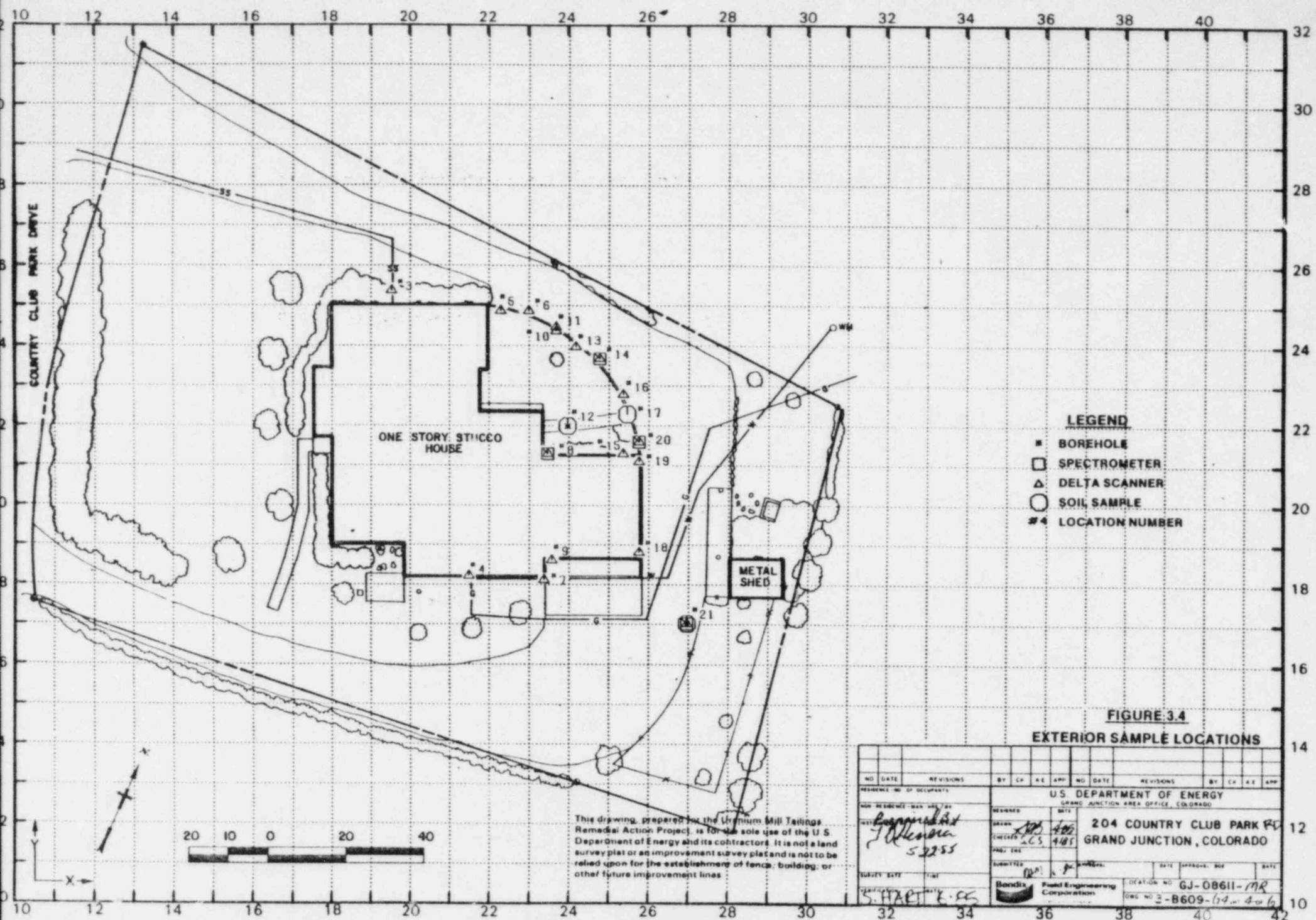


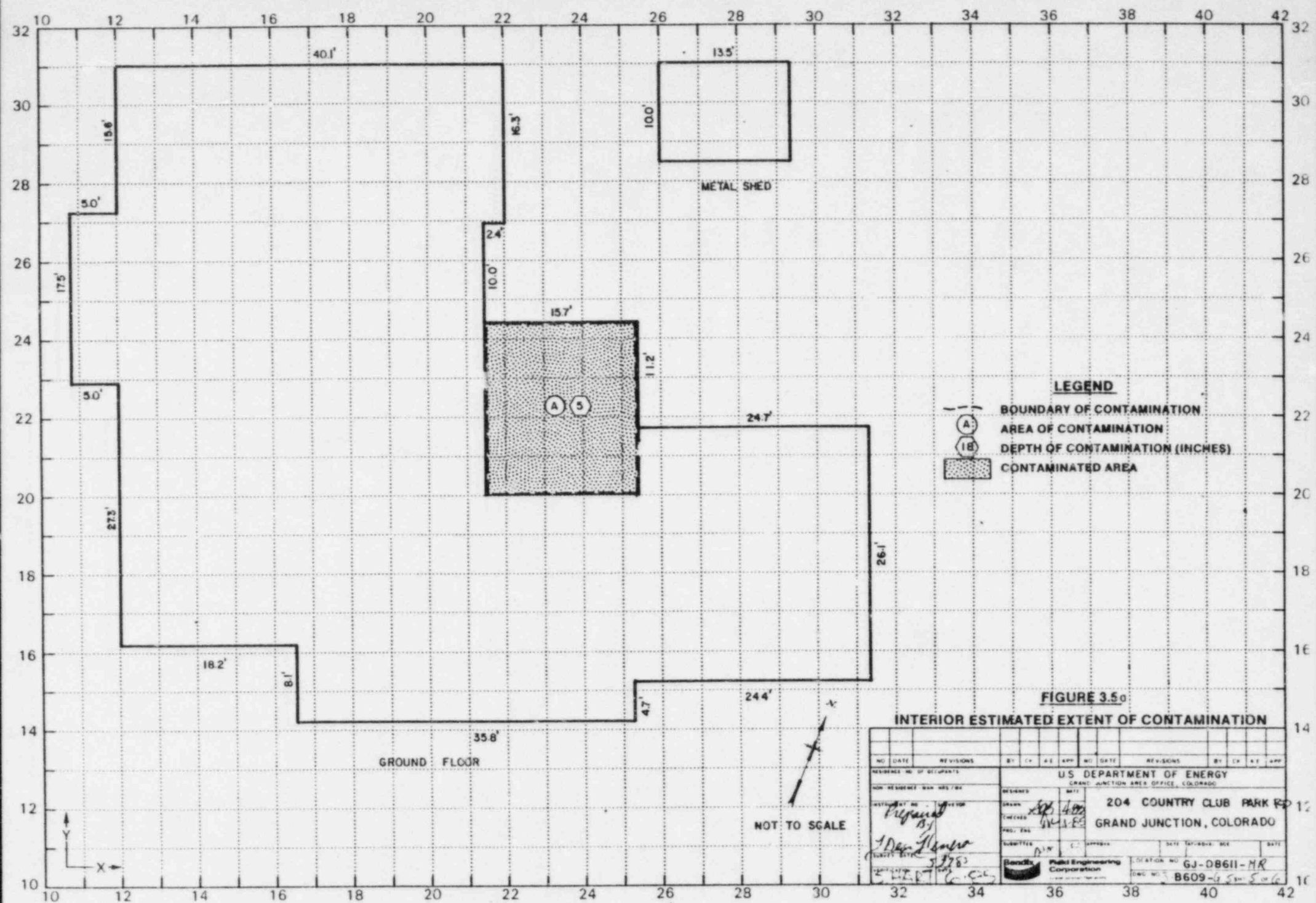


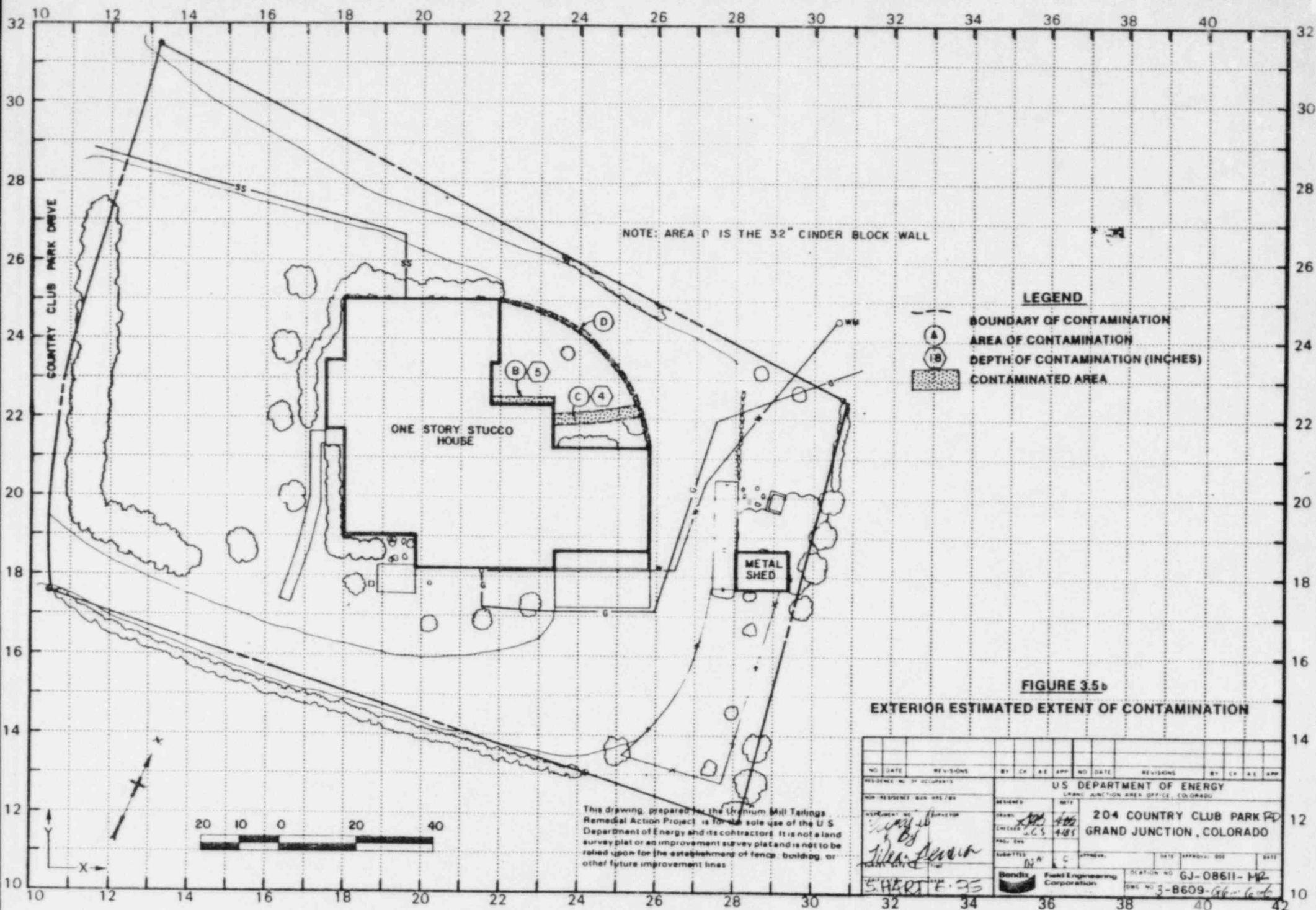
NO. DATE		REVISIONS		BY	CHK	APP	NO. DATE	REVISIONS		BY	CHK	APP
RESIDENCE NO. OF OCCUPANTS												
U.S. DEPARTMENT OF ENERGY GRAND JUNCTION AREA OFFICE, COLORADO												
204 COUNTRY CLUB PARK RD. GRAND JUNCTION, COLORADO												
NON-RESIDENCE MAY 1975/76		REMOVED		DATE		CHG. NO.		DATE		DATE		
5-70-9		400		4/85		400		4/85		4/85		
SUBMITTER		DATE		APPROVED		DATE		APPROVED		DATE		
Bonds		Field Engineering Corporation		LOCATION NO.		GJ-08611-MR		DATE		DATE		
5-70-9		F.C.C.		B609-61		10/6						











GJ 08611 - MR

4/29/85

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

Official Survey Report

Property Address 204 Country Club Park ^{ROAD} ~~Drive~~ mg 6-17-85
Property Owner Richard Swerdfeger
Address of Owner (if different from above) Same As Above
Report Prepared By T.D. Herrera

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 = 30 uR/hr

HOG = 27 uR/hr



Bendix
Aerospace

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

May 21, 1985

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

ATTN: Chuck Thornberg

Dear Chuck:

The following is in response to your questions and comments during the Technical Review concerning Department of Energy (DOE) Identification (ID) number GJ-08611-MR, conducted 18 April 1985.

1. A revisit was made to the property. Stucco and mortar samples were obtained from the 32-inch high wall and sent to the petrology and chemical analysis laboratory. The analytic result had no indication of tailings in the mortar or the stucco wall. The slightly elevated reading could be associated with natural radioactive minerals such as zircon, monazite, sphene, etc., which are common (primary) accessory minerals in granite.
2. The written technical notes indicate that the water line was not located. It was questionable by Bendix surveyors as to the location of the water line location.
3. The direction of the water line is not west. The water line is south of the primary structure and has been revised in Table 3.1.

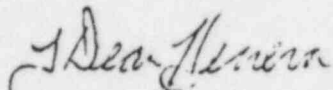
Table 3.1 and the sample location map have been changed to indicate the revised locations. You will receive a copy to update your files.

A third revisit was made 15 May 1985, to obtain a sample from the stucco wall of the patio. The wall is approximately 32-inches high. The sample was sent to the petrology and chemical laboratory for analysis.

Chuck Thornberg
Colorado Department of Health
GJ-08611-MR
May 21, 1985
Page 2

Thank you for your time and cooperation. If you should have additional questions or comments you may contact me at 242-8621, extension 280.

Very truly yours,



T. Dean Herrera
RSD Survey Team Leader

TDH:pr

CDH.LETTER:08611.HERRERA

MEMORANDUM

ALLIED Bendix
Aerospace

Bendix Field Engineering Corporation
Grand Junction Operations
Grand Junction, Colorado 81501

DATE: April 22, 1985
TO: Files
FROM: Dean Herrera
SUBJECT: Team Leader Notes - GJ-08611-MR

Address: 204 Country Club Park *Road*

Owner: Richard and Joy Swerdfeger

Occupancy: Four

Team Members

D. Herrera (Team Leader)	L. Kula
R. Herman	S. Larsen
N. Wallace	R. Wilkins
I. Caley	H. Mattison

Instruments

Crutch Scintillometers - C-3502, C-1196, C-3510, C-1163
Delta Scintillometers - C-3942, C-3935, C-3940
Total Count - C-4006
Surface Spectrometer - C-3413

Date: April 18, 1985

The team members arrived on the property at 8:45 A.M. The weather was cloudy and raining in the morning until approximately 10:00 A.M. The remainder of the day was cloudy but calm at 65 degrees.

Team Leader Notes
Dean Herrera
GJ-08611-MR
April 22, 1985
Page 2

Slightly elevated readings were located on the cinder block wall that encircles the screened porch. The estimative readings are so marginal that the wall will not require remedial action. It appears that the mortar is contaminated, not the cinder block. The underlying soil was investigated with a delta and appears to be uncontaminated.

During the interior survey, the den which houses an ore collection, showed slightly elevated gamma readings of 170 cps.

In a resultless effort to locate the water line, a 34-inch deep hole was dug. However, it appears the indicated water line on the facility map is questionable.

Concrete cores and soil samples were obtained from the porch. Also a core and soil sample was taken from the sidewalk. Colorado Department of Health and Oak Ridge National Laboratory data indicate these areas as being contaminated.

Revisit

Team Members

D. Herrera
D. Fossey

Date: April 22, 1985

A second visit was made to survey the water meter and the outside north wall.

Delta measurements were taken on the ground and on the wall of the garage. The water meter was scanned with a crutch scintillometer.

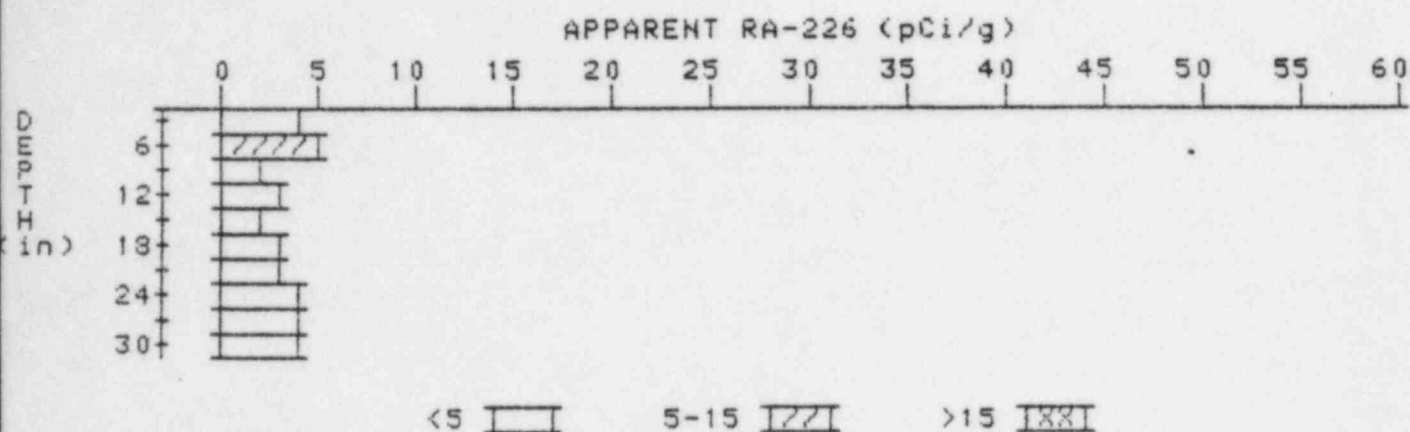
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

1

PROPERTY NUMBER: GJ-08611-MR

HOLE NUMBER: 1

LOCATION:



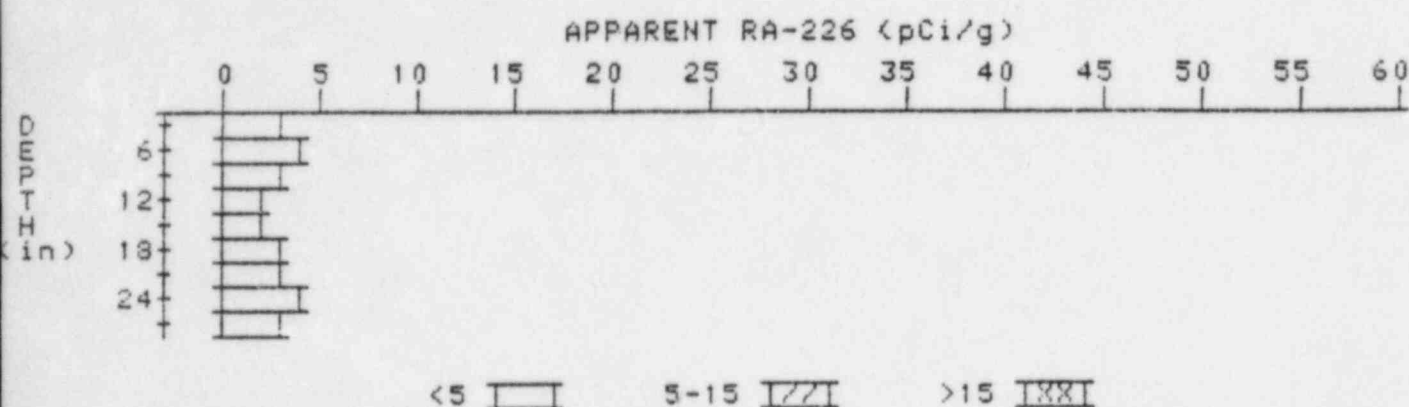
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	7.2	7.2
6	5.5	5.3
9	3.9	1.9
12	3.4	3.2
15	3.0	2.1
18	3.1	3.1
21	3.2	3.0
24	3.4	3.6
27	3.5	3.5
30	3.6	3.6

APPARENT RADIUM-226 CONCENTRATION 12 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-08611-MR

HOLE NUMBER: 12

LOCATION: 240220

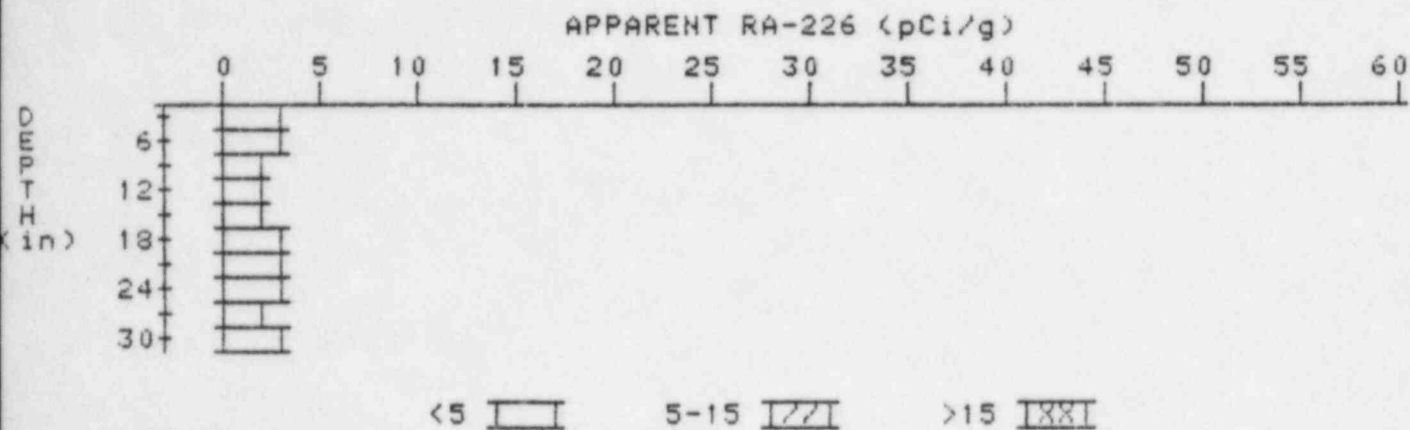


Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	5.9	5.9
6	4.6	4.1
9	3.6	2.9
12	3.0	2.3
15	2.8	2.1
18	3.0	3.2
21	3.1	2.9
24	3.3	3.7
27	3.3	3.3

APPARENT RADIUM-226 CONCENTRATION 21

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-08611-MR
HOLE NUMBER: 21
LOCATION: 270170



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.5	2.5
6	2.5	2.7
9	2.4	2.4
12	2.3	2.1
15	2.3	1.8
18	2.6	2.6
21	2.9	3.4
24	2.9	3.1
27	2.8	2.4
30	2.9	2.9