

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-03190-RS  
ADDRESS: 274 LITTLE PARK ROAD

SEPTEMBER 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

BENDIX FIELD ENGINEERING CORPORATION  
P.O. Box 1569  
Grand Junction, Colorado 81502

APPROVED BY

*Michael K. Tucker*  
M. TUCKER  
DOE PROJECT ENGINEER

DATE

*September 6, 1985*

REA03190:REA-623

8509270198 850912  
PDR WASTE  
WM-54 PDR

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## **1.0 EXECUTIVE SUMMARY**

### **1.1 Introduction**

The location, DOE ID No. GJ-03190-RS, is a single-family residence located at 274 Little 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**

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, 70 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action is \$4,454. Remedial action on this property will take approximately 14 days to complete.

## 2.0 PROPERTY DESCRIPTION

### 2.1 General Description

Address: 274 Little Park Road, Grand Junction, Colorado

Zoning: Residential (R-2-A)

Lot Size: Approximately 112,372 sf (2.6 acres)

Legal Description: Beginning at a point being the NE corner of the SW 1/4 NW 1/4 of Section 27, T1S, R1W, Ute Meridian, thence N 89° 37', W 5.27 feet, along the north line of the SW 1/4 NW 1/4 to the southeasterly right-of-way of Little Park Road; thence S 54° 08', W 215.89 feet; thence along the arc of a curve to the left having a radius of 124.86 feet, a distance of 87.53 feet (the chord of said arc bears S 34° 03', W 85.74 feet); thence S 13° 58', W 57.96 feet, thence along the arc of a curve to the right having a radius of 440.28 feet, a distance of 123.20 feet (the chord of said arc bears S 21° 59', W 122.80 feet); thence S 60° 00', E 130.0 feet; thence S 36° 58', E 309.97 feet; thence N 00° 55', W 680.35 feet, along the east line of the said SW 1/4 NW 1/4 to the point of beginning, County of Mesa, State of Colorado.

Point of Reference: This property is located approximately 2 mile(s) southwest 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/underground
Gas:	Underground
Telephone:	Overhead
Sewer:	Underground
Water:	Underground
Cable TV:	Overhead

Bordering Properties:

North:	Little Park Road
South:	Cactus Drive
East:	Little Park Road
West:	Vacant land



## 2.2 Existing Facilities and Structures

### Primary Structure:

Type:	Two-story residence with attached carport
Size:	Approximately 2,665 sf
Construction Date:	1966
Construction:	Block and wood-frame
Foundation:	Concrete stemwall on spread footing
Footing Depth:	Not determined
Basement:	None
Crawl Space:	None
Condition:	Good

### Other Structures:

Type:	Barn
Size:	Approximately 925 sf
Construction:	Wood-frame
Foundation:	None
Condition:	Fair

### 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-03190-RS on May 9, 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 to determine areas of potential contamination identified during previous radiologic assessments of this property. Remedial action was performed on this property under the Grand Junction Remedial Action Program (GJRAP) in March of 1977. During remedial action, the floor of the basement and approximately 6 inches of tailings were removed. Also, half of the carport pad was removed along with a 54-inch backfilled area along the east side of the house.

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 team leader notes, deconvolution graphs, and Exterior Gamma Scan map are included in the Appendix (Section 6.0).

#### 3.2 Gamma Exposure-Rate Surveys

##### 3.2.1 Exterior Findings

Background Readings: 13 to 17 uR/h  
Highest Outside Gamma Reading (HOG): 97 uR/h

Exterior radium-concentration measurements are presented in Appendix Table 3.1. Exterior exposure rates and walking scan survey results are shown in Appendix Figure 3.1.

##### 3.2.2 Interior Findings

Measurements were not collected in the primary structure as the CDH data indicate a certification was done when remedial action was completed under GJRAP. Interior radium-concentration measurements collected in the storage shed are presented in Appendix Table 3.2. Interior gamma exposure-rate measurements are summarized in Appendix Table 3.3. Appendix Figure 3.2 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; the locations and types of these investigations are shown in Appendix Figures 3.2 and 3.3. Data from these investigations are included in Appendix Tables 3.1 and 3.2.

### 3.4 Radon/Radon Daughter Concentration (RDC)

Determined by CDH (post remedial action): 0.016 gross working level (WL). No additional RDC measurements were taken by Bendix.

### 3.5 Extent of Contamination

Appendix Figures 3.4a and 3.4b 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) Surface Material: Concrete  
 Direction From Primary Structure: South  
 Other Directions: Storage shed floor  
 Total Depth of Contamination: 27 inches  
 Other (Height or Thickness): 4-inch-thick concrete  
 Comments: The depth of contamination is based on data collected in Area H.  
 Approximate Square Footage: 26
- (Area B) Surface Material: Soil  
 Direction From Primary Structure: Northeast  
 Total Depth of Contamination: 6 inches  
 Approximate Square Footage: 238
- (Area C) Surface Material: Soil  
 Direction From Primary Structure: Northeast  
 Total Depth of Contamination: 6 inches  
 Approximate Square Footage: 15
- (Area D) Surface Material: Soil  
 Direction From Primary Structure: East  
 Other Directions: Adjacent to Area F  
 Total Depth of Contamination: 6 inches  
 Approximate Square Footage: 146
- (Area E) Surface Material: Sand and gravel  
 Direction From Primary Structure: East  
 Total Depth of Contamination: 6 inches  
 Approximate Square Footage: 186

- (Area F) Surface Material: Sand and gravel  
Direction From Primary Structure: East  
Total Depth of Contamination: 18 inches  
Comments: In driveway  
Approximate Square Footage: 480
- (Area G) Surface Material: Concrete  
Direction From Primary Structure: Southeast  
Total Depth of Contamination: 21 inches  
Other (Height or Thickness): 4-inch-thick concrete  
Comments: Concrete slab in the carport.  
Approximate Square Footage: 276
- (Area H) Surface Material: Soil  
Direction From Primary Structure: West  
Total Depth of Contamination: 6 inches  
Approximate Square Footage: 240
- (Area I) Surface Material: Rocky soil  
Direction From Primary Structure: East  
Other Directions: West side of the storage area  
Total Depth of Contamination: 21 inches  
Approximate Square Footage: 25
- (Area J) Surface Material: Rocky soil  
Direction From Primary Structure: Southeast  
Total Depth of Contamination: 6 inches  
Approximate Square Footage: 36
- (Area K) Surface Material: Rocky soil  
Direction From Primary Structure: South  
Total Depth of Contamination: 12 inches  
Approximate Square Footage: 45
- (Area L) Surface Material: Soil  
Direction From Primary Structure: Southwest  
Total Depth of Contamination: 6 inches  
Other Directions: Contamination abuts sidewalk  
Approximate Square Footage: 45
- (Area M) Surface Material: Concrete  
Direction From Primary Structure: Southwest  
Total Depth of Contamination: 10 inches  
Other (height or thickness): 4-inch-thick concrete  
Comments: The depth of contamination is based on  
the data collected in Area L.  
Approximate Square Footage: 9

(Area N) Surface Material: Concrete  
Direction From Primary Structure: West  
Total Depth of Contamination: 10 inches  
Other (height of thickness): 4-inch-thick concrete  
Comments: The depth of contamination is based on data  
collected in Area H.  
Approximate Square Footage: 60

#### 4.0 RECOMMENDED REMEDIAL ACTION

##### 4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-03190-RS, includes removal of all areas identified as containing radioactive material (as discussed in Section 3.5 and shown in Appendix Figures 3.4a and 3.4b) 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 \$4,454.

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

There is no owner preference with respect to remedial action and no legal or other complications are foreseen at this time.

## 5.0 REFERENCES

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

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

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

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

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

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

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

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

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



## 6.0 APPENDIX

This Appendix contains the following:

### Appendix Tables:

Table 3.1	Radium Concentrations at Exterior Locations
Table 3.2	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 Exposure Rates
Figure 3.2	Interior Gamma Exposure Rates and Sample Locations
Figure 3.3	Exterior Sample Locations
Figure 3.4a	Interior Estimated Extent of Contamination
Figure 3.4b	Exterior Estimated Extent of Contamination

### Team Leader Notes

Deconvolution Graphs (Apparent Radium-226 Concentration)

Exterior Gamma Scan Map



## Radium Concentrations at Exterior Locations

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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	350391	00	DS	2.4		*	Gas line
		25	DS	<1.0		*	On gas line
4	353360	00	DS	3.1		*	On dirt
5	354363	00	DS	13.5		*	
6	354385	00	DS	2.6		*	
		06	DS	1.5		*	
7	355351	00	DS	22.6		*	DC = 6 inches
		03	TC	8.5		*	Based on the
		06	TC	6.5		*	deconvolution graph
		09	TC	5.3		*	
		12	TC	4.7		*	
		15	TC	4.2		*	
		18	TC	3.9		*	
		21	TC	3.7		*	
		24	TC	3.4		*	
		27	TC	3.3		*	
		30	TC	3.2		*	
8	355376	00	DS	5.9		*	DC = 6 inches
		06	DS	1.6		*	Based on all
		03	TC	3.6		*	available data
		06	TC	3.2		*	
		09	TC	3.1		*	
		12	TC	3.1		*	
		15	TC	3.1		*	
		18	TC	3.0		*	
		21	TC	2.8		*	
		24	TC	2.9		*	
9	356217	00	DS	<1.0		*	Background
		00	GS		<1.0	*	
		03	TC	1.5		*	
		06	TC	1.6		*	
		09	TC	1.8		*	
		12	TC	1.8		*	
		15	TC	1.9		*	
		18	TC	1.9		*	
		21	TC	1.9		*	

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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.		
9	356217	24	TC	1.9		*	
		27	TC	1.8		*	
		30	TC	1.8		*	
		33	TC	1.7		*	
		36	TC	1.7		*	
		39	TC	1.6		*	
		42	TC	1.6		*	
10	358352	00	DS	2.9		*	
11	358355	00	DS	4.8		*	
12	358360	00	DS	<1.0		*	Concrete
13	358363	00	DS	8.6		*	
14	360430	00	DS	2.2		*	
		00	GS		4.0	*	
15	367421	00	DS	6.2		*	
		06	DS	1.7		*	
16	368434	00	DS	11.0		*	
		06	DS	<1.0		*	
17	370352	00	DS	1.3		*	
18	373435	00	DS	7.8		*	
		06	DS	<1.0		*	
19	373454	00	DS	1.3		*	
		06	DS	<1.0		*	
20	375445	00	DS	6.5		*	
		06	DS	1.1		*	
21	380338	03	TC	3.2		*	Edge of leach field
		06	TC	3.4		*	DC = 0 inches
		09	TC	3.6		*	
		12	TC	3.7		*	

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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.		
21	380338	15	TC	3.7		*	
		18	TC	2.5		*	
22	380350	03	TC	4.0		*	West of primary
		06	TC	4.7		*	structure
		09	TC	4.4		*	Sewer line
		12	TC	3.8		*	Auger refusal
		15	TC	3.6		*	DC = 0 inches
		18	TC	3.2		*	
		21	TC	3.1		*	
		24	TC	3.1		*	
23	380440	00	DS	1.5		*	
		00	GS		1.7	*	
		03	TC	3.1		*	DC = 0 inches
		06	TC	3.3		*	
		09	TC	3.2		*	
		12	TC	2.9		*	
		15	TC	2.7		*	
		18	TC	2.8		*	
		21	TC	2.9		*	
		24	TC	3.0		*	
		27	TC	3.1		*	
24	381442	00	DS	4.2		*	
		06	DS	1.0		*	
25	385395	00	DS	3.8		*	
		06	DS	2.5		*	
26	393405	00	DS	3.1		*	DC = 18 inches
		06	DS	3.2		*	Based on all
		12	DS	6.5		*	available data
		03	TC	19.0		*	
		06	TC	26.0		*	
		09	TC	31.1		*	
		12	TC	36.1		*	
		15	TC	32.8		*	
		18	TC	20.8		*	
27	393352	00	DS	<1.0		*	On concrete

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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.		
28	395395	00	DS	1.7		*	Buried electric line
		03	DS	2.1		*	
29	395415	00	DS	3.3		*	
		06	DS	<1.0		*	
30	397346	00	DS	4.0		*	
		06	DS	<1.0		*	
31	397352	00	DS	2.9		*	
32	397359	00	DS	<1.0		*	
33	399399	03	TC	34.7		*	East of primary structure DC = 18 inches Based on the deconvolution graph
		06	TC	52.7		*	
		09	TC	68.5		*	
		12	TC	62.2		*	
		15	TC	36.1		*	
		18	TC	21.8		*	
		21	TC	15.8		*	
34	400310	00	DS	<1.0		*	Background DC = 0 inches
		00	GS		<1.0	*	
		03	TC	2.5		*	
		06	TC	2.8		*	
		09	TC	2.9		*	
		12	TC	2.9		*	
35	402356	00	DS	14.0		*	Next to south side of primary structure Due to sloughing
		06	DS	9.5		*	
		12	DS	4.6		*	
36	402364	03	TC	22.9		*	West of carport Auger refusal DC = 21 inches Based on the deconvolution graph
		06	TC	24.9		*	
		09	TC	22.2		*	
		12	TC	19.0		*	
		15	TC	15.5		*	
		18	TC	12.1		*	
		21	TC	10.7		*	
37	403365	00	DS	22.3		*	
		03	TC	9.6		*	
		06	TC	9.5		*	

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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.		
37	403365	09	TC	8.7		*	DC = 21 inches
		12	TC	7.7		*	Based on the
		15	TC	7.7		*	deconvolution graph
		18	TC	6.4		*	
		21	TC	5.3		*	
		24	TC	4.8		*	
		27	TC	4.5		*	
38	410360	00	DS	5.7		*	
		06	DS	2.0		*	
39	410370	00	DS	76.8		*	On carport pad
40	410400	00	DS	14.7		*	
		06	DS	4.3		*	
		12	DS	4.4		*	
		18	DS	3.6		*	Due to sloughing
41	414415	00	DS	2.7		*	
		06	DS	<1.0		*	
42	415355	00	DS	1.5		*	
43	416368	03	TC	136.9		*	On carport pad
		06	TC	162.1		*	Auger refusal
		09	TC	162.5		*	DC = 27 inches
		12	TC	145.1		*	Based on all
		15	TC	126.8		*	available data
		18	TC	109.9		*	Close to edge of
		21	TC	81.1		*	stemwall
		24	TC	58.1		*	
44	417362	27	TC	50.4		*	
		03	TC	4.5		*	Southeast of
		06	TC	4.4		*	primary structure
		09	TC	4.4		*	DC = 0 inches
		12	TC	4.5		*	
		15	TC	4.4		*	
		18	TC	4.6		*	
		21	TC	4.6		*	
45	420344	00	DS	1.6		*	
		06	DS	2.0		*	

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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.		
45	420344	12	DS	2.1		*	
46	420390	00	DS	16.7		*	Adjacent to carport
		06	DS	3.6		*	
		12	DS	5.8		*	
		18	DS	2.8		*	
47	420405	00	DS	2.2		*	
		06	DS	<1.0		*	
48	424387	03	TC	31.0		*	Carport Auger refusal DC = 21 inches Based on the deconvolution graph
		06	TC	54.7		*	
		09	TC	47.2		*	
		12	TC	29.3		*	
		15	TC	19.4		*	
		18	TC	13.8		*	
49	422405	00	DS	4.1		*	
		06	DS	1.4		*	
50	427368	00	DS	1.8		*	
51	435376	00	DS	1.5		*	
		06	DS	<1.0		*	
52	438384	00	DS	2.3		*	
		06	DS	1.3		*	

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 = 05-09-85  
 Team Leader = CA

## Radium Concentrations at Interior Locations

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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	DS	51.3		*	In storage shed
2		00	DS	1.8		*	In storage shed
=====							

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 = 05-09-85  
Team Leader = CA

Table 3.3

## Summary of Interior Gamma Exposure Rates

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274 Little Park Road

Page 1 of 1

Location *	Number of Readings Taken at Waist Level	Range at Waist Level (uR/h)	Mean at Waist Level (uR/h)	Number of Readings Taken at Surface	Range at Surface (uR/h)	Mean Surface (uR/h)
Storage Shed	02	21-41	31	02	19-48	34
Pole Barn	09	13-14	14	09	13-15	14

\*Exposure rates and room locations are shown in Appendix Figure 3.2.



Table 4.1  
Area and Volume Calculations  
DOE ID No. GJ-03190-RS

<u>AREA</u>	<u>CALCULATIONS(ft)</u>	<u>SF</u>	<u>DEPTH(ft)</u>	<u>CF</u>	<u>CUBIC YARDS</u>
EXTERIOR					
Concrete					
A	2 x 13 =	26	x 0.3 =	8	
G	13 x 24 =	312	x 0.3 =	94	
M	3 x 3 =	9	x 0.3 =	3	
N	4 x 15 =	60	x 0.3 =	18	
				123	
Volume of Concrete				=	123/27 = 5
Contaminated Fill					
A	2 x 13 =	26	x 2.0 =	52	
B	14 x 17 =	238	x 0.5 =	119	
C	5 x 3 =	15	x 0.5 =	8	
D	14 x 4 =	56			
	10 x 9 =	90			
				146	
				x 0.5 =	73
E	31 x 6 =	186	x 0.5 =	93	
F	30 x 16 =	480	x 1.5 =	720	
G	12 x 23 =	276	x 1.5 =	414	
H	6 x 40 =	240	x 0.5 =	120	
I	5 x 5 =	25	x 1.8 =	45	
J	9 x 4 =	36	x 0.5 =	18	
K	5 x 9 =	45	x 1.0 =	45	

Table 4.1  
Area and Volume Calculations  
DOE ID No. GJ-03140-RS

Page 2 of 2

<u>AREA</u>	<u>CALCULATIONS(ft)</u>	<u>SF</u>	<u>DEPTH(ft)</u>	<u>CF</u>	<u>CUBIC YARDS</u>
L	9 x 5 =	45	x 0.5 =	23	
M	3 x 3 =	9	x 0.5 =	5	
N	4 x 15 =	60	x 0.5 =	30	
Volume of Fill				= 1,765	= 1,765/27 = 65
TOTAL VOLUME - EXTERIOR					= 70

See Appendix Figures 3.4a and 3.4b For Areas

=====

Table 4.2  
Estimated Cost of Decontamination and Restoration  
DOE ID No. GJ-03190-RS

Page 1 of 1

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EXTERIOR

Remove identified residual radioactive material		
60 cy @ \$14.50/cy (machine-open)	\$	870
5 cy @ \$44/cy (manual-open)		220
Remove/replace concrete		
407 sf @ \$3/sf		1,221
Replace areas with compacted roadbase		
20 cy @ \$11.50/cy		230
Replace areas with topsoil		
45 cy @ \$9.50/cy		428
Shore carport (wood-frame)		
48 lf @ \$3/lf		144
		<hr/>
TOTAL EXTERIOR	\$	3,113
TOTAL INTERIOR		0
ACCESS CONTROL		150
		<hr/>
SUBTOTAL	\$	3,263
CONTINGENCY @ 5%		163
		<hr/>
SUBTOTAL	\$	3,426
CONTRACTOR OVERHEAD & PROFIT @ 30%		1,028
		<hr/>
GRAND TOTAL	\$	4,454

=====

LR090585  
REA03190/REA-623/LMR

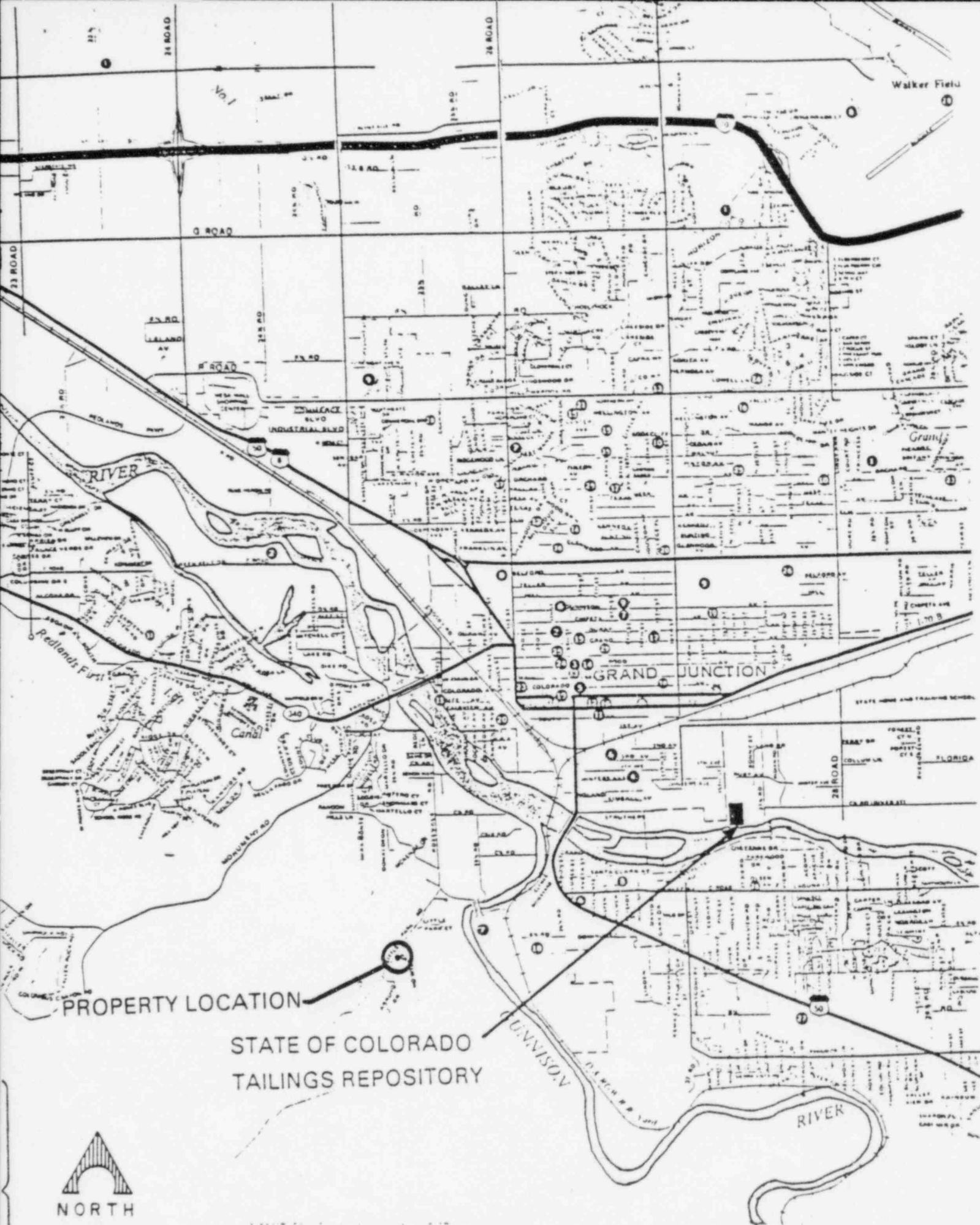
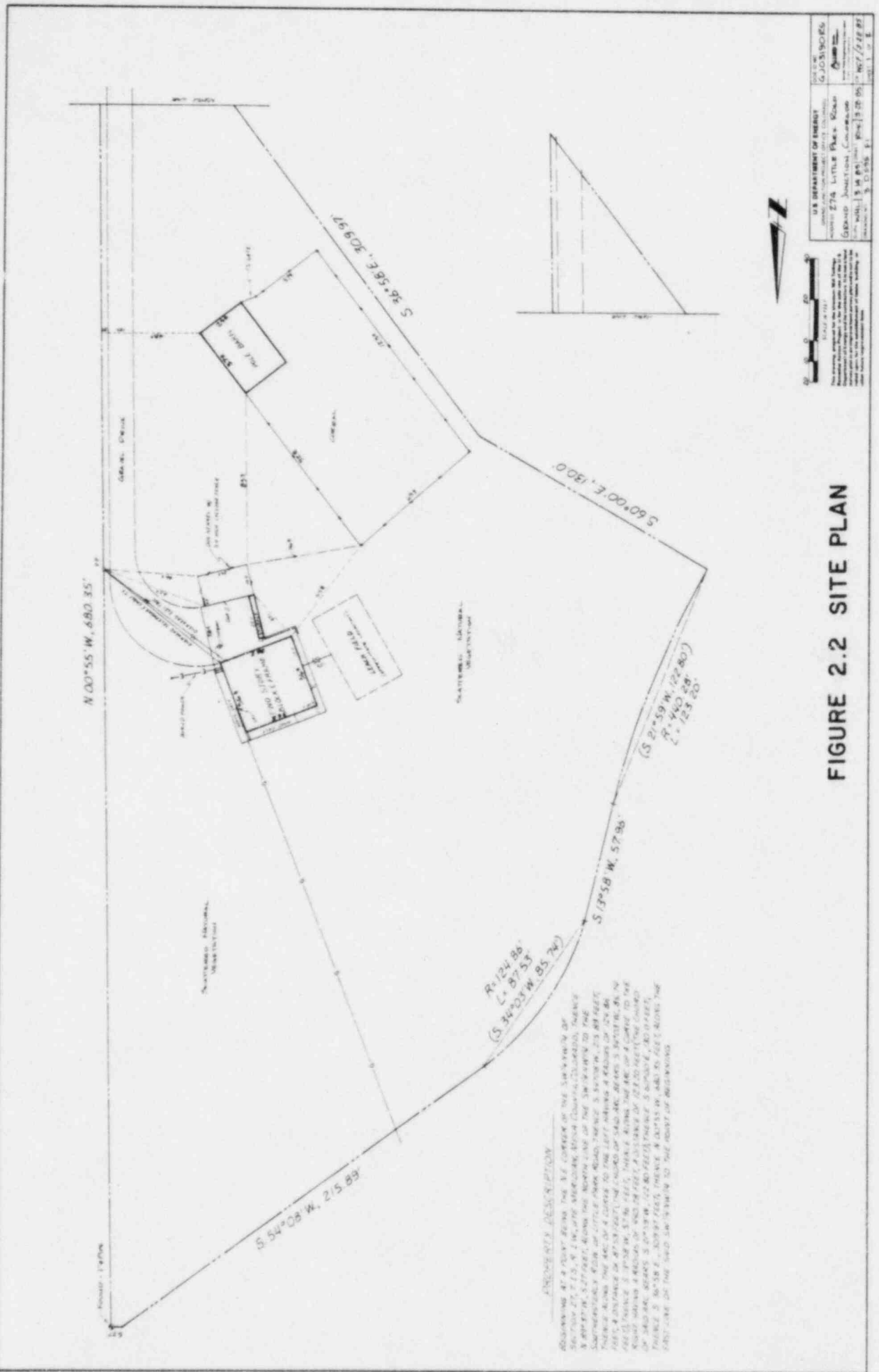
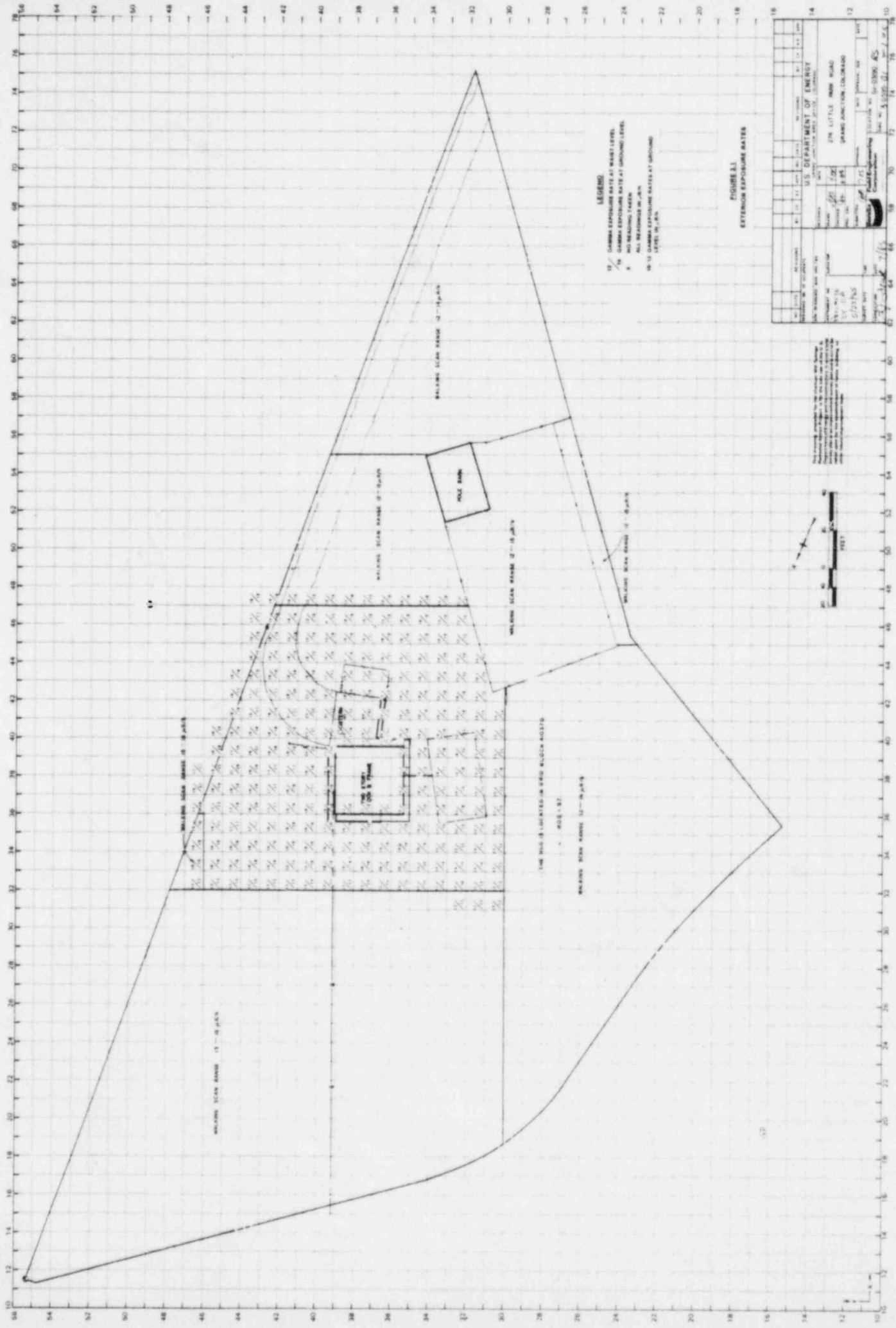


FIGURE 2.1  
VICINITY MAP

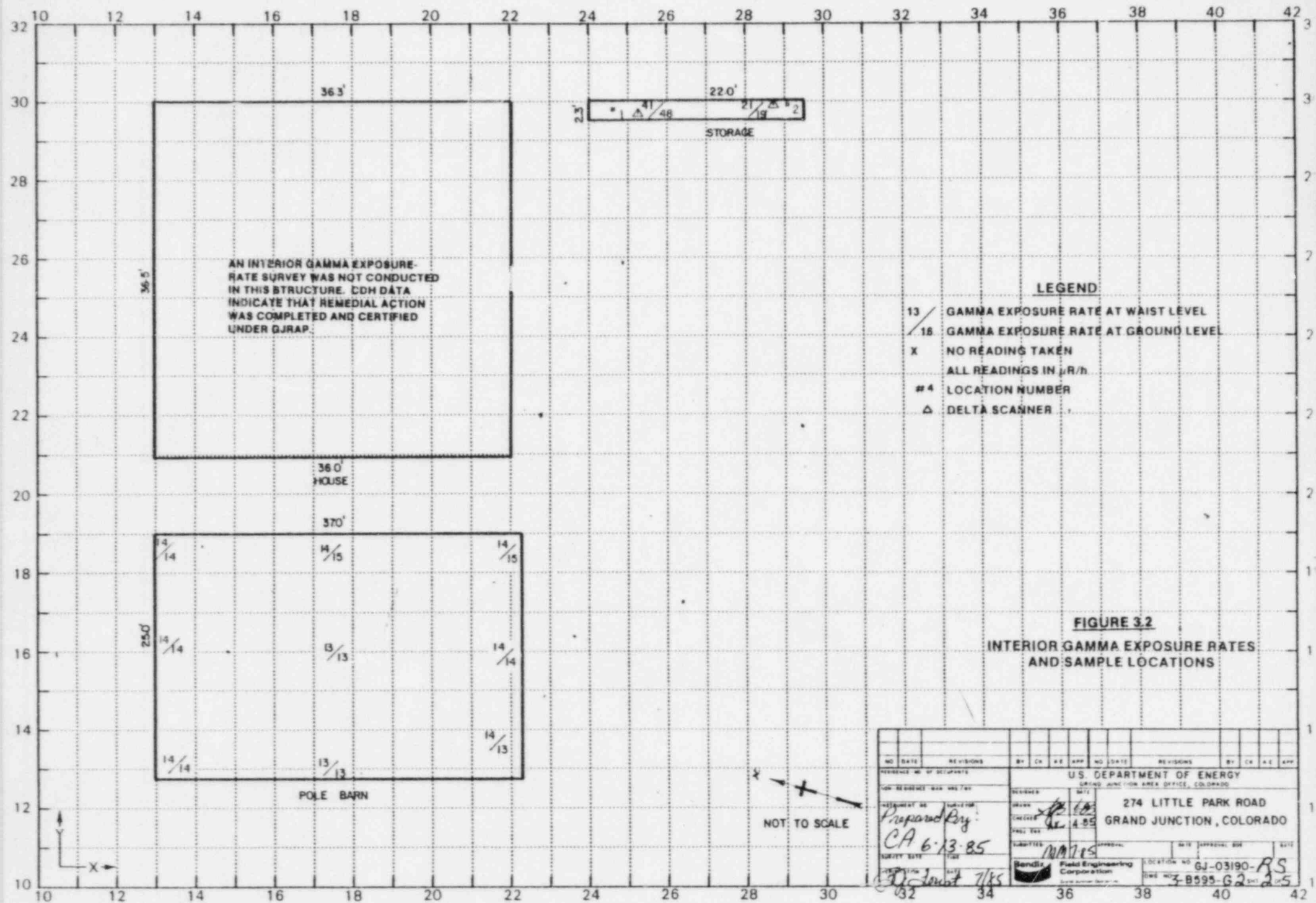




**LEGEND**  
 15 GAMMA EXPOSURE RATE AT WASTELAND  
 16 GAMMA EXPOSURE RATE AT WASTELAND  
 17 GAMMA EXPOSURE RATE AT WASTELAND  
 18 GAMMA EXPOSURE RATE AT WASTELAND  
 19 GAMMA EXPOSURE RATE AT WASTELAND  
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 76 GAMMA EXPOSURE RATE AT WASTELAND  
 77 GAMMA EXPOSURE RATE AT WASTELAND  
 78 GAMMA EXPOSURE RATE AT WASTELAND

FIGURE 3.1  
 EXTERIOR EXPOSURE RATES

U.S. DEPARTMENT OF ENERGY	
OFFICE OF ENVIRONMENTAL AND SAFETY	
270 LITTLE ROCK ROAD	
GRAND JUNCTION, COLORADO	
81400	
5/21/75	
F. J. [Name]	
[Signature]	
[Stamp]	





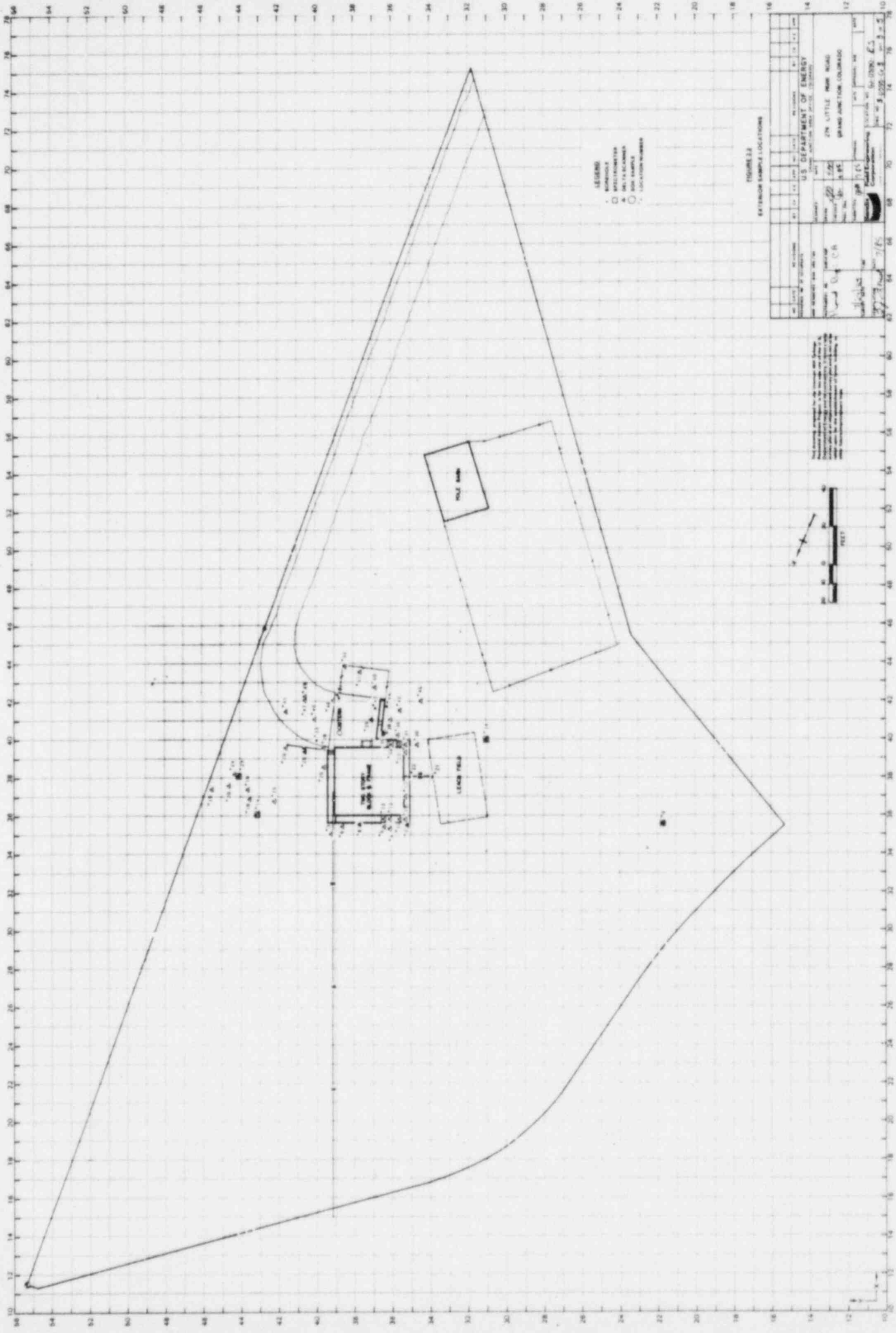
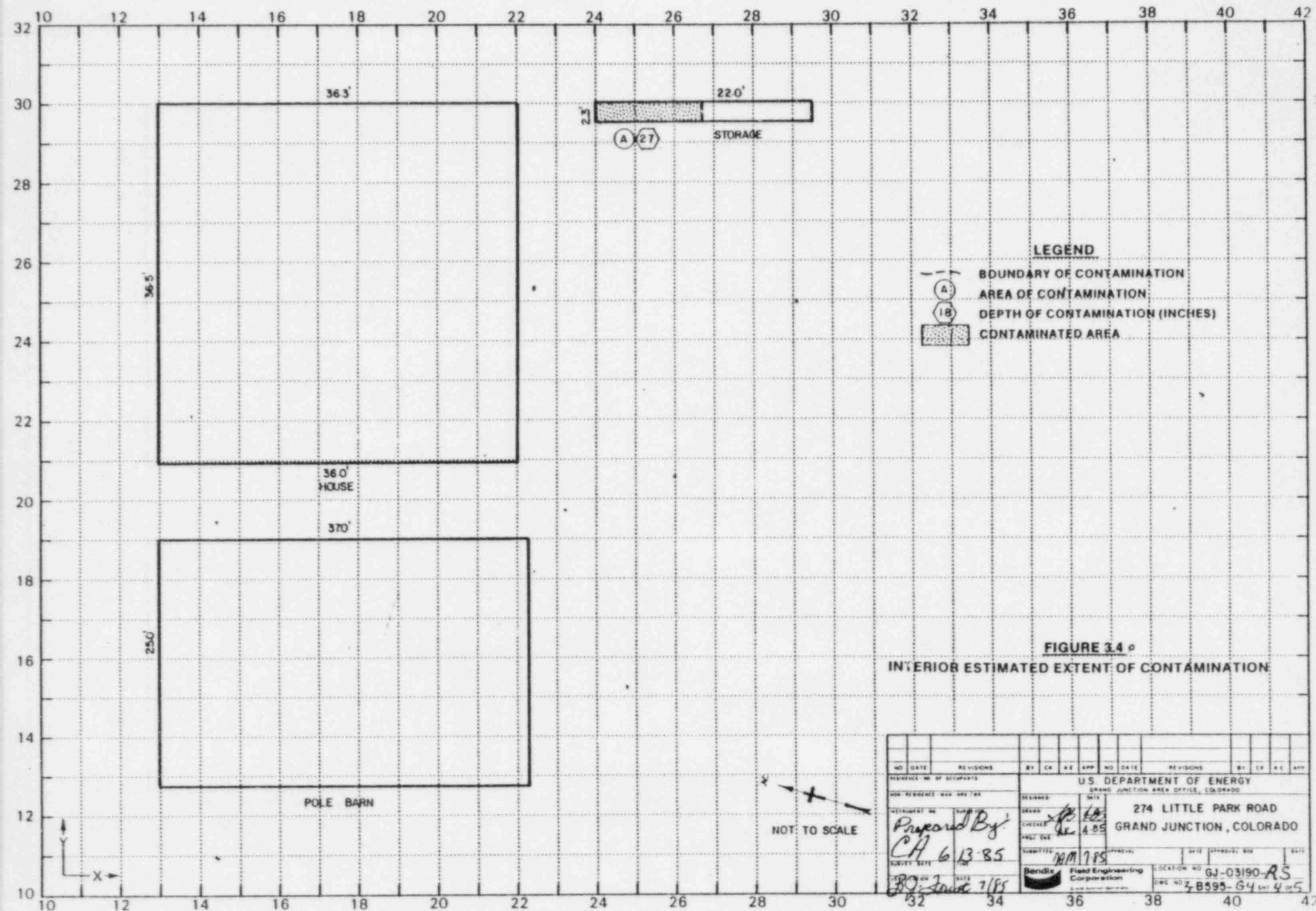


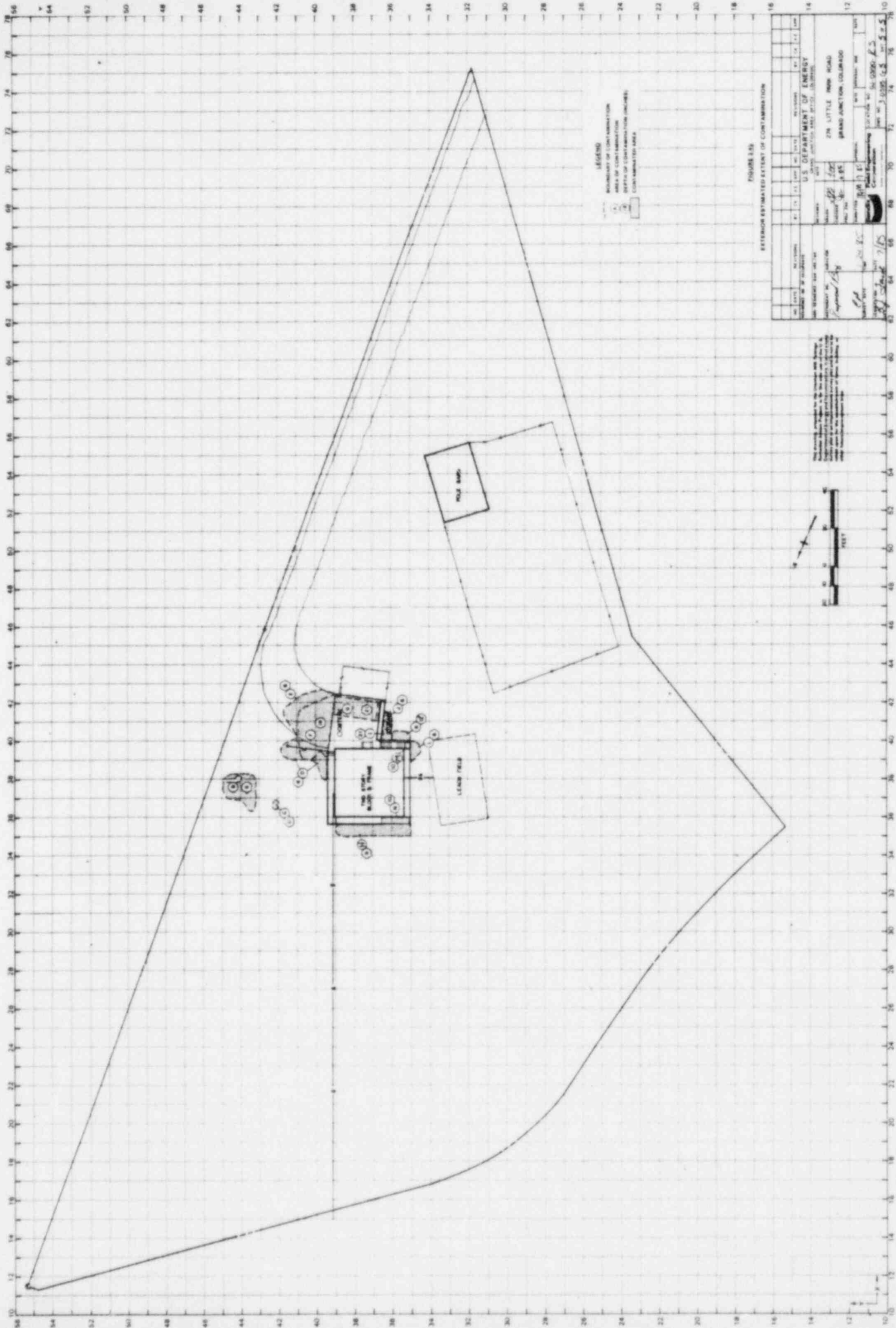
FIGURE 2.1  
EXTENSION SAMPLE LOCATIONS

U.S. DEPARTMENT OF ENERGY	
OFFICE OF ENVIRONMENTAL RESTORATION	
FACILITY: GRAND JUNCTION COALBURN	
PROJECT: 27N LITTLE ROCK ROAD	
DATE: 10/1/83	
BY: J. C. [Signature]	
CHECKED BY: [Signature]	
APPROVED BY: [Signature]	
SCALE: 1" = 100'	
NORTH ARROW	





NO. DATE				REVISIONS				BY CR RE APP				NO. DATE				REVISIONS				BY CR RE APP											
RESERVE NO. OF DEPARTS																U.S. DEPARTMENT OF ENERGY															
NON-RESIDENT N/A																GRAND JUNCTION AREA OFFICE, COLORADO															
274 LITTLE PARK ROAD																GRAND JUNCTION, COLORADO															
DESIGNED BY: <i>Prepared By: CH 6/13/85</i>																CHECKED BY: <i>4/85</i>															
SUBMITTED BY: <i>RM 7/85</i>																APPROVED BY: <i>4/85</i>															
SITE: <i>7/85</i>																DATE: <i>4/85</i>															
Bendis Field Engineering Corporation																LOCATION NO. GJ-03190-AS															
ENC NO. 48595-64																ENC NO. 48595-64															



U.S. DEPARTMENT OF ENERGY	
OFFICE OF ENVIRONMENTAL RESTORATION	
274 LITTLE ROCK ROAD	
BRAND JUNCTION, COLORADO	
PROJECT NO. 2-0000-0-5	
DATE: 1/15/85	
BY: [Signature]	
CHECKED BY: [Signature]	
APPROVED BY: [Signature]	
TITLE: [Blank]	
SCALE: [Blank]	
SHEET NO. [Blank]	
TOTAL SHEETS: [Blank]	

ALLIED Bendix  
Aerospace

Bendix Field Engineering Corporation  
Grand Junction Operations  
Grand Junction, Colorado

Date: May 9, 1985

To: Files

From: Cordell Adams, Kate Kanaly

Subject: Team Leader Notes - GJ-03190-RS

Address: 274 Little Park Road

Owner: James and Sharon Stavast

Weather: Windy and cloudy.

Team Members

K. Kanaly (Team Leader)  
A. Raabe  
P. Hardy  
L. Kula  
D. Dow  
H. Mattison

C. Adams (Team Leader)  
P.J. Bonner  
M. Dexter  
D. Bell  
V. Rothman  
R. Wilkins

Instruments

Scintillometers - C-1205, C-1185, C-1128, C-1127, C-1207, C-1239  
C-1036, C-1182  
Deltas - C-3943, C-3935, C-3940  
Total Counts - C-4005, C-3957  
Surface Spectrometer, C-3431  
Borehole Spectrometer - C-3361

The house sits atop a small hill.

Large cobbles were responsible for multiple auger refusals.

Team Leader Notes  
Kate Kanaly  
Cordell Adams  
GJ-03190-RS  
May 9, 1985  
Page 2

An abandoned dirt road leads from Little Park Road to a point atop the same hill that the structure was built upon (somewhat east of the structure). This was the approximate location indicated to be contaminated in the Oak Ridge National Laboratory (ORNL) inclusion report.

This structure underwent remedial action under the direction of Colorado Department of Health (CDH). In keeping with this information, most of the contamination located on the property was some distance from the structure. However, tailings were readily visible under the sidewalk, which lies along the northwest corner of the structure. This portion of the sidewalk has cracked and slumped.

Tailings were also readily visible along the southern edge of the carport. Again, this information is in keeping with the CDH information concerning the remedial action undertaken at the property.

Two soil profiles were visible at this property. The top half of the hill was cobbles. The soil matrix was white in appearance. The lower half of the hill was sandy and of a reddish cast.

All team members were alpha scanned before leaving the property.

Team Leader Notes  
Cordell Adams  
GJ-03190-RS  
July 23, 1985  
Page 3

### Revisit

Date: July 23, 1985

Weather: Sunny and warm

### Team Members

C. Adams (Team Leader)  
C. Holmes

J. Johnson

### Instruments

Total Count: C-4006  
Deltas: C-4060, C-3937

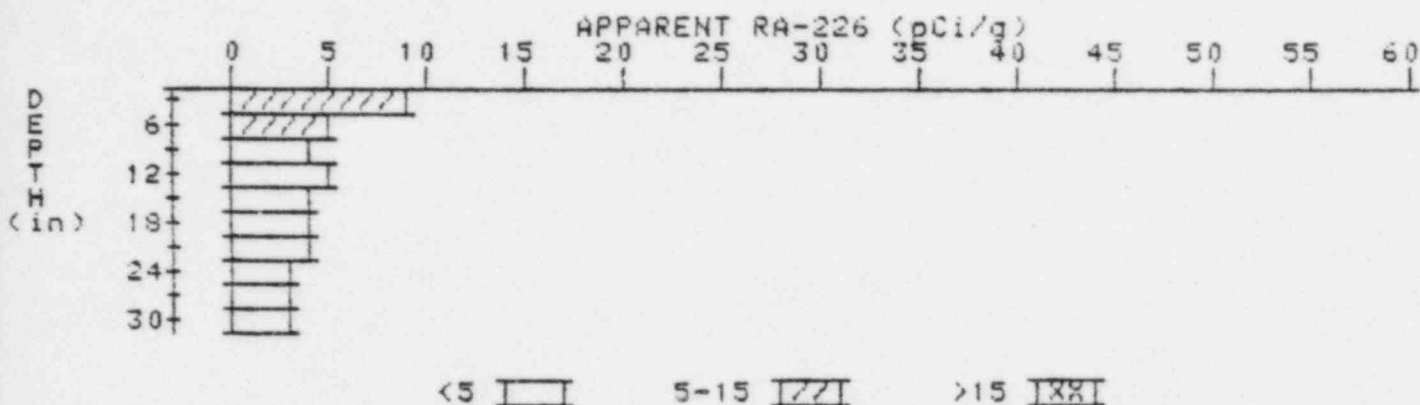
The purpose of the revisit was to confirm the presence of (or lack of) contamination in areas that were in question during the period of final Quality Control (QC). Several delta readings and boreholes were taken. The information was then fed into the computer. New Sample Location maps have been generated and a new map of "Extent of Contamination" was made. A new Radium Table was also made. A new package for CDH will be made up and mailed to them.

Our investigation did help to clear up uncertainty in many areas. Some areas were considered to be free of contamination, while other areas were enlarged or made considerably deeper.

# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

7

PROPERTY NUMBER: GJ-03190-RS  
HOLE NUMBER: 7  
LOCATION: 355351



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	8.5	8.5
6	6.5	5.1
9	5.3	4.2
12	4.7	4.5
15	4.2	3.8
18	3.9	3.7
21	3.7	3.9
24	3.4	3.0
27	3.3	3.3
30	3.2	3.2

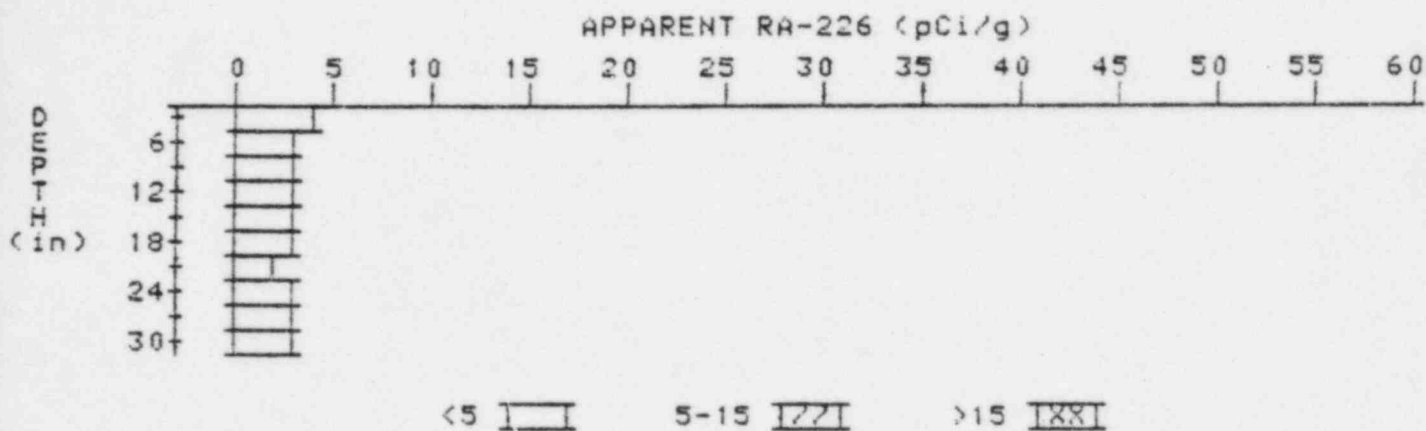
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

8

PROPERTY NUMBER: GJ-03190-RS

HOLE NUMBER: 8

LOCATION: 355376



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.6	3.6
6	3.2	2.7
9	3.1	2.9
12	3.1	3.1
15	3.1	3.3
18	3.0	3.2
21	2.8	2.3
24	2.9	3.3
27	2.8	2.6
30	2.8	2.8



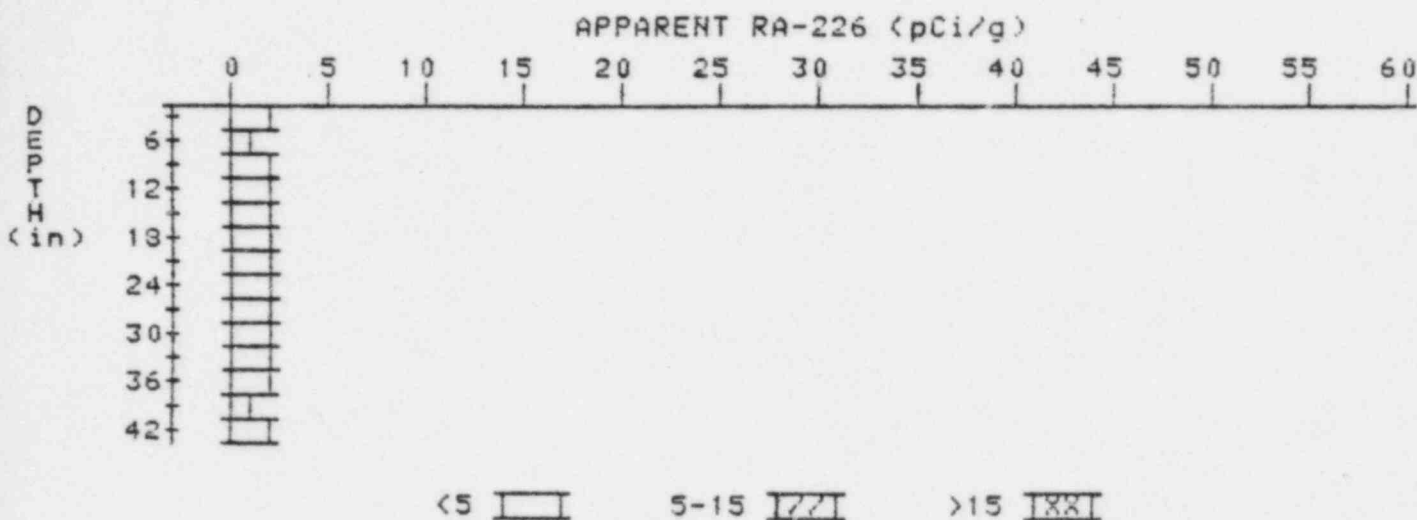
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

9

PROPERTY NUMBER: GJ-03190-RS

HOLE NUMBER: 9

LOCATION: 356217



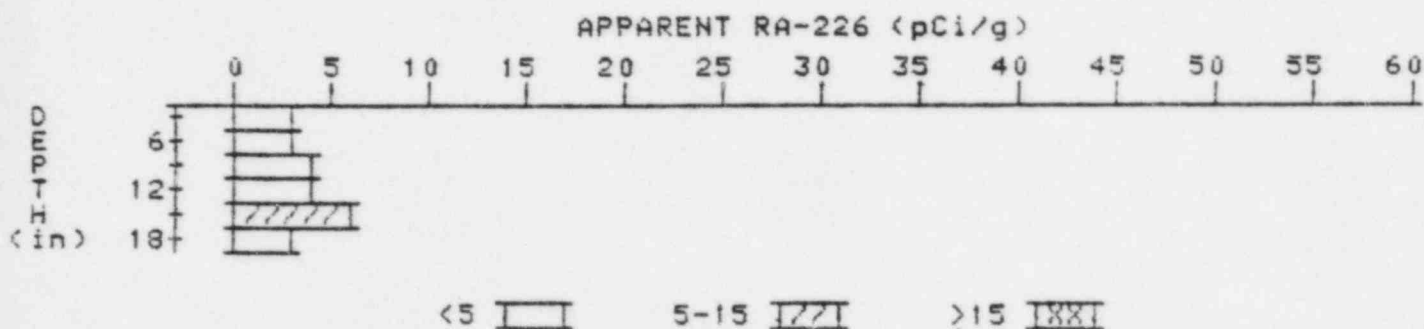
Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	1.5	1.5
6	1.6	1.4
9	1.8	2.2
12	1.8	1.6
15	1.9	2.1
18	1.9	1.9
21	1.9	1.9
24	1.9	2.1
27	1.8	1.6
30	1.8	2.0
33	1.7	1.5
36	1.7	1.9
39	1.6	1.4
42	1.6	1.6

# APPARENT RADIUM-226 CONCENTRATION 21 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-03190-RS

HOLE NUMBER: 21

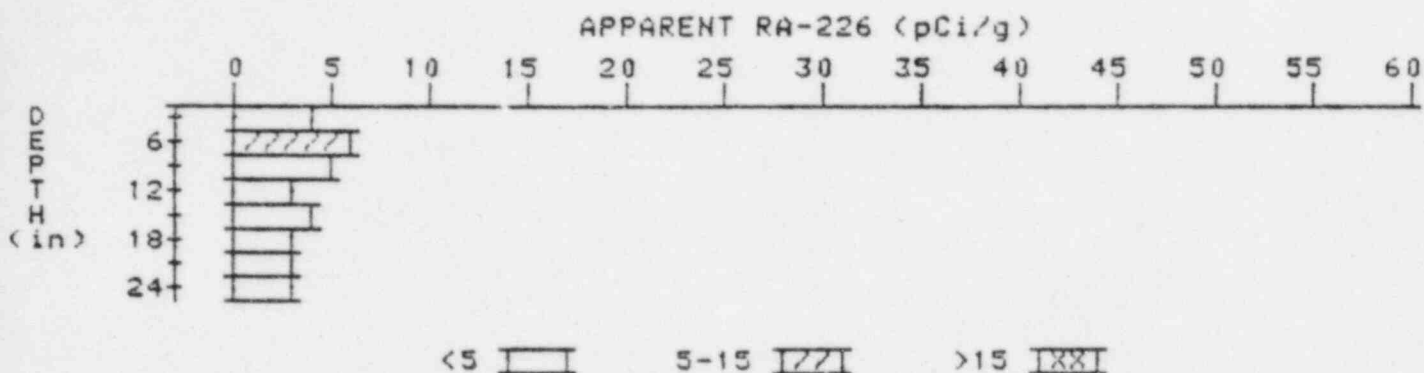
LOCATION: 380338



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.2	3.2
6	3.4	3.4
9	3.6	3.8
12	3.7	3.9
15	3.7	5.8
18	2.5	2.5

# APPARENT RADIUM-226 CONCENTRATION 22 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-03190-RS  
HOLE NUMBER: 22  
LOCATION: 380350



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.0	4.0
6	4.7	6.5
9	4.4	4.9
12	3.8	3.1
15	3.6	4.0
18	3.2	2.7
21	3.1	2.9
24	3.1	3.1

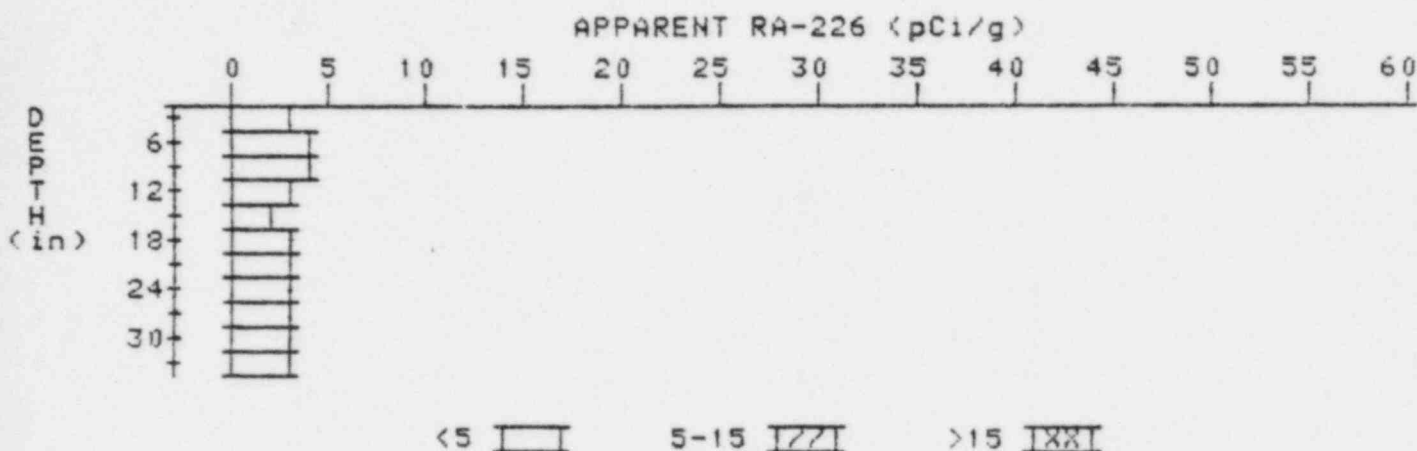
# APPARENT RADIUM-226 CONCENTRATION 23

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-03190-RS

HOLE NUMBER: 23

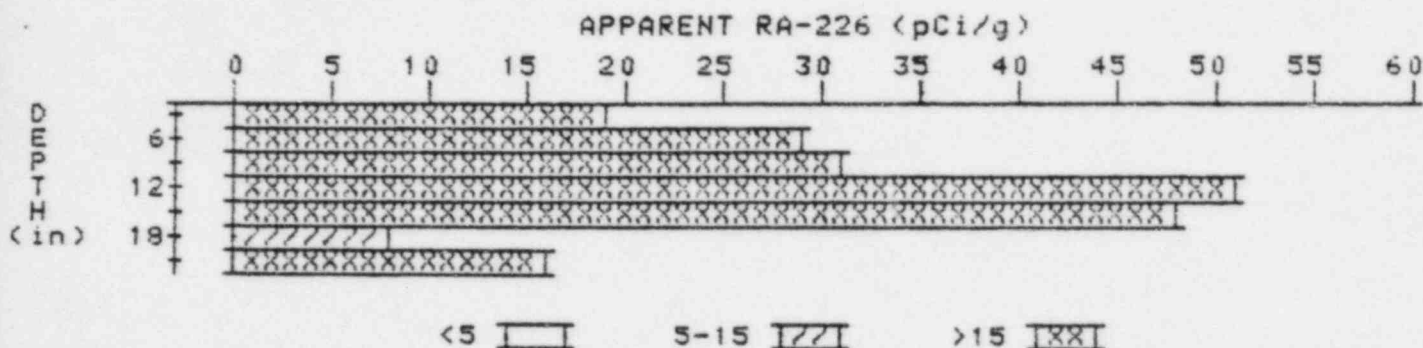
LOCATION: 380440



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	3.1	3.1
6	3.3	3.3
9	3.2	3.6
12	2.9	2.7
15	2.7	2.2
18	2.8	2.3
21	2.9	2.9
24	3.0	3.0
27	3.1	3.1
30	3.2	3.4
33	3.2	3.2

# APPARENT RADIUM-226 CONCENTRATION 26 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-03190-RS  
HOLE NUMBER: 26  
LOCATION: 393405



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	19.0	19.0
6	26.0	29.4
9	31.1	31.3
12	36.1	50.9
15	32.8	48.3
18	20.8	8.0
21	16.0	16.0

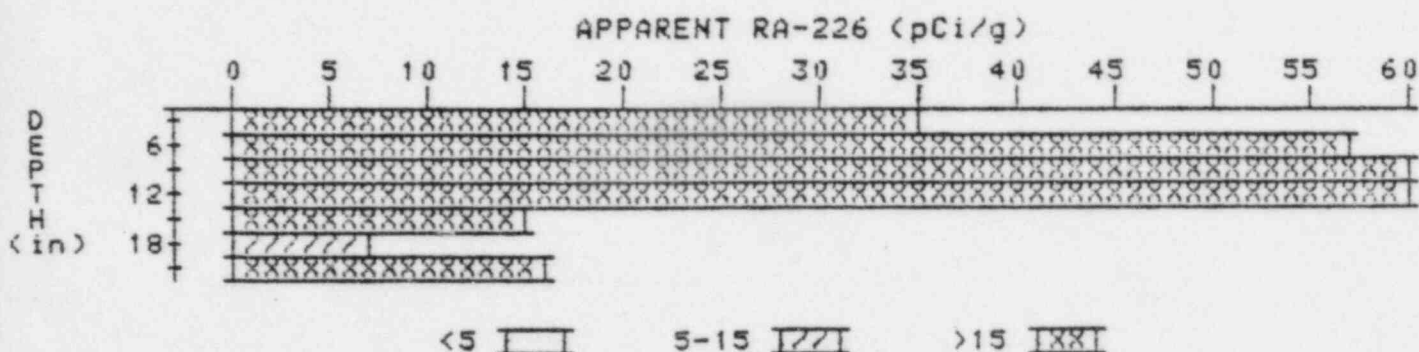
# APPARENT RADIUM-226 CONCENTRATION 33

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-03190-RS

HOLE NUMBER: 33

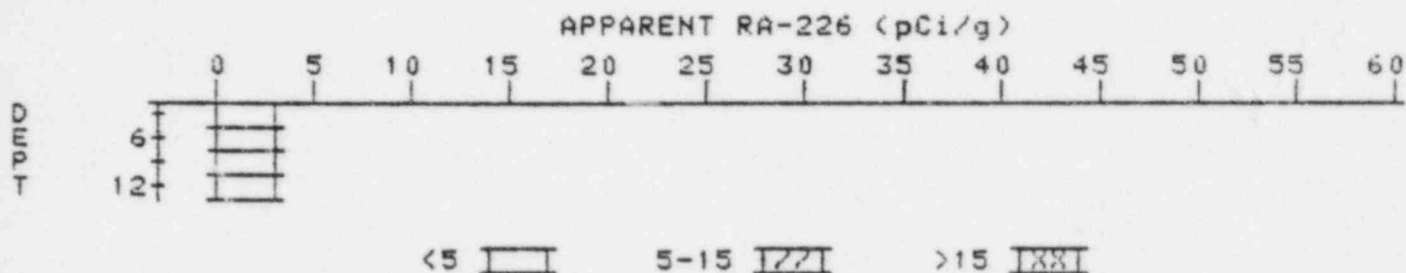
LOCATION: 399399



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
=====	=====	=====
3	34.7	34.7
6	52.7	56.6
9	68.5	107.8
12	62.2	97.4
15	36.1	15.1
18	21.8	7.0
21	15.8	15.8

# APPARENT RADIUM-226 CONCENTRATION 34 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-03190-RS  
HOLE NUMBER: 34  
LOCATION: 400310



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	2.5	2.5
6	2.8	3.2
9	2.9	3.1
12	2.9	2.9



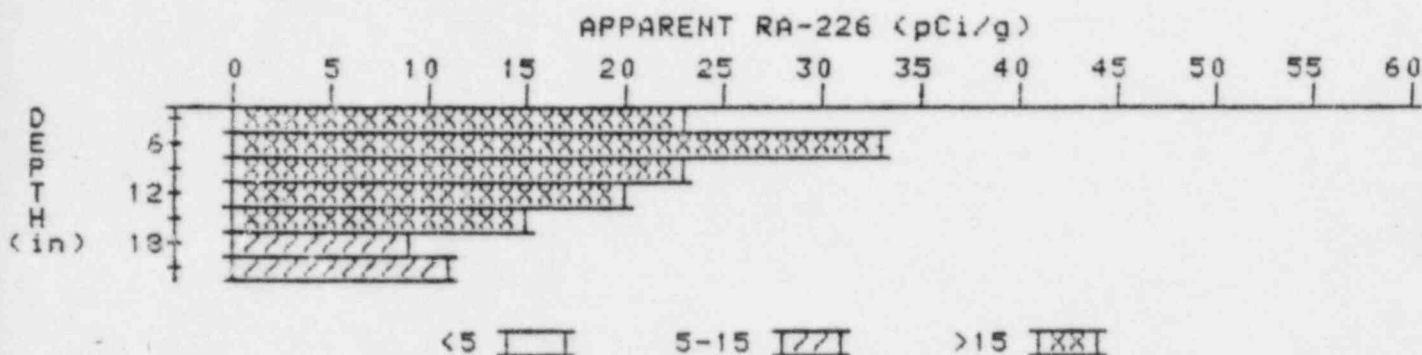
# APPARENT RADIUM-226 CONCENTRATION 36

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-03190-RS

HOLE NUMBER: 36

LOCATION: 402364



Depth (in)	Apparent Radium-226 (pCi/g)	Apparent Radium-226 (pCi/g)
	Undeconvolved	Deconvolved
3	22.9	22.9
6	24.9	33.7
9	22.2	23.1
12	19.0	19.5
15	15.5	15.3
18	12.1	8.5
21	10.7	10.7

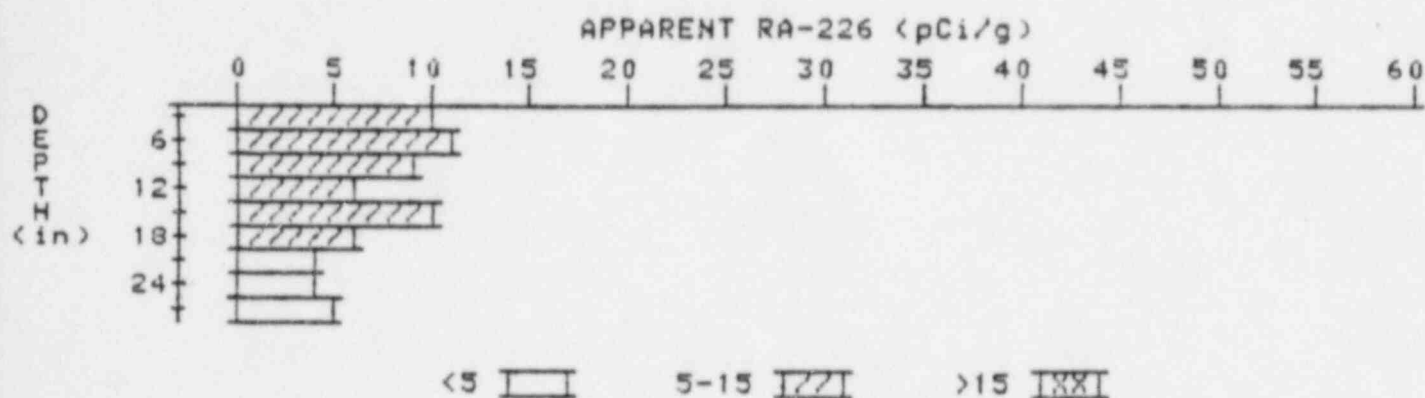
# APPARENT RADIUM-226 CONCENTRATION 37

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-03190-RS

HOLE NUMBER: 37

LOCATION: 403365



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	9.6	9.6
6	9.5	10.7
9	8.7	9.1
12	7.7	5.9
15	7.7	10.0
18	6.4	6.0
21	5.3	4.2
24	4.8	4.4
27	4.5	4.5

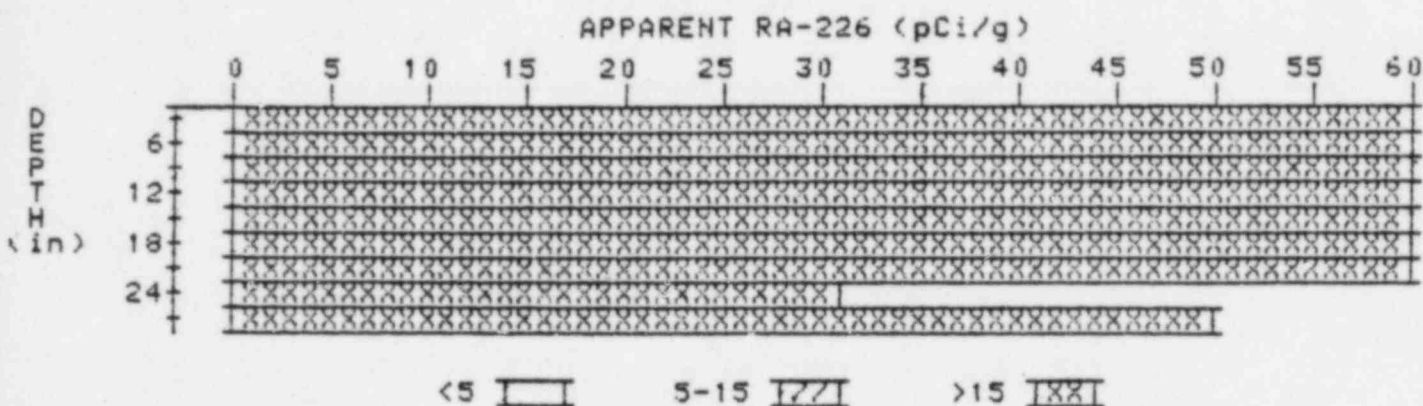
# APPARENT RADIUM-226 CONCENTRATION 43

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-03190-RS

HOLE NUMBER: 43

LOCATION: 416368



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
=====	=====	=====
3	136.9	136.9
6	162.1	206.2
9	162.5	194.1
12	145.1	146.7
15	126.8	124.3
18	109.9	131.1
21	81.1	70.8
24	58.1	30.9
27	50.4	50.4

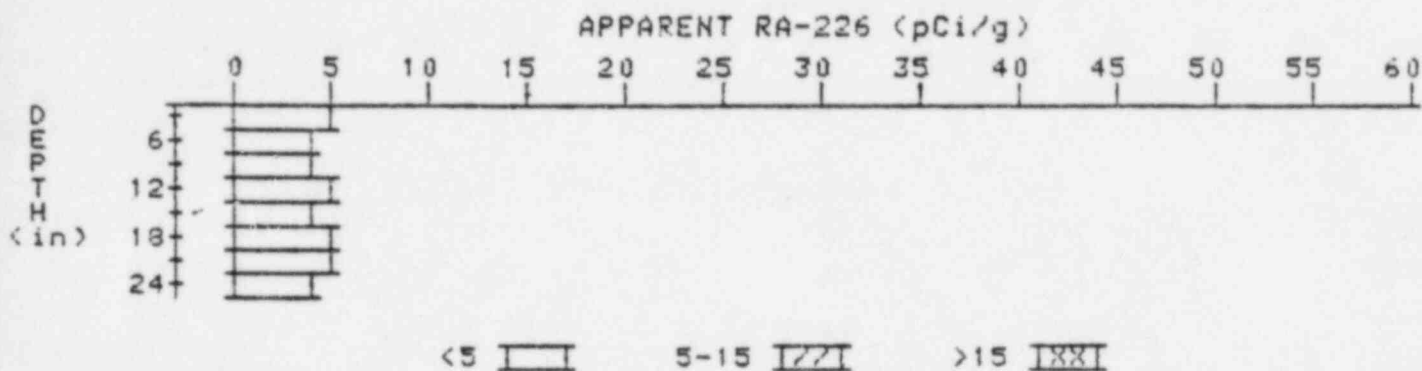
# APPARENT RADIUM-226 CONCENTRATION 44

## DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-03190-RS

HOLE NUMBER: 44

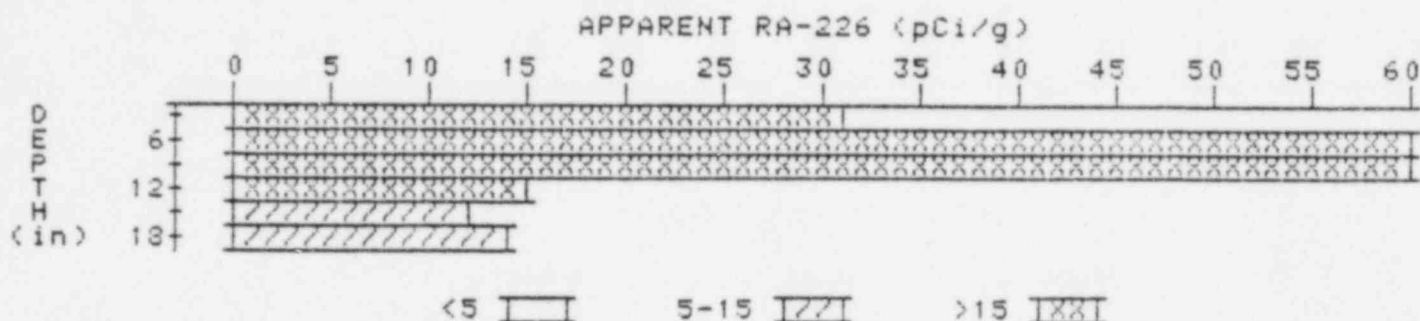
LOCATION: 417362



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	4.5	4.5
6	4.4	4.2
9	4.4	4.2
12	4.5	4.9
15	4.4	3.9
18	4.6	5.0
21	4.6	5.0
24	4.4	4.4

# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH 48

PROPERTY NUMBER: GJ-03190-RS  
HOLE NUMBER: 48  
LOCATION: 424387



Depth (in)	Apparent Radium-226 (pCi/g) Undeconvolved	Apparent Radium-226 (pCi/g) Deconvolved
3	31.0	31.0
6	54.7	110.2
9	47.2	65.7
12	29.3	15.1
15	19.4	11.8
18	13.8	13.8

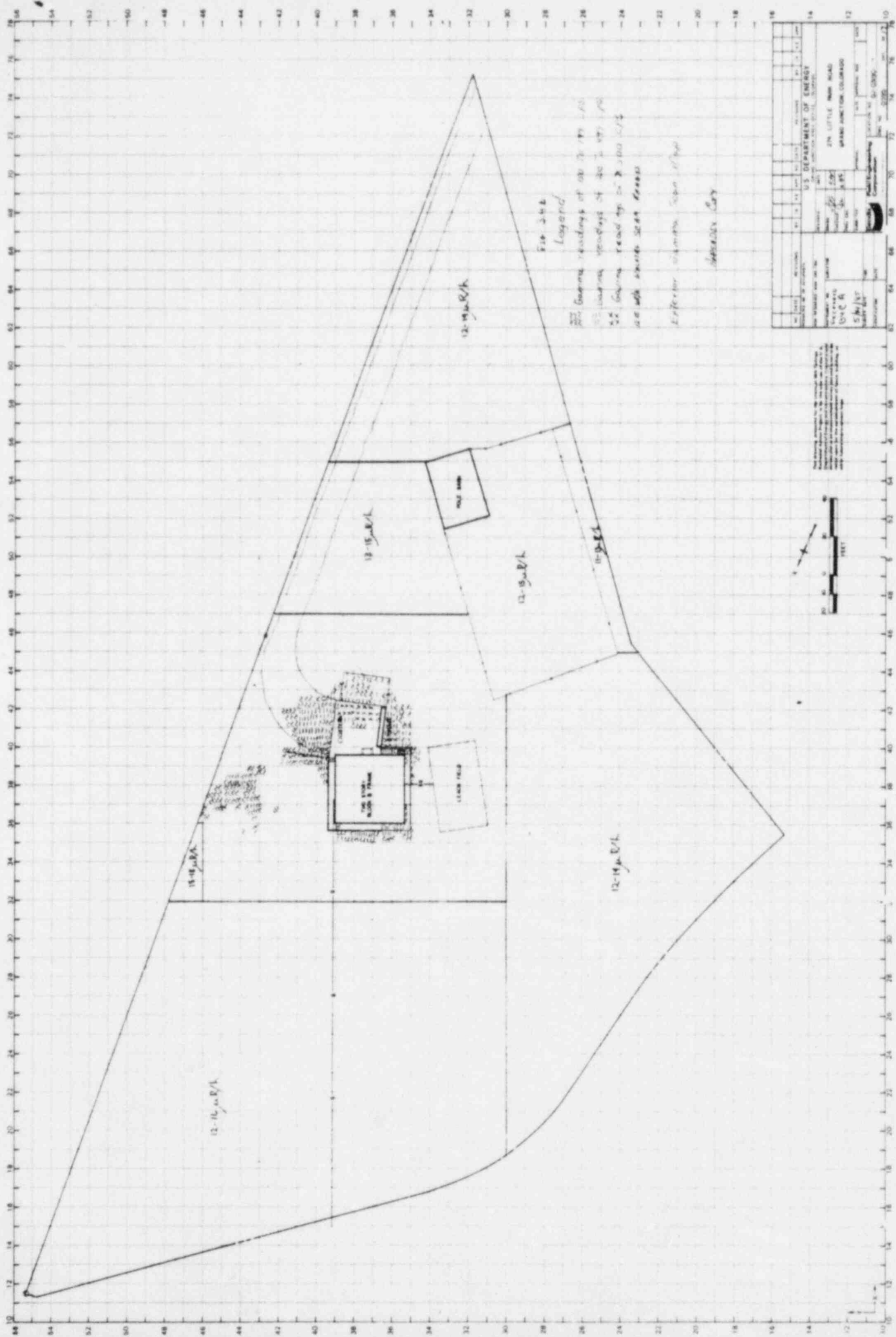


Fig. 3-4-6  
 Legend  
 12-16 E/L  
 12-15 E/L  
 12-14 E/L  
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U.S. DEPARTMENT OF ENERGY	
OFFICE OF NEUTRONICS	
27th LITTLE ROCK ROAD	
GRAND JUNCTION, COLORADO	
Project: 12-16 E/L	
Scale: 1" = 100'	
Date: 12-1-66	
By: J. C. R.	
Check: J. C. R.	
Title: 12-16 E/L	